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CREATIVITY, GARFIELD AND AI:

USING AI TO ENHANCE OUR UNDERSTANDING OF COMICS

MA Thesis

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I hereby confirm that I am the sole author of the thesis submitted. All the works and conceptual viewpoints by other authors that I have used, as well as, data deriving from sources have been appropriately attributed.

Jonna “Jon” Karvinen

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CHAPTER 1: INTRODUCTION

1.1 SO WHERE ARE WE? – THE GOAL OF THE THESIS

Figure 1. *Garfield* by Jim Davis, https://garfield.com/comic/2020/03/26. Accessed March 26th 2020.

Speaking analytically about the medium of comics is like running in the 110 metre hurdles; you may move forward at a great speed but one misstep will bring you down and blow your entire argument wide open – the field of academic comics research, even a few decades in, still feels comparatively new and you cannot always count on the applicability of concepts from other strands of cultural studies to its object of study. Until very recently, comics theory and scholarship largely revolved around the simple question of how to define the term 'comics' (Groensteen, 2011, 14). However, with different new theories and recent scholars redefining the field, a short introspective is needed to examine what is required for the advancement of academic discourse on comics.

To outline my reasons for choosing to investigate this particular topic, my interest in comics has been with me since childhood. Like many Finnish children, I learned to read from the weekly *Donald Duck* magazine and soon expanded my horizons, consuming comics from all around the world by the late teens. I found the wonderful worlds laid out on the pages and screens riveting; a chance to let my eyes explore wild new stories and worlds that someone else had created. Yet their motivations and intentions escaped me; leaving me wondering, as I grew up, about the possible alternative ways of reading comics, and whether it was possible to delineate and explain the formulation of an interesting comic. The stigma of comics being seen as primarily children's media along with the tacit understanding that adults should have moved on from illustrated books

and comics to 'real' books as they matured, is still repeated in light discussions about comics as well as mentioned in comics theorist Scott McCloud's magnum opus *Understanding Comics* (1993, 140). Comics being part of art and culture discussions is vital and needs more attention. In comics theory-related discussions I took part in, it felt like most of the debate revolved around the definition of the medium; not on the inner workings of actual comics or which analytical tools should be used to study them. In 2013, I first delved into this issue, writing my BA thesis about the possibilities of comics in innovation. Subsequently, I have accumulated suitable background knowledge in the field of comics and, wanting to continue in the same spirit, I can confidently take the vital step towards investigating comics from a scholarly point of view in this MA thesis.

Furthermore, having become a comic artist myself I understood what needs to be considered in creating a basic comic to make it comprehensible for even those who do not read comics regularly. Another key moment in the prehistory of this thesis happened in late January 2019 when I attended the 8th Winter School of the Estonian Graduate School of Culture Studies and Arts called *The Humanities and Posthumanities: New Ways of Being Human*. The discussions and lectures at this workshop, combined with my previous experiences, including classes on robotics I had attended during my BA studies, gave me the final push to move towards the technology-oriented approach to culture and art; to pose the question, whether a machine could have the capability to create comics and if so, what kind? After the winter school, the use of AI – algorithms, machine learning, and the capabilities of machines when working with people – stuck with me as a new field of study which needed more research on its potential applications to art and culture. The knowledge gained from these classes and the winter school workshop combined with my childhood interests together gave me the knowledge base and desire to write my MA thesis about comics and AI.

The moment that robots and artificial intelligence are mentioned, humans feel a certain disquiet. Popular culture causes thoughts of Skynet from *Terminator*, HAL 9000 from *2001: A Space Odyssey* and the malevolent programs of *The Matrix* to flood people's minds. In reality, robotics and AI are not in any position to threaten humanity on their own; instead questions over the use of AI by humans themselves are far more commonplace. Who would benefit from this? How would it benefit humanity? Does it

need to? Capitalists clearly have a great interest in the utility of artificial intelligence for studying people's online behaviour, so that they can create algorithms and neural networks to streamline decision making and affect consumer habits (Stephen, "AI Is Changing Marketing As We Know It, And That's A Good Thing"). And yet, the world of arts and culture is yet to try using AI when exploring works of art, to attempt to analyse the motivations and inspirations of the artist; instead, it is only used for surface-level analysis. AI is widely used to understand how art is viewed or consumed, by examining what kind of art pleases people the most; this then translates into the kinds of art that are recommended to these people. This is discussed by Lev Manovich in his book *AI Aesthetics*, which showcases how AI can be used in audience studies now as well as outlining the future for it (Manovich, 2018, 408). The process does not necessarily focus on the art itself, only how it is consumed. Breaking down and understanding AI is a task which I understand to being a huge undertaking in the school of humanities; it requires comprehending thought processes and models which are mostly only present in the field of post-humanities, and sometimes the concepts addressed are closer to social sciences. Yet implementations of AI are all around us, affecting our standards of beauty, what music is recommended to us, what photography we view and how we might think about AI in the future (Manovich, 2018, 75). AI is here to stay, already having become an integral part of our culture.

Uttering the name Garfield stirs a lot of emotions, one way or another, among those who have ties to the field of comics. Generally, the *Garfield* comic strip by the American comic strip artist Jim Davis, ubiquitous in newspapers around the world, is not considered to be a work possessing great artistic merit; in fact, there are multiple examples that point to it being regarded as anything but. A multitude of reinterpretative memes exist, ranging from the Lovecraftian horrors of *I'm Sorry Jon*[1] to *Garfield Gameboy'd*[2], in which the orange cat's love for lasagna has been taken to horrible extremes, to the widespread *You Are Not Immune to Propaganda* reaction image[3], which mocks people's inability to recognise marketing ploys using an image of *Garfield*. In the comics insiders' circles, jokes about the predictability and over-familiarity of this 42-year-old juggernaut of newspaper strip comics abound. However,

[1] https://www.reddit.com/r/imsorryjon/ (Warning! Graphic content!)
[2] https://www.youtube.com/watch?v=tDqUDt3K5Mk (Warning! Graphic content!)
[3] https://knowyourmeme.com/memes/you-are-not-immune-to-propaganda

such familiarity also offers new and unexpected opportunities for analysis. The goal of better understanding comics and their core characteristics could be partially achieved by using means which are, perhaps, viewed as unconventional but promise to be rewarding, such as leveraging the growing use of artificial intelligence, or AI, in everyday life.

The initial research questions of the thesis seek to address comics and AI; the abilities of the latter and how they can, in their current position, further the study of the former. The primary question is whether AIs have the means and measurable capabilities to create comics-related imagery that is feasible for analysis on its own. The secondary question is whether the AI which is generating imagery creates something that a human user could not, showcasing something that otherwise would not exist. And so, the goal of the thesis is to examine the capabilities of these AI-produced visual narratives and, by analysis, measure if the methods and analysis used could help to understand how human artists themselves create comics. This is achieved by studying and analysing comic strips and comic art produced by different creative uses of an AI or algorithm. As comics have been discussed in a more academic setting within the Anglophone world for close to thirty years now, they can be used to study various phenomena in different fields (Miodrag, 2013, 3). The language, the art, and the storytelling capabilities of comics can be placed under scrutiny, and actionable data can be learned by understanding the end results. Another key element in the argument of the thesis is to understand the concept of creativity. I will examine the capability of different artificial intelligences to create and innovate within the world of comics. This analysis is performed by examining the comic strip *Garfield* and reviewing whether using different algorithms upon the source material created different meanings for the comic strip, or if they made the comics funnier in any way; then I question how and why any such effects have been achieved. I also examine whether this methodology can teach us more about comic strips and their formulation in general.

Chapter 1 focuses on the outline of the topic, introducing the basic terminology as well as explaining the basics of the comic strip *Garfield*. The overarching hypothesis for this thesis is that AIs are not necessarily creative on their own, but can support human innovation and help in the betterment of the visual and linguistic arts by creating transgressive art. The theoretical knowledge base of this thesis comes from discussing two disciplines; computational creativity and comics scholarship. Both subjects are

broad and varied but I hope to give an overview of the core themes, goals and current development of the multi-layered disciplines. This will be achieved in **Chapter 2** of this thesis: the theory chapter, examining the aforementioned two disciplines. Trying to come up with a specific formula for creativity is a discussion that is to be avoided (Boden, 1990, 29). Creativity has been debated intensely; traditionally it has been treated as if it was purely *ex nihilo*; born out of nothing. This suggested a divine element to creativity, shrouding it in unpredictability which makes it an academically unstable tool for analysis (Boden, 1990, 2-3). The set of rules required for any analysis and definition of such a chaotic phenomenon as creativity have been lacking and subjective.

The current status of the comic strip is subjected to deeper analysis in **Chapter 3** which focuses on the subject matter itself: *Garfield*. Could algorithms breathe new life into this seemingly moribund comic strip? And if it does or does not, what in turn does that tell us about *Garfield*? There are provided three different case studies divided into two camps, alongside the original *Garfield* comic strip series; these will be discussed and evaluated using adequate techniques and tools, the specific method of which will be described in the chapter as well. The case studies are all experimental works created online by different private individuals. Some of the comics analysed were produced by me using different generators (when provided); others utilize comics or panels that the creators themselves have created to showcase their work. The first case study focuses on text generation, the second and third showcase two separate image generation systems with different end results. **Chapter 4** concludes the thesis by going over the findings of the previous chapters, and briefly sets out possible paths that would allow the work to be developed further.

1.2 TERMINOLOGY AND GARFIELD 101

The thesis will discuss concepts that people more inclined to the humanities might not be as immediately familiar with. This subchapter aims to introduce some basic terminology and abbreviations that will be used throughout the thesis, as well as giving a short introduction of what exactly *Garfield* is.

Artificial intelligence (AI), machine learning (ML) and deep learning (DL) are three terms used (often quite interchangeably) to describe software that behaves intelligently. Intelligence is another loaded term which lacks a standard definition that would satisfy any debate, but in the case of AI, it refers to the program's ability to make decisions, come to conclusions and think logically; all this happens independently and in service of creating the 'right' result, given the knowledge that the program possesses at the time (Russell, Norvig, 2016, 1-3, 36-37). However, the three differ from each other and that difference needs to be understood for further discussion. The concept (and the difference between the three) can be understood better if you imagine the three as a set of matryoshka or Russian nesting dolls, beginning with the smallest concept, deep learning, and working outward. As defined, deep learning is a subdivision of machine learning, machine learning is a subdivision of AI, and AI is an umbrella term for any computer program which acts intelligently. To put it simply, all machine learning is AI, but not all AI is machine learning. The term AI is used in this essay when a framework uses more than one algorithm to act, and the term algorithm is used when a singular process works independently.

Artificial intelligence itself consists of a set of algorithms which are designed to function in parallel with human intelligence actions such as image recognition, decision-making, language translation and, in an ideal world, creativity. Generative Adversarial Networks, or GAN for short, are algorithmic architectures which pit two different neural networks against each other. In layman's terms the two programs consist of a generator which creates new data by breaking down the original data into abstract basic blocks, and a discriminator that checks all newly created models to determine if they are fake or real. This process repeats itself until the generator beats the discriminator, which in the process learns to distinguish the generator's fakes better (Goodfellow et al., 2014, 1). After enough training, these newly generated packets of data will then be capable of passing for real data. GAN was introduced in 2014 and is employed in the generation of images, video and music. The technological details are kept to the surface level in this essay; speaking in abstraction is more useful for the purposes of the thesis as going any further into detail would distract from the topic of creativity and *Garfield*.

Garfield is a comic strip created by Jim Davis which first made its debut nationwide in the US on the 19th of June, 1978 in 41 separate publications through print syndication.

The comic focuses on the antics of Garfield, an orange tabby cat who lives with his owner Jon Arbuckle and Jon's dog Odie. The comic is published seven days a week, building to a body of over 14 000 individual comic strips over four decades. The comic strip is still continuing strong as it enters the year 2020; when *Garfield* celebrated its 40th anniversary in 2018, the comic strip was running in 2400 different newspapers with a readership of well over 200 million people (Garfield by Jim Davis). Among its many achievements is the record for most syndicated comic strip in the world (Senda). The strip is a widely-known phenomenon that has been translated into multiple languages.

But what is *Garfield* about? The main character of the strip is Garfield, a fat, orange cat drawn in a simple cartoon style; the comic strips are plainly but brightly coloured. Most commonly in the strips, Garfield spends his time on an elevated platform of some sort – usually the living room table, kitchen counter, or the bed – interacting with Jon, Odie and less regularly with any other member of the cast, which includes (or has included) Jon's friend Lyman, Jon's girlfriend Dr. Liz Wilson, and the other cats Arlene and Nermal. Typical interactions usually revolve around Garfield being a cat, his laziness, his love of food, his hatred of Mondays, his age and being fat. The juxtaposition in the character of Garfield comes from the fact he is not quite like any other cat. He watches TV, drinks coffee, and enjoys lasagne. The absurdity of Garfield as a character draws attention due to his uncanny nihilistic approach to life and the power he holds over his owner Jon. Garfield's dry comments and his capricious whims find a victim in the form of Jon, who is alternately amused and annoyed by Garfield's antics.

The aim of this thesis is not to discuss the definition of comics but the current state and direction of the comics scholarship. Tackling the discussion of *what* exactly a comic is would need its own thesis. For the purpose of clarity, the term *comics* will be used throughout the essay when referring to a sequential graphic work whatever its subgenre or the form it takes: it can be a graphic novel, comic zine, underground comix, manga, or a comic strip that is only one or a few panels long; all will be referred to in this thesis as comics unless clarification is needed for context. The term *comic strip*, meaning a short three or four-panel comic, will also be used when discussing *Garfield* or any similar comic that might fall under that category.

CHAPTER 2: THEORY

2.1 INTRODUCTION

As the use of artificial intelligence, or 'AI', has amassed more public interest and users of the technology have developed more creative applications, there has been a rise in the number of studies focused on the abilities of AI and different models of neural network. The purpose of this chapter is to introduce and discuss the theories and frameworks that will be used in the later chapters and subchapters of this thesis, while to a smaller extent also examining the historical background and the circumstances in which they appeared. The two fields that pertain to the topic of this thesis – computational creativity and the medium of comics – are broad, and I will focus on discussing only the directly relevant main theories and the developments of the fields that pertain to the analytical part of the thesis.

First, I will discuss AI and the multidisciplinary attempts to discuss creativity in artificial, man-made environments; this field has accordingly been dubbed *computational creativity*. The latter part of this section will dissect the field of comic theory and examine the current scholarship, examining how the medium of comics is discussed and what methodologies are applied to the field itself. The focus will be on the development and particular interests of European comics discourse.

2.2 COMPUTATIONAL CREATIVITY

The development of AI is affecting how we see culture and what its future will look like (Manovich, 87, 2018). No field has been untouched by the development of AI, even if that effect manifests in different ways: for example, in biomedical research, the implementation of AI could become an important asset for work; specifically, it could help overcome challenges where the cognitive limitations of humans can halt progress and development of long-term solutions within different important processes (Kitano, 2016, 41; 45). All these prospective developments demand initial resources and tools in order to understand how and why AI does what it does. But how does computational

creativity fit into the picture? Simon Colton and Geraint Wiggins define computational creativity thusly:

> The philosophy, science and engineering of computational systems which, by taking on particular responsibilities, exhibit behaviours that unbiased observers would deem to be creative (2012, 21).

Computational creativity tests AI's ability to create these behaviours, and studies the processes it employs to see how these creative processes take place. The first major issue with this potential ability already lies within the second word in the name of the discipline itself: creativity.

There are not any straightforward, universally applicable explanations of what creativity actually is. It is a concept still somewhat shrouded in mystery; an enigma which for which most answers might elicit purely anecdotal explanations. As it is, most definitions are concerned with the exemplary achievements that the use of creativity should result in. "We can know more than we can tell" is a concept which has come to be known as Polanyi's paradox (named after the philosopher Michael Polanyi). This idea predates the computer era but in it you can see the roots of the high hurdles that artificial intelligence would have to overcome in order to gain legitimacy in many people's eyes. The tacit knowledge humans hold is often hard to transcribe into written or spoken works. Indeed, most of the literature on AI and computational creativity begins in this way, with the scholars recognising the immense task ahead of them. From a purely scientific point of view, [being] creative could be described as the "hashing of old ideas in a novel way" (Boden, 1994, 75). Robert E. Franken, the author of the book *Human Motivation,* defines creativity as "the tendency to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems, communicating with others, and entertaining ourselves and others" (1994, 396). The Hungarian-American psychologist Mihaly Csikszentmihalyi tells us that "Creativity is any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one...What counts is whether the novelty he or she produces is accepted for inclusion in the domain." (1996, 27-28). Similar allusions are made by Robert W. Weisberg, noting that a novel idea must have value or "be appropriate to the cognitive demands of the situation" (1993, 4). Dictionary definitions for creativity tells us that "the ability or power to create" is, in essence, "to bring into existence" (Merriam-Webster Dictionary). All of these definitions, of course, consider only humans as the

possible actors of creativity; simple as they are, they cannot capture every facet of the *de facto* understanding of the word. Such limited explanations seek to leave out very mundane activities and so underline the uniqueness and novelty which creativity has always had associated with it.

The definition of creativity already being a delicate subject, then, means that the addition of the aspect of artificial intelligence to the discussion induces a certain amount of anxiety to many, since creativity is treated in their eyes as the "final frontier" of what makes humans unique compared to mere machines and software (Colton et al., 2012, 25). The first to unite, and bring a credible framework to, the field of computational creativity in a way which stirred widespread conversation was Margaret A. Boden. The comprehensive study of creating evaluative frameworks for computational creativity had its beginning when Boden opened up the discussion in 1990 with her book *Creative Mind: Myths and Mechanisms*. The book has now been around for close to thirty years; the theories presented by it remain extensively referenced to this day and are a widely accepted reading of the concept. It is also Margaret Boden who delves the deepest into the topic, leading to her being the most referenced author in the field; she discusses the nature of creativity and how it can manifest, analysing these manifestations in three distinct ways. Due to the concise nature of her work, she did not seek to clarify most of her goals extensively but rather laid out a framework for future discussions which she later expanded on herself with a new edition. In this more recent 2004 publication, her core ideas remained the same, albeit with more detail provided. The reason that the literature reviews on computational creativity largely revolve around the book *Creative Mind* is due to it having been central to the discussions of the subject ever since its release, alongside a multitude of other works referencing Boden's volume.

At the beginning and centre of Margaret Boden's entire thesis sit four questions that she dubbed the Lovelace questions in honour of Ada Lovelace, the world's first computer programmer (she wrote a machine algorithm in 1843). The four questions are as follows (Boden, 1990, 6-8, 10):

- Can computational ideas help us understand how human creativity is possible?
- Can computers ever do things which at least appear to be creative?
- Can a computer ever appear to recognize creativity?

- Can computers themselves ever really be creative?

The other reason that Boden named these questions thusly is because many, both laymen and scholars, would give a negative answer to all four questions (Boden, 6). This reasoning stems from Ada Lovelace's quote about the Analytical Machine, which still rings true to this day: "It can do [only] whatever we know how to order it to perform" (Bowden, 1953, 398). Boden notes that it is a quote often deployed too quickly when used against AI in regards to intelligence & creativity. According to her thesis, the last question will always have "no" as its answer, but that does not necessarily mean that the other three will have negative responses (Boden, 1990, 7-8).

The biggest contribution of Margaret Boden comes from her concept of transformational creativity, which examines more deeply another divide which she set for both humans and AI to consider: H-creativity, short for Historical Creativity, and P-creativity, short for Psychological Creativity. P-creativity means coming up with ideas that are new specifically to the person who imagines them (Boden, 1990, 32-33). Any previously existing iterations of the idea do not matter, nor the number of those iterations, so long as it is new to the person who came up with it. It is humanity in action: ideas and revelations are constantly rediscovered by different individuals and the meaning as well as the impact of those repeated ideas still remain. For a new idea to be accepted as H-creativity, it means that no-one else has had that particular idea before; that it has not been recorded in any history book or patent office ever before, leaving the impression that this particular thought has happened for the first time in human history. Boden's remarks concerning H-creativity and P-creativity seem somewhat redundant but the idea that P-creativity surrounds us constantly as a series of acts of non-historical discovery is a blessing for any prospective creative agent, whether human or machine; it is not limited by trying to achieve absolute uniqueness but instead is achieving creativity by deploying different variations to transform a space or a subject within that space. This also suggests that H-creativity inevitably becomes absorbed as P-creativity, so the prime focus of creativity studies should be on P-creativity, as any system is independently capable of producing novel ideas.

Through different methods of observation between the years 1990 and 2004, Boden came to the conclusion that there are three different means in which creativity happens which can be then categorised into observable models (Boden, 2004, 3). This applies

not just to a specific field of arts, humanities or sciences; instead, these forms of creativity are present in normal, everyday life. According to Boden, creativity presents itself through these three ways: combinational creativity, exploratory creativity and transformational creativity (Boden, 2009, 3). These three types all differ from each other in how ideas and conceptual spaces are utilized. I will give a brief description of how these three different creativities differ from each other.

In combinational creativity, already known ideas which are associated with each other are combined to produce a whole new set of ideas. This combination happens within a conceptual space – a structure of ideas. Boden gives examples of a conceptual space for these types of creativities and what they could be, varying from how molecule structures are presented in chemistry to different music genres or art styles (Boden, 2004, 4). Combinational creativity in particular depends on the rules and boundaries of the conceptual space. Looking through the different possible styles shines a light on how expansive creativity actually is when examined through a scientific lens. Combinational creativity is the type that is most often associated with creativity when trying to provide a definition, as well as the area of creativity which has been studied the most (Boden, 2009, 24). Combinational creativity deals with unfamiliar combinations of familiar ideas or with making new associations between ideas which were previously only linked indirectly, within some defined domain.

In exploratory creativity, the already prevailing guidelines of the conceptual space are used to produce inventive concepts that might not have been realised before the creative exploration happened (Boden, 25). The space itself does not change. This principle of creating new ideas within a conceptual space occurs in both combinational and exploratory creativity; despite the greater focus on studying the combinational, exploratory creativity likewise relies on a culturally defined style of thinking. It is, however, more restricted as it is both more defined and constrained by a set of rules. This concern with structure can be seen with any word string generated following the English syntax to create a grammatically acceptable English sentence. So in exploratory creativity, the person moves through the established conceptual space, exploring it to find out what can be achieved within its limits. Exploratory creativity, as the name implies, explores the space it is limited by rather than escaping it, which leads us to Boden's third type of creativity.

Transformational creativity differs from the previous two types of creativity. It does not create an entirely new space to explore, but variations of both ideas and the initial space itself create something that is original but might be seen as difficult to accept or even impractical initially (Boden 2004, 3; 2009, 4). The variations on the space may not create a whole new system but they can change it radically, questioning the fundamental ideology and practices of the field. In transformational creativity, one of the defining dimensions (such as are present in exploratory creativity) simply does not exist, allowing the generated ideas to go beyond the realm of the designated area. This sort of creativity can result in misunderstood geniuses whose work might be hailed as revolutionary only long after their time. The fundamental difference in the results compared to the starting point makes this branch of creativity highly valued, as it opens up new spaces such as the invention of the printing press, photography, Newton's laws of motion etc.; indeed, any sort of field that has opened up new possibilities allowing creativity to thrive. From these definitions, it is clear that the lines between the three models can sometimes be inconclusive, and it is not immediately clear which of the three forms of (human) creativity would be the easiest for artificial intelligence to emulate. Even if we conclude that creativity is not magic but an observable event, it is still not immediately obvious that it could be mimicked by the particular types of models offered by AI. Modelling creative processes is a difficult task.

Boden's division of creativity into these bite-size pieces admittedly seems to put the entire concept of creativity, as discussed previously with the basic definitions, under debate. The conclusion occurs that creativity is a value which can be discussed only as relatively broad definitions; that there is no real scale of measurement, no initial starting point. Boden's divisions are to a certain extent artificial; the clinical approach is a refreshing and comprehensible one, yet works purely on a meta-level. Despite this, they reflect tell-tale signs of the complicated matters that the field has to tackle before even discussing the computational side of the issue. Boden argues for creativity being an aspect of basic intelligence as it depends on the ability to think, to see, to hear and recognise correlations between different variables (Boden, 245; 257). Creativity is then a series of events that can potentially be tracked or even predicted (1990, 217) which then ties it back to Boden's divide of P-creativity and H-creativity. Striving for H[istorical] creativity is what people dream of, Boden calling it "the sexiest of the three

types", but it is also a goal that is hard to reach (Boden, 2009, 25). This would explain humanity's interest largely focusing in seeing AIs and different neural networks performing in ways that exceed our own abilities, as anything else feels like the machine has failed; however, this is not the reality of computational creativity. As previously discussed, the purpose, and the best use, of computational creativity is rather to help recognise and measure human creativity and aid us in understanding how human creative processes might work.

Wiggins discusses computational creativity in further detail in his paper *A preliminary framework for description, analysis and comparison of creative systems,* written in 2006, sixteen years after Boden's landmark work. In it, he insists that the question of what exactly AI is trying to emulate cannot be ignored. In contrast to Boden, Wiggins does not see transformational and exploratory categories as different categories, noting that transformational creativity is just a metalevel of exploratory creativity (Wiggins, 2006, 454). His model codifies the concept of an exploratory search, using *U* to define the space, with *R* (rules) and *E* (evaluation) being explored by *T* (method). He argues that this takes away the need for particularly rigid rules and allows for even more definitions (2006, 457). Despite these differences, both scholars still use the same terms and discuss their ideas from the same basic point of view; they do not hold any truly contrasting opinions. Wiggins's framework supplemented Boden's theory by expanding the potential reach of computational creativity. The best framework in which to study the formulation of visual arts, though, is combinational creativity. The way in which it operates retains an element of surprise as the domain remains constant, but the possibilities within that given domain and area are limitless. Transformational creativity may be what we as humans might strive for, but by attaining a basic understanding of a system, it helps us to identify and describe why certain choices take place within a creative process. The pitfall of such a purely analytic approach (with no understanding of how factors are measured) to the arts is that it runs the risk of devaluing the resultant created piece or oversimplifying how the process is seen; the analytical knowledge lacks any trace of mystery or wonder at the creation process (Colton et al, 2012, 24). Yet the potential benefits of the analysis would still be great: it gives the process context which is important for understanding influences upon creativity, identifying factors such as the surrounding culture and political environment.

How does computational creativity appear in practice within the field of visual arts? Boden remarks that looking at AI and machine learning-assisted visual arts aids in answering the first Lovelace-question in particular, help us in understanding our own creativity (1990, 135). Currently these applications are used in lesser creative systems such as GANs (generative adversarial networks) to model independent artistic operations of AIs and to examine the application of different machine learning models to the creation of art for the purpose of showing off what the systems are capable of. A set of exemplars, laid out to be executed by an algorithm or set of algorithms, create an output which reproduces a mimicry of what humans would call true creativity. Machine learning techniques fall short in layman's eyes; their actions seem nothing but imitation rather than genuine creativity. Expanding on what machine learning is capable of by expanding the capabilities of the algorithms is one of the desired ends of the process. This includes discovering ways to help existing models of machine learning (ML) learn data in different ways within the same environments, producing an example of combinational creativity (Riedl, "Computational Creativity as Meta Search", 2018). What machine learning requires first and foremost is varied data that can be used for further analysis using the tools available. This data can be acquired from human created artefacts as well as already existing AI created art.

The most well-known independent programs include AARON, designed by Harold Cohen in 1973, and Painting Fool, designed by Simon Colton, which debuted digitally in 2001 (The Painting Fool, "About Me…", 2001). Cohen's AARON in particular is envisaged as a long-term project; experimentation with the AI and teaching independence to AARON has lasted over forty years thus far, always using real paper and paints; it took until the year 1995 before AARON had learned to incorporate colour into its works (Garcia, "Harold Cohen and AARON — a 40-year collaboration", 2016). Like a human artist, AARON has developed a style and seems to stick to it, which is valuable in itself, although in theory the system should be able to do better. This shows that a general knowledge of the world, of different art styles and objects, is needed before anything novel can be created (Boden, 1990, 152), and that creativity in itself is not enough if the skills lag behind. Even a human artist needs reference to learn from while they develop the ability to make something completely new for themselves. And as they have become more sophisticated, AIs, even separate algorithms, now also have that ability to learn.

Nothing challenges the notion of computational creativity more than the cry for originality; in a sense, computational creativity measures AIs ability to adapt. Even as AIs fail to match humans, the contributions they have provided even as of the present are not irrelevant. In a best case scenario, human creativity can be bolstered by artificial intelligence supporting various processes. (Wiggins et al, 2012, 25). The study of computational creativity exists within its natural space, developing online[4] to spread knowledge and advance the discourse surrounding the field, creating a forum in which these ideas can be discussed and developed further.

Both Wiggins and Boden note a reluctance to discuss the aspect of creativity when it comes to machines, because it feels like the final frontier that separates human and machine. Studies of computational creativity could potentially unlock greater understanding of human creativity (Boden, 1990; Reidl, 2018; Wiggins, 2006), but the field still struggles with the frequently asked question: can computers be creative? That question is more philosophical in nature than scientific (Boden, 2009, 33). It is easy to demand superhuman achievements from artificial beings and, if they fail to achieve what would be next to impossible tasks for humans, they are considered to have failed. Considering the struggle to even provide a definition for what creativity, or even intelligence, means makes the work even harder. Having AI and algorithms with different levels of independence also makes the evaluation difficult. Yet there are tasks Ais are clearly superior at; they can work relentlessly while dealing with a sheer volume of data that would defeat a human. The quest for defining and understanding creativity by modelling with machines pushes us towards meta-creativity; in other words, we get creative about being creative.

2.3 COMICS SCHOLARSHIP: WHAT ARE THE RIGHT TOOLS?

The obsession with finding a set of universal elements of analysis that can encompass all comics has plagued comics scholarship for decades. The definition of what constitutes a comic and what characteristics they should have is an ever-present

[4] https://computationalcreativity.net/home/

discussion that seeks to establish concrete dogmas within the field. Setting so-called universal truths, such as describing comics as a combination of word and image telling a single story, set unnecessary limits and only hinder the medium (Miodrag, 2013, 89). These simple definitions leave out a vast field of comics that might not hit the agreed markers, resulting in circular and stagnant discussions over "what are comics". This academic anxiety is what to some extent defines comics scholarship, with different frameworks arguing for alternative takes when there may not be any need to compete to start with. The scholars I have decided to highlight in this theory section all have different takes on a surface level but use narratology as one of their main structural supports. Comics theory and narratology are often tied historically: Groensteen's work, discussed in more detail subsequently, reflects narratology's theoretical roots; before the transmedial era, in narratology guides, comics were the format used to demonstrate the theory (Mikkonen, 5-6, 2017). The catalyst for academic discussion crystallised around Scott McCloud's book *Understanding Comics* following its publication in 1993. Both McCloud and his clear influence Will Eisner (in his 1985 book *Comics and Sequential Art)* focused on defining comics. The discourse in comics scholarship circles has largely moved on from discussing the credibility of comics as an art form. Both Eisner and McCloud were not academic scholars; they were comic artists with strong opinions and theories about the art form. McCloud wished to build his arguments on analysis and observations rather than upon existing theories (Miodrag, 6, 2013). Such *ex nihilo* texts have affected Anglophone comics studies since the early 1990s.

McCloud's theses have been highly scrutinized in the years since, especially by Hannah Miodrag who is particularly scathing about several of them. Her stance is that it is necessary to have a strong theoretical framework, separate from the viewpoint of practitioners, that would address theoretical shortcomings such as those of the aforementioned McCloud (Miodrag, 2013, 251). A given example is McCloud's categorisation of six scene transition types, which run a high risk of simplifying how comics can potentially portray closure[5] or transition (McCloud, 1993, 70-74). Miodrag identified closure, and thus also sequentiality, to be at the core of many scholars' attempts to define the uniqueness and language of comics (Miodrag, 2013, 109). This

[5] McCloud's definition of closure: The phenomenon of observing separate parts but perceiving it as a whole. McCloud has presented this happening in six different ways, with the space between the individual comic panels (the gutter) being an important tool for portraying time and space.

avoidance of singularity in theoretical frameworks is what sets Miodrag apart from the rest of the scholarship.

The tightrope walk between valuable academic discourse and snobbery is precarious; Miodrag steps away from the defensive stance that Anglophone scholars such as McCloud established, elaborating more on the minute details of art and literature which have possible applications in the field of comics. McCloud's now infamous definition of comics, "juxtaposed pictorial and other images in deliberate sequence" (McCloud, 1993, 9) is also seen as outdated even if still recognised as the cornerstone of most current conceptualizations (Miodrag, 2013, 141). It is the notion of sequentiality, the most popular and widely accepted theory which is most efficiently problematized in future writings in the field. In the rest of the chapter, I will focus on highlighting a few authors that have shaped comics scholarship by discussing different approaches to comics theory, beginning with Hannah Miodrag.

As discussion of the medium rapidly evolved and gained popularity, different schools of comics academia formed around the world. The year 2013 was an important one for comics scholars, as the Anglophone world gained access to Thierry Groensteen's book *Bande Dessinée et Narration: Système de la Bande Dessinée 2*, originally published in French in 2011 and published in English as *Comics and Narration*. The aforementioned Hannah Miodrag in her book *Comics and Language: Reimagining Critical Discourse on the Form*, argues that comics, be it the combination of images and text or the framework of *visual language* itself, are not themselves a language (Miodrag, 2013, 13). Her goal is to revise the field's approach to criticism, achieving this by examining how current trends of literary and linguistic criticism in the field ultimately do a disservice to the form and instead pushing for disciplinary reflection. She also focuses on discussing the small amount of analysis which has been produced with regards to verbal language in comics, as well as discussing images and their styles from an art historical context. *Comics and Language* consists of three parts: "Language in Comics", "Comics as Language", and "Images as Language." In each part, Miodrag's approach to the current framework problematizes the existing theory, showcasing through analysis the possibilities that result from shredding away the academic anxiety concerning the uniqueness of comics.

The most essential components, elements that are not unique to the comics form but essential to its functioning, are the collaborative play between word and image that result in a hybrid form, the completed effect of which requires participation from the audience and a sense of sequentiality. Hannah Miodrag's argument lies in the fact that no single verbal-visual interaction can, nor should, represent the full scope of creation that comics are capable of. This aforementioned interplay within comics should be referred to as a *hybrid*, as the term, according to Miodrag:

> …acknowledges that this new whole is formed from two constituent elements, totalities in *their* own right that are ontologically separate entities, and so avoids the problems inherent in positing the form as a 'language,' whose interacting elements somehow override their dual consistency" (2013, 99).

The hybridity, for example, materialises in visualizations of verbal onomatopoetic signs such as POW.

Figure 2. POW! onomatopoeia clip art, https://www.translatemedia.com/wp-content/cache/thumbnails/2014/08/pow-860x9999.jpg. Accessed May 25th 2020.

Using linguistic structuralism to categorise the effect of the bang layer POW sees it lying between both langue and parole depending on the context, as it invokes different possible meanings with subsequent readings (Miodrag, 2013, 103-105). Continuing further with the example of the relatively common onomatopoeia, depending on whether it is typed (in a common, bland typeface) or hand-drawn, the reaction and effect of the visual signifier POW would be different in what it signified and thus by extension, have a different effect upon the reader as well. The different examples of POW can be seen in Figure 2. The example given by Miodrag manages to show how POW is simultaneously visual and verbal yet at the same time neither, as well as the

implied possibilities of using different semiotic systems. This also shows up Miodrag's interest in using Ferdinand de Saussure's semiotics for one of her main arguments, pointing out how the two different semiotic systems should remain separate and distinct when analysing words and images (Miodrag, 2013, 8-11). Such a collaborative approach to studying comics adds both context and more levels for analysis.

Along with Miodrag, Thierry Groensteen is a heavily referenced author within the field of comics. Comics compel the reader to engage with the narrative; they cannot help but to take in the whole scene in front of them at once, while individual panels contribute information inside the larger unit which is the page. Miodrag pushes this aspect with her focus on the previously ignored status of language as an intrinsic part of comics, explaining that on the two dimensional page, these multiple panels exist simultaneously and provide a non-linear window into the narrative (Miodrag, 2013, 143). She also points out the "visualization of words that precludes the easy dissection of the visual and verbal" and notes how these co-present comic panels can simultaneously "participate in webs of interrelationship that violate narrative sequence*"* (2013, 101, 111-12). In his book *Comics and Narration,* Groensteen focuses on the role of narratology (especially as regards perspective and point of view) as a way to study and understand the structure and rhythm of comics (Groensteen, 2013, 24; 96). Comics still hold a certain point of view and can create subjective imagery (2013, 84), but gain context by existing within a particular space in a certain way, the meaning accumulating as the comic is read.

This places Groensteen in the same position as Miodrag as an advocate of context. Groensteen further specified her point, explaining that this method of telling a story, plurivectorial narration, is possible in the medium of comics in particular as subsequent panels encourage the reader to return to prior panels due to retroactive causality; new information forces the audience to reconsider their interpretations of the narrative thus far (Groensteen, 2013, 111). It is a useful way to distinguish comics from any other art-form which uses narrative sequences, eg. film studies, by making clear the multiple temporal possibilities that comics allow compared to film. Groensteen sees rhythm (and the deployment of the multiframe) as the key to understanding the multi-faceted issue of the hybridity of comics; focusing on it as a potential core component for comics theory is consistent with the stress on context. The choice of placement of the panels and

different narrative interruptions work to emphasize different visual components such as graphic style, use of colour, or the subject and its meaning (Groensteen, 2013, 135). The rhythm of the comic differs from the passage of time in the narrative; time may move at a speed dictated by the narrative, but the rhythm is about the time intervals created by the interplay between the panelling, words (or lack of) and images (or lack of) (2013, 149). This aspect of time is discussed in greater detail by the next author, who also helped to build and study the base for comics theory.

Neil Cohn's book on the cognition of sequential images, *The Visual Language of Comics*, also emerged in the year 2013. Miodrag and Groensteen focus on comics as a network, which is an idea advocated by and credited to Groensteen, one that supposes that each panel connects with every other in a comic. In contrast, Neil Cohn's interests lie in hierarchical sequencing and panel closure. In his book, Cohn's main proposition is that a definite visual language and lexicon does exist in sequential, drawn structures such as comics. The elements which form visual language include morphology, lexical items with divisions into bound morphemes inside visual affixation, and different panel constructions (Cohn, 2013, 24; 52-53; 65). This leads to the ability to decode sequences in a codified manner which would greatly help the study of narrative structures in comics. Narrative elements are again elaborated on, Cohn discussing how dissecting them into different pieces produces different meanings; the reader decides for themselves how time and place are depicted if no other defining features are provided through graphic style analysis or written language (2013, 68). By dividing and giving grammar to visual language, Cohn brings attention to the fact that we cannot assume readers naturally understand page and panel layouts if they differ from the Z-path which is dominant in Western comics (2013, 92). It plays into the cohesion level of the piece as a whole; a disturbance in the flow could accidentally pull the reader out of the diegetic world of the comic. To draw similarities back to Hannah Miodrag, Neil Cohn is also interested in Saussure's linguistic unit theory; yet his focus is not on reducing the visual units into measurable parts (Cohn, 2013, 24). Pushing for a recognised grammar yet not wanting to reduce it down to smaller parts feels like an oxymoron that underlines the fact that Cohn's theories alone are insufficient to analyse comics.

Outside of these three authors, the rest of comics scholarship moves between the two camps, either expanding on Groensteen's system or clinging to a strict promotion of

sequentiality and seeing the definition of comics themselves as an important issue. Different scholars focus on particular issues. For text analysis, an Italian scholar named Mario Saraceni is a big proponent of cohesion between the graphical and verbal elements of comics, this relatedness occuring through the repetition of elements, collocation and closure, or inference where the reader fills in the blanks themselves (Saraceni, 2016, 119-123). It aids in the understanding of why and how text is perceived in comics, and the theme of context and cohesion continues into the study of visuals. The study of graphic style comes from Pascal Lefévre, who asserts that coherency, within the medium's diegetic world, is what ties and affects all qualifications of theory as singular panels cannot function in isolation (2016, 74). His list of stylistic elements includes detail, deformation, line, distribution, depth, light and colour. Graphic style, being only one part of the comic-reading experience, should be consistent and maintain the illusion of the world the comic creates. The need to streamline comics theory might have arisen from the need to claim legitimacy for comics, but it can only lead to a reductionist view. The English translations of French, Italian and German scholars have added substance to the academic canon, providing more background and clarifying which approaches are overwhelmingly popular, helping future scholars to focus on developing different fields of study within the comics medium.

A case against narrativity also arises when the subject of hybridity and abstraction is discussed. Advocating in his own way for plurivectorial reading is Andrei Molotiu in his essay discussing abstract comics. Like Groensteen, he promotes rhythm as a core component of comics theory (Molotiu, 89, 2012). He too delves into the question of just what comics are, another sign of the ever-present anxiety surrounding the medium, as he discusses Scott McCloud's definition of comics as well as Robert C. Harvey's forced definition regarding one of comics' essential characteristics being the interplay of word and image, underlining how neither word or image make complete sense without the other (Harvey, 1996, 8-9). Yet the abstraction of comics allows space for the reading of comics which do not take place in any sort of diegetic space. These types of medium-specific methods are examples of case-by-case implementation; they are not meant for all analysis methods.

The basis for the framework of comics analysis began from the definition of comics but has continued to grow into an interesting and varied field of study. The theoretical

framework for comics contains different perspectives from which to approach the discussion, those of Hannah Miodrag in particular. Her language describing the different potential approaches is colourful, cautioning against moving different discipline paradigms (e.g. art criticism, visual theory and narrative theory) into comics wholesale (Miodrag, 2013, 220). This would lead to the usage of more varied, visual, literary and linguistic theories, although Miodrag stresses the importance of both verbal and visual signification, insisting that both be considered separately. This approach is quite bold, dissecting the hybrid form yet suggesting this approach from different theoretical angles to produce new meaning and potential angles for comics scholarship that may yield different, or even directly contrasting, results. This all serves to further the field of comics theory. The framework Miodrag suggests is an amalgamation of different disciplines coming together, as she urges scholars to treat different elements of comics as needed by applying literary analysis to language and art analysis to visuals. She reiterates, though, that the import of different disciplines cannot happen wholesale (2013, 220), instead, curation and consideration of the proper elements is what helps comics theory and scholarship to move forward.

Most of Hannah Miodrag's criticism towards the existing canon of comics study stems from her disapproval of the application of critical theories to the form of comics. Her disdain towards focusing only on the visual side of comics explores an intriguing side of the medium as she challenges the grasp of sequentiality which has even devoured pieces of historical art, in comics' quest for legitimacy (Miodrag 2013, 108). The metaphor of Russian nesting dolls emerges: the comic page as a unit is interlaced with meaning that cuts through several layers of different elements yet the most minimal units can never be reached (Miodrag, 2013, 245) because the visual elements, and their meaning, are gradated to infinity. The elements from which analysis forms depend upon the tools required by the individual comic. Therein lies the beauty of Miodrag's suggestion: clinging onto a few specific frameworks that depend purely on sequentiality or an emphasis on superficial art analysis can only scrape the surface of the medium.

Of the comics scholars with influence in the Anglophone world, Hannah Miodrag, the translated works of Thierry Groensteen and Neil Cohn maintain the most consistent emphasis on studying narrative time and understanding how cohesion and context move stories forward. The three have their differences in how they see the definition of

language in comics, the role of different styles and what role *langue* and *parole* play. What Groensteen, Miodrag and Cohn all have in common is their advocacy of sequentiality in the form of a back-and-forth moving network that does not move strictly in linear sequence (Miodrag, 2013, 141). Of these three, Cohn's views focus more on hierarchical sequence and how panel structure equates to an organizing principle to form a grammar, whereas Groensteen's and Miodrag's theories place the basic building blocks of comics elsewhere. The idea of these unrestrained transitions, the worry of confusing the reader on a cognitive level and making unnecessary connections, is Cohn's main (yet seemingly purely theoretical) worry. This is what separates the three; Cohn stands alone whereas Groensteen, with Miodrag's agreement, sees that a larger framework is required in order to help interpret the meanings and allusions made within the text (Miodrag, 2013, 134). This all appears to be case-by-case specific, with broader generalisations only making the formation of a basis for comics theory harder. In the final analysis, all see the basis of understanding comics as lying within non-linear reading. Miodrag in particular encourages abandoning the concept of sequentiality and instead the embracing of *networks* when describing how in reality, readers have the power to move through the narrative in either a linear or non-linear manner as long as the cohesion and the rhythm are there to enable the process.

2.4 CONCLUSION: DID ANXIETY RUIN EVERYTHING?

In computational theory, the question of the nature of humanity still governs the different paths that computational creativity might take in order to gain prevalence within the humanities (Colton et al, 2012, 25). Computational creativity orbits around its main scholar Margaret Boden with a few others such as Wiggins and Colton expanding on her theses; their theories allow room for weaker creative systems to help in the analysis of human creativity. Questions of creativity may leave laymen to debate the ethical and moral implications of the field, but rather than trying to discover exactly what creativity is and how it can be replicated, computational creativity provides models and processes that can observe and understand the criteria of creativity when applied to artefacts or ideas, allowing further knowledge to be gained.

In comics theory, cognitive analysis of the art form is making its way towards the mainstream, although it is still, perhaps, Miodrag's book which brings out the most discussion of the topic. Lingering on *what* comics are is a disservice to the field, and moving onwards from that preoccupation is essential before developing and identifying analytical tools. Miodrag's attack on the understanding of sequentiality added to a discussion on the topic. Sequentiality, a vital element in early theories, does not appear to hold the key to understanding the future of the form or where the scholarship is heading. Hannah Miodrag in particular takes comics scholarship seriously, elevating it to a sufficient level to provide academic debate. Productive debates which consider the actual potential range of comics have the ability to grow the field by letting go of older paradigms. By addressing the problems and inherent anxieties of the scholarship we can bring forth more convergent solutions, which provides an opportunity to apply different visual and literary methodologies. The field is still somewhat scarce and riddled with different theories. To be quite clear, these are not necessarily downsides within a field which is still adopting and accepting new analytical tools; it is how the separation of word and image is handled.

Examining and choosing the best tools for analysing a comic so that the best results and insights into the art can be achieved feels only fair for the piece. Comics scholarship demands a hard critical eye from the researcher as well as the ability to be see which aspects would serve best for both credible end results and to serve the purpose of furthering the field.

Anxiety within the field is great, with a defensive stance often adopted by both fans and scholars against the idea that the medium is considered culturally inferior; this often causes comics to be presented as a form of literature that just happens to also offer images, and thus relinquishes the rule of verbal elements of comics. It is a power imbalance eating itself; this anxiety sometimes leads scholars to push for new frameworks where a more confident approach might drive forward even with no immediate success in an existing line of thought. Both fields discussed in this chapter suffer from this anxiety, both against mainstream receptions and their peers within their field.

2.5 SUMMARY OF THE CHAPTER

The previous subchapters discussed an overview of two different fields of study, computational creativity and comics scholarship. Computational creativity is a multidisciplinary study which studies what the concept of creativity might be, how it could be measured and how it could be utilized to study and support human creation and creative processes for the betterment of humankind. This involves the categorisation of different behavioural patterns as well as using both strong and weak computational creative systems in order to bring out varied results.

Comics scholarship within the Anglophone world is shifting towards the consideration of paradigms outside of McCloud and Eisner; moving from the views of creators to critics and scholars in an attempt to create more useful results. Being overly defensive of the medium has to some extent prevented it from existing as a format within its own diegetic space. The battles over and misunderstanding of the medium as a subset of literature continue, but understanding and embracing the hybrid nature of comics is the next step in developing frameworks for comics scholarship. Utilizing different visual and literary methodologies according to what is needed for a particular piece works to the field's advantage in the long run, adding credibility and more accurate analysis of both the language and imagery of comics. Comics may be narrative in nature but this does not mean that they are necessarily a literary form of narrative, and this is an important distinction. The key words for understanding the aura of both disciplines are multidisciplinary anxiety as well as the context and application of different analytical frameworks that can enrich the experience of both methodologies.

CHAPTER 3: ANALYSIS

3.1 INTRODUCTION

Daily comic strips have been a constant element in newspapers since the late 1800s, initially appearing in the US and then spreading across most of the world. Before these, newspapers and periodicals had mostly only featured humorous drawings or editorial cartoons (Harvey, 1995, 4). A single comic strip usually consists of between one to four panels, telling a single story or a joke or sometimes forming an overarching continuous story over several issues, which may then span decades of content for the whole family to enjoy. For most people, the term 'comics' is synonymous with this, the newspaper comic strip format. What make comic strips a particularly interesting object of study are their formulaic structure and familiarity, and the abundance of available content. Comic strips reached their currently recognisable format at the end of the 19th century. *Yellow Kid*, the comic strip originally known under the name of *Hogan's Alley* and created by Richard Felton Outcault (1863-1928) in 1896 for the *New York Journal,* is generally credited as the first instance of a commercially successful comic strip (Sabin, 1996, 20). The popularity of the comic opened the way for more gag strips. Humour comic strips had their most popular period from 1930s to 1960s; this occurred as children became the main target for the strips due to economical and societal change. Children were no longer working yet had access to disposable income in the form of pocket money. This caused the art style of comics to tend towards becoming easier and faster to read (Sabin, 1996, 27).

Getting published and recognised as a newspaper comic artist immediately brings a certain artistic and internal turmoil to the artist; should they do what they want creatively or be limited by the wishes of the public? The way in which newspaper comics found their widespread success was through syndication. Comic strip syndication entails the use of an agency which, on behalf of the comic artist, promotes and sells their comic strips to different publishers and newspapers alongside a selection of other strips. The first comic syndications formed in the US in the late 1890s to early 1900s, as soon as the wide commercial appeal of the strips became evident; the most popular comics were increasing the circulation of the papers they appeared in. The syndicates would help to fill up smaller local newspapers with additional content such

as illustrations and comic strips (Harvey, 1995, 67-68). This resulted in thousands upon thousands of applications to different syndicates from artists who wished to have their work published. The expectations for a prospective syndicated comic strip lay in having a wide appeal; the strips had to be relatable to a wide audience regardless of social status or place of living (Harvey, 1995, 68). There arose expectations of formulaic and commercialised procedure, as the only job the comic artist was considered to have was to draw what the masses expected. The most successful artists were often the blandest ones or those who followed traditional models that had garnered attention for decades.

Not all strip comics remained single gag creations; the style of comics gradually developed to include more long-form storytelling. Serial comic strips entered the market around the same time as newspaper comic strips saw their rise in the late 1890s. These early examples, usually comics in the adventure or domestic drama genres, were written with longer serialization in mind and read like the best soap operas, with exciting and unbelievable things happening to the characters. Their decline only began in the late 1960s as the competition from television (and even earlier, radio play serials), withered newspaper comic serials pages to the point that they became almost non-existent (Sabin, 1996, 131). The space for comics was limited and not a great deal was expected of them. But a gag comic strip with slight serial elements that offers humour within a domestic environment? In the comic strip *Garfield*, both archetypes meet. On the surface level, the individual comic strips of *Garfield* seem to have no ongoing continuity, but occasionally recurring elements would appear and tie a week of comics together. An example of such a strip was the now infamously bleak story of Garfield being stuck inside an abandoned house, a story published between the 23rd and 28th of October, 1989, coinciding with the Halloween holiday season. Multiple plot elements and themes also appear sporadically but are recycled again and again over the span of months or even years, including Garfield's hatred of Mondays, his efforts to avoid visits to the vet or his attempts to eat his owner Jon's food.

Garfield hits another genre hallmark with its use of the funny animal trope. Talking or 'funny', animals, as they are commonly referred to, have been a part of Western storytelling since ancient times, often utilised to teach life lessons and morals (Elick, 2015, 9-10). Anthropomorphised animal caricatures and stories came early to comic strips and illustrations, first appearing when the newspaper strips were still young, e.g.

Jimmy Swinnerton's *Mr.Jack*, the story of a lecherous tiger, in 1901 (Booker, 2014, 235). During the golden era of American comics between the 1940s and 50s, funny animals were synonymous with the visual format (Booker, 2010, 238-239). Such characters continue to make appearances, most commonly in visual literature media such as picture books, novels, comics and cartoons; these include George Herriman's comic *Krazy Kat*, cartoon creatures such as Mickey Mouse or Bugs Bunny, and even earlier the animal characters of Beatrix Potter such as *Peter Rabbit,* among many other modern examples of this timeless storytelling trope. Many of these examples have stood the test of time, with creative lifespans lasting into the decades. It is somewhat debated what funny animals are meant to represent; whether they are actually animals or merely a representation of something else: an emotion or a stereotype (Booker, 2014, 234). The answer lies somewhere in between; animals are used as a part of what Scott McCloud calls 'amplification through simplification', stripping images to their most essential, quick to understand meaning in a way that realistic art cannot necessarily do (McCloud, 1993, 30). This may include the use of animals to give a modicum of distance in order to examine some human societal predilection or issue.

The reason that *Garfield* was chosen for this thesis is that, along with its status and background as a cultural monolith, it is a perfect comic strip for artificial intelligence and its algorithms to dissect. It has a multitude of positive factors on its side for such an application. The art style is somewhat easy to mimic, consisting as it does of line drawings with mostly flat colours; these are simpler for GANs (Generative Adversarial Networks) to learn, as will be discussed later in subchapter 3.2.2. A substantial amount of the Garfield comics are in the weekday comic strip form consisting of three panels, with only the longer Sunday strips being in a different and expanded format. Especially in the daily three panel comics, the scenery rarely changes from the interior of Jon Arbuckle's house.

Additionally, what makes *Garfield* suitable for study and analysis is the easy accessibility of available material. Every daily *Garfield* comic strip ever produced is officially available in its original colour, presented online and free to read, download and thus to study. Additionally, an individual[6] has also typed out the entirety of existing

[6] http://john.ccac.rwth-aachen.de:8000/ftp/dilbert/garfield.txt

Garfield strip dialogue into a simple online text file which makes text analysis, implementation and adaptation for new use extremely convenient. Similar sites[7] also exist in which all Garfield comic strips up until 2020 have been transcribed, offering the option to search for a specific comic strip by either specific dialogue or characters appearing; very useful for analysis.

Figure 3. First ever Garfield strip, July 19th 1978. https://garfield.com/comic/1978/06/19 Accessed March 1st 2020.

3.2 ANALYSING GARFIELD

3.2.1. GARFIELD

This subchapter discusses and analyses the original comic strip created by Jim Davis. The description of the comic was given in the introduction chapter of this thesis but as a brief reminder, *Garfield* is a comic strip about Garfield, a fat orange cat with a dry wit and a love for food. Most of the comics follow the same simple structure: setup, action/framing and punch line. The repetition of these elements creates a world in which words and actions have consistent collocation, discussed by Saraceni as part of their comics framework.

The strip's creator Jim Davis has not been shy about the origin of the character either, calling the comic a conscious attempt to come up with a good, marketable character (Shapiro). The comic was not necessarily only fashioned from a need to create but from a desire for great financial success. Davis has mentioned in several interviews that he creates comics for the love of cartooning, yet he also contradicts himself by demonstrating a keen eye for what will be most successful (Barnett; Shapiro). Before

[7] http://www.lasagna.cz/

Garfield, Davis had produced a comic strip about different insects called *Gnorm Gat*. His goal was to begin a successful and profitable career as a cartoonist. The comic concluded in 1975 after a very short run in the *Pendleton Times* (Quinton Reviews, 00:08:55 - 00:09:10). The comic was missing a certain appeal: Davis' editor found the jokes funny but considered that bugs were not something people related to (Barnett). At this point in time, young Davis' goal was to create a profitable cartoon that could be widely syndicated; he then planned to form a production company in order to support the comic and licensing that would follow.

Surprisingly, *Garfield* as it is commonly known was not the first run Davis created using the orange cat. The first iteration of the comic strip was published only in Davis' local magazine the *Pendleton Times* between January 1976 and March 1978 (Quinton Reviews, 00:10:10 - 00:10:45). This creation, dubbed *Jon*, contained comics that were later adapted into *Garfield* strips. The focus on these early strips was more on the Jon character rather than the cat. In one example of the strip, Jon is sitting by a diner counter exchanging good mornings with the waitress, Irma. She comments on the strength of the coffee, telling Jon to 'get it before it gets you'. Jon asks her if the coffee is hot, and in the third panel, Irma has dipped her finger into his cup, affirming that 'Yup', the coffee is hot. Jon has no reply to this: he instead silently stares out at the reader as if to ask himself (and us) whether this behaviour had really just happened. The recycled Jon strips would later end up in Garfield, with the orange tabby added into scenes where he has no place to be, such as in the diner having coffee with Jon. Garfield is there to deliver the punchline, to really drive home the joke. He is there to make it simple and obvious to the reader by pointing out what they are supposed to find funny; in this case that yes indeed, 'this isn't one of your better diners'. We usually would not expect a waitress to plunge their finger into the coffee in a fine establishment, but the joke is more subtle with Jon's non-verbal reaction in the original strip. Garfield's added presence, as mentioned earlier and pointed out by a Youtuber, Quinton Reviews, is born out of necessity; the current strip *Garfield* is named after the cat, not Jon, and so Garfield needs to be present and part of the shenanigans (Quinton Reviews, 00:14:37 - 00:16:14).

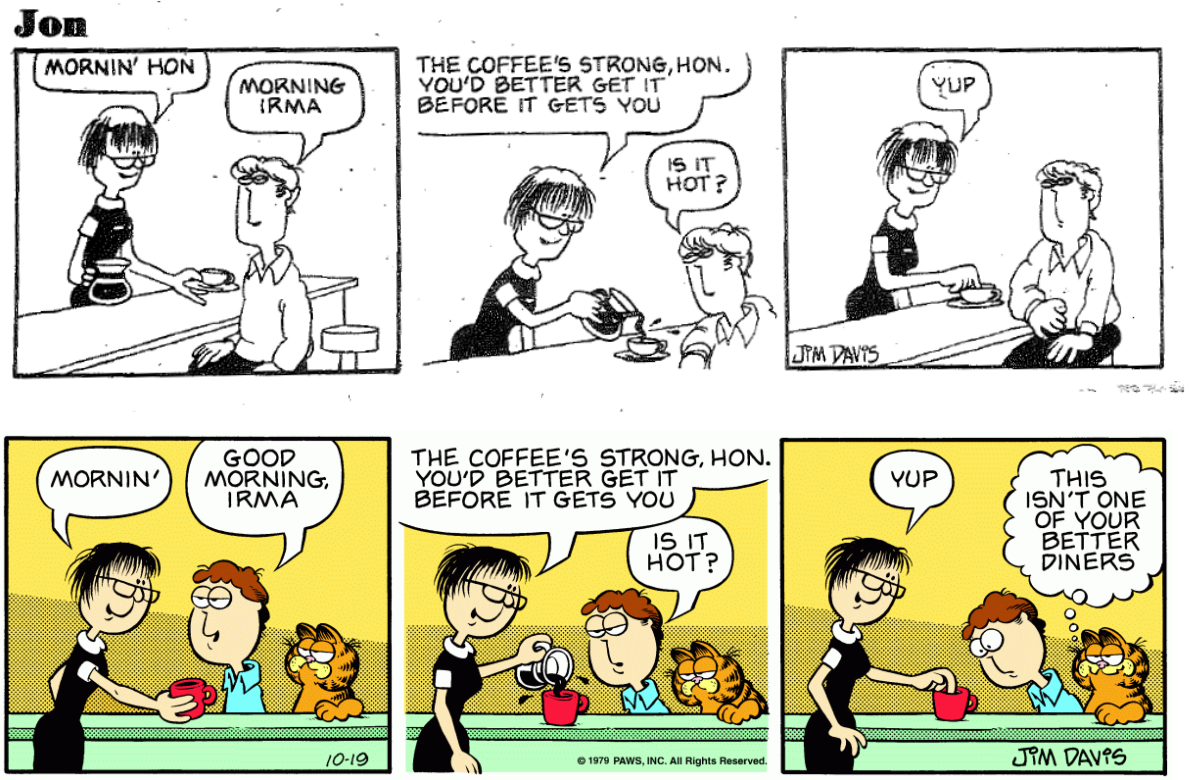

Figure 4. 'Jon' comic strip (January 27th, 1977) https://drive.google.com/file/d/1e6qIhEusfMgSJ9-e_R-Vgh4Vrlq93-aw/view and 'Garfield' comic strip (October 19th, 1979) https://garfield.com/comic/1979/10/19. Accessed March 10th 2020.

If originality is used as a measurement of creativity, *Garfield* strips started in already pretty mediocre fashion. As mentioned in the previous paragraph, Davis recycled ideas from *Jon* into *Garfield.* As he struggled to keep up with the constant need for new ideas, the quality of the comics deteriorated; even the modest quality of the early 1980s strips is far greater when compared to the material which came out in the early 21st century. In the first few years of the comic, Garfield spent his time bullying Odie the dog and his owner Jon and performing relatively recognisable cat behaviour: he was fascinated by the outside world and window blinds, he clawed furniture and played with a ball of yarn. Jim Davis himself has been quoted as saying that he wanted to get all of the basic cat-related jokes out in the few first years (Flood). Garfield would be later included in scenarios that did not fit his established characteristics from the earlier comic strips, eventually turning the character into an antithesis of itself. Garfield begins to show up at places and events that a lazy cat would not participate in. He would be shown as Jon's

partner and caddy driver at a golf course in March[8] and August[9] of 1986, eat in a restaurant with Jon in March[10] of 2006 or go shopping for a new refrigerator in January[11] of 1993. These are not singular events either; many similar situations take place where Garfield takes an active role despite his stated primary interests being food and being lazy. It could be an evolution or development of the character but it seems unlikely: Garfield's entire image is based on him being lazy and loving lasagne. Increasingly the comic strip clings to its long existence, most jokes becoming meta-level gags such as Garfield's hatred of Mondays being played for its repetitious aspect time and a time again. In a comic strip from November 2018, Garfield is drinking coffee and looking tired. Jon comments on it only being Saturday, asking "isn't it too early for your Monday face?" Garfield replies with "Just getting into character" (Davis, 2018). This gag works only if the reader has previous experience with Garfield and his familiar hatred of Mondays; it relies on knowing and understanding the established lore of *Garfield*.

For the purposes of discussing theory, looking at *Garfield* for plurivectorial narration adds nothing to the analysis; it opens up no alternative scenarios. In a strip comic, the entertainment value of the piece lies either within the visual realm or in wordplay. In *Garfield*, no such distinction exists. The same ideas have been recycled again and again, the same punchlines with different setups.

The interest of the *Garfield* comic does not lie in what is within it, but instead what can be omitted when looking beyond the fat orange cat. In the comic lexicon, cloud-like speech bubbles with a tail of bubbles that point to a character are a type of speech indicator (Eisner, 1985, 26). The dialogue inside these types of bubbles represents a character's internal dialogue and is not spoken out loud. All of Garfield's dialogue is presented to the reader via these aforementioned thought bubbles. This suggests that when Garfield is speaking or reacting to Jon as depicted in the comic, Jon is merely imagining the interactions, providing Garfield's witty comebacks himself. Despite Garfield being an extraordinary cat, he is still a cat nonetheless and, most of the time, acts like a normal, lazy house cat.

[8] https://garfield.com/comic/1986/03/04
[9] https://garfield.com/comic/1986/08/07
[10] https://garfield.com/comic/2006/03/20
[11] https://garfield.com/comic/1993/01/12

To analyse *Garfield* and subsequently its AI variants I will use different methods, taking heed of Miodrag's expansive suggestion to mix and match different disciplines to study the text and art of the comic (Miodrag, 2013, 13; 220). One of the more important issues for readability is the internal coherency inside the comic strip and how it affects the reader's experience of understanding and internalising the strip's diegetic world. Using Pascal Lefèvre's model to study graphic style by examining detail, deformation, line, distribution, depth, light, and colour, I will analyse where the strengths of the art, and possibly coherency, of *Garfield* comic strip series lies.

I will take a closer look at the original *Garfield* comic strips present in Figure 4 and an upcoming Figure 6, as these represent typical *Garfield* comics from two different art styles that the strip has utilised; a few more general examples are also going to be mentioned. The comic strip is drawn in simple detail; a simple line stands in for a table, generic boxes with small amount of detail stand in for different furniture or other items. This style has remained the same for years; a cylinder with a simple handle containing black liquid was the representation of a cup of coffee in 1979, and it continues to be so in 2020. This embrace of simplicity continues into the simplified character designs; they are cartoon versions of their real life counterparts. Although still cartoonish, in the beginning of the strip's run the characters were proportioned in a more realistic fashion: the eyes were small relative to the head, and the angles of the body were softer as legs or arms bent (see Figure 3). This had already stiffened up by 1979; the angles of the diner waitress Irma's arms are clearly more angular. Later on, the eyes of the characters become huge, the movements of the figures exaggerated or stiff as they walk around or lean over, most commonly walking back and forth with the never-ending table in the foreground, as present in Figures 3 and the upcoming Figure 5. The environment and the characters follow the same model of deformation; no stylistic outliers exist to emphasize the ugliness or beauty of a character. The dominant line-work in the living characters of *Garfield* is rounded, clear and crisp. Most items use straighter lines but none falter; the points connect to each other with the same dead-flat thickness throughout the stroke, meaning that there is no modulation. The lines have, though, grown thinner between 1979 and 2014.

If the speech/thought balloons and lettering are considered, most of the visual markers were originally spread evenly among the top two thirds of the panels. The distribution was generally top-heavy, with the balloons taking up the most space alongside the characters' heads. In the newer comic strips, the distribution becomes more bottom-heavy, focusing on the unmoving Garfield lying on the table. In terms of depth *Garfield* is remarkably planimetric; all characters and locations lack any three dimensional aspects. The coffee cup and the diner counter in the 1979 strip have vague elements of perspective, although tonal changes are miniscule; the grey shadow in the background of Figure 3 changes for the second frame but otherwise stays at the same angle. Colours remain consistent throughout the comics, with the same flat yet saturated tones throughout. The colours are not there to imply any changes in mood, but merely exist to aid in the recognition of objects. The internal coherency of the graphic style of *Garfield* is consistent, helping the reader to easily form a diegetic world so that they can receive their punchlines in a non-offensive and unobtrusive manner. The moment that we, the readers, lay our eyes upon Garfield's orange fur, his heavyset eyelids looking back at us from the top of that table surface, we know what to expect: kicking dogs, something about hating Mondays, and trays of lasagna.

Garfield has had a syndicated print run long enough that the cartoon's art style has evolved both naturally, and due to conscious decisions made by the creator Jim Davis. The evolution in the art style is easily noticeable from comparing the titular cat himself across the different decades of the comic strip. Most substantial changes happened between the years 1978 and 1992. In the beginning, the character of Garfield had small eyes, an almost square-like silhouette, fat cheeks and small ears. He also stood on all fours with small feet. As time progressed, Garfield's eyes would grow in size and his front paws would be redesigned to more closely resemble human arms. By 1979, the eyes were already remarkably bigger compared to the previous year. Despite the changed appearance, the heavy-set eyelids have remained a constant throughout the decades. By 1984, Garfield had grown longer and would continue to do so. Davis himself explained in a 2018 interview for the *Guardian* how Charles M. Schultz, the creator of *Peanuts*, had helped with the decision to make Garfield bipedal with bigger feet so that he could stand up and do more without naturalized anatomy and a subsequent loss of cohesion in the character silhouette getting in the way of simple character acting (Flood). This resulted in Garfield becoming more active; he was now

able to push the dog Odie off the table more easily, partake in more physical gags and run around. Ironically, the fat cat would also appear to become leaner as his feet and legs grew in size, especially between the years of 1983 and 1984; this can be seen as Garfield stands up from sitting on his hind legs like a regular cat to reach for a popsicle (Figure 5). In more particular detail, Davis' ink line has become thinner, with Garfield's stripes becoming fewer in number and not as concentrated as in the late 1970s and early 1980s appearances. The amount of facial stripes has also lessened; entering the 1990s the amount of stripes present went down from five per cheek to four. This was due to Garfield's face becoming more elongated. It is almost remarkable how repetitious Garfield's poses are; the back legs in the 1980s comics are always in the same position whenever the orange cat is sitting down.

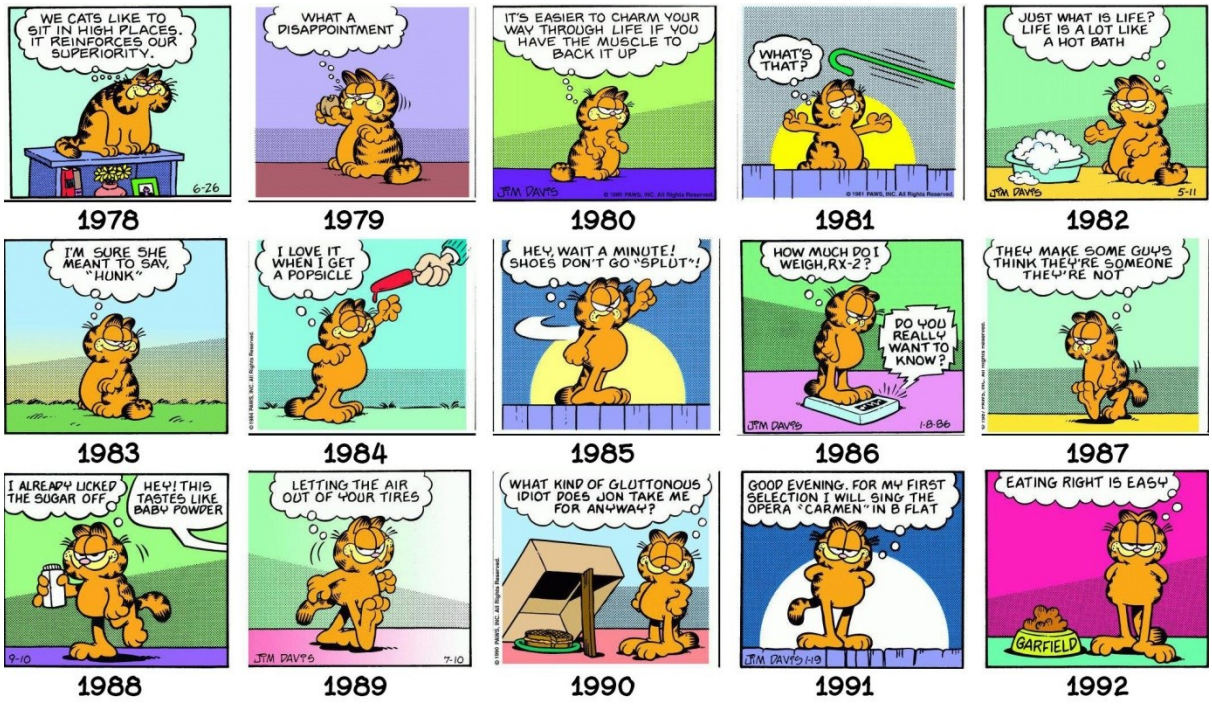

Figure 5. Vdalv via Jim Davis. Evolution of the art of *Garfield* from 1978-1992. https://vdalv.github.io/2018/12/04/ganfield.html Accessed April 6th 2020.

With the *Garfield* comic strip being around for as long as it has, a multitude of fan works or adaptations have been created to expand the world of *Garfield* or to pay homage to the orange tabby. One of the more famous examples of man-made remixes of the *Garfield* comic is *Garfield minus Garfield* by Dan Walsh. In *Garfield minus Garfield*, Garfield has been edited out from the comic strip, adding a layer of sadness to Jon's interactions with the world; he is a lonely man talking to himself, and there is an

oppressive atmosphere of crippling depression and an existential dread which is not present in the original comics. Occasionally the comics have been edited to add to the punch line or edit out any mentions of Garfield, such as in Figure 6 below.

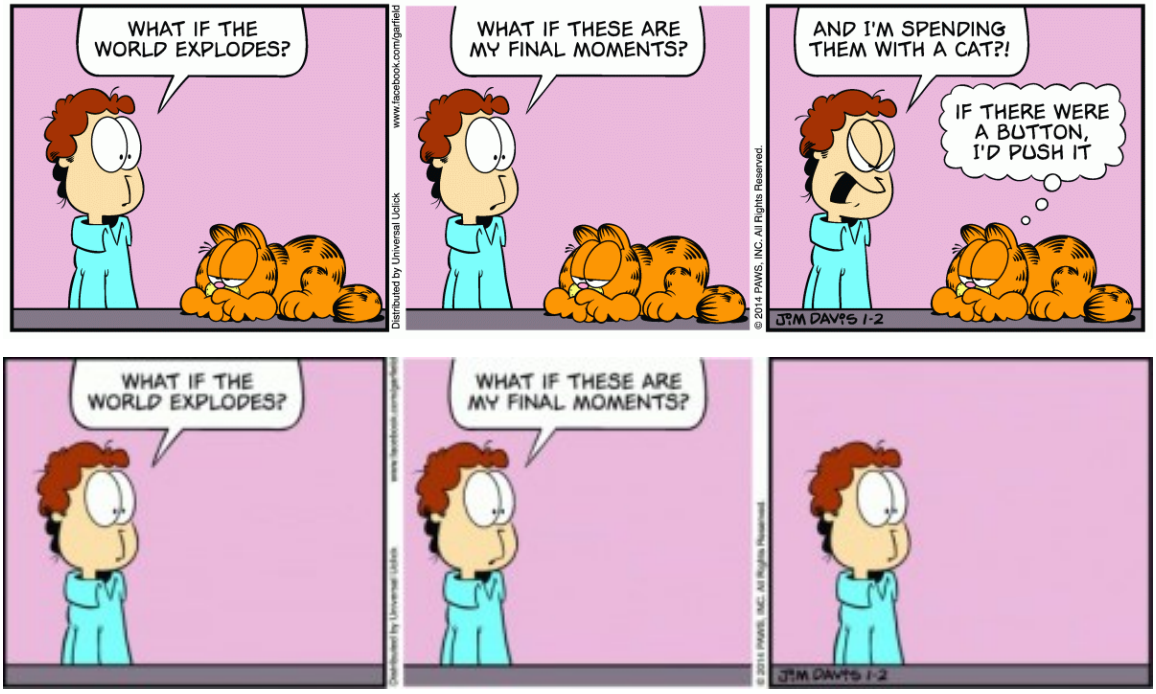

Figure 6. *Garfield* (January 2nd, 2014) https://garfield.com/comic/2014/01/02 vs *Garfield minus Garfield* (January 2nd, 2014). https://garfieldminusgarfield.net/post/71987885978/g-g-the-book-g-g-on-facebook-g-g-on-twitter Accessed March 9th 2020.

More transformative fan works of Garfield include such pieces of media as *Lasagna Cat*, in which comic strips have been turned into short music videos on YouTube; *Garfield Pipe*, in which each Garfield comic strip ends with the same punchline from an early strip where the orange cat is smoking a pipe; *Silent Garfield* where the titular cat does not think or speak at all in the comic; and two different variations of the same trope in which Garfield is a real cat, dubbed *Fairfield* and *Realfield*. A whole subgenre of (often Lovecraftian) horror using *Garfield* exists as well, with its own subreddit on the popular discussion and forum website Reddit. As people have read *Garfield,* there appears an urge to experiment with the orange cat and his owner. However, all of these aforementioned works have been created by a human hand, devised by human thought. Garfield's familiarity and relatively simple graphic style, with decades of available

canon provides enough material for people to expand on and create additional unique content.

Most of the fan works of *Garfield* are parodies, part of remix culture and intertextuality. Remix culture, and fan culture by extension, is an often neglected area of the social sciences, but the freedom, the right, to remix and make new content out of existing media is a critical expression of creative freedom (Lessig, 2008, 56). The more familiar a character or property is to the public, the more fascinated they are by it. *Garfield* is not a niche comic strip by any means; as mentioned before, it holds the record for the most syndicated comic strip in the world. What *Garfield* stands for in the eyes of fans and haters alike is a familiarity that frequently borders on staleness. *Garfield* is safe and inoffensive with its recycled meta-level jokes and predictable punchlines; people can easily apply new meanings to the actions they see taking place inside the world of the strip. It is highly possible that *Garfield* brings out the darkest fascinations in people as they feel free to experiment with *Garfield* because they have little sentimental value or (straightforward) respect.

In the next two sections, I will discuss what becomes of *Garfield* after AI has been applied to, and experimented with, the orange cat using two different case studies, and question whether it brings in anything additive to the strip by using different literary and visual analysis tools. Using formal art analysis and critique is important for observing how AI measures up to similar feats executed by human creativity.

3.2.2 GARKOV

The *Garkov* project is a project created by Josh Millard in 2008. In *Garkov*, multiple Garfield comics have been stripped of their text and run through a Markov chain, a stochastic (random) model which is used for automated text synthesis. The probabilities of the end results are always predictable, in the sense that it uses the text fed to it as its basis and follows the probability of what would have come afterwards in the original material. What makes analysing each individual *Garkov* strip challenging is the nature of the algorithm. As you enter the website, it generates a brand new comic strip that has likely never been seen by anyone else. In *Garkov*, the actual art of *Garfield* or the

sequence of the individual panels is not altered in any way. The characters are in the same place as the originals, and the panels are not mixed in any way. The selection of available comic strips is limited to fewer than twenty different originals; instead, what keeps changing is the dialogue within the existing thought or speech bubbles. The dialogue itself is all taken from *Garfield*; all the words have appeared in the a strip that has been produced since its conception.

Beneath is an example of an original *Garfield* strip comic from September 18th 1981, and another one utilizing the same comic strip with the text generated using the *Garkov* website generator. The comic follows a classic joke structure: setup, build and punchline. In the strip comic, Garfield has climbed a tree and wonders why cats cannot run down trees if they can so nimbly run up them. In the second panel we see him plummeting towards the earth with a relaxed, fearless look on his face as he experiments with running down the tree. In the third panel Garfield has landed face first to the ground, berating himself for being "very, very stupid" for thinking that any other result was possible.

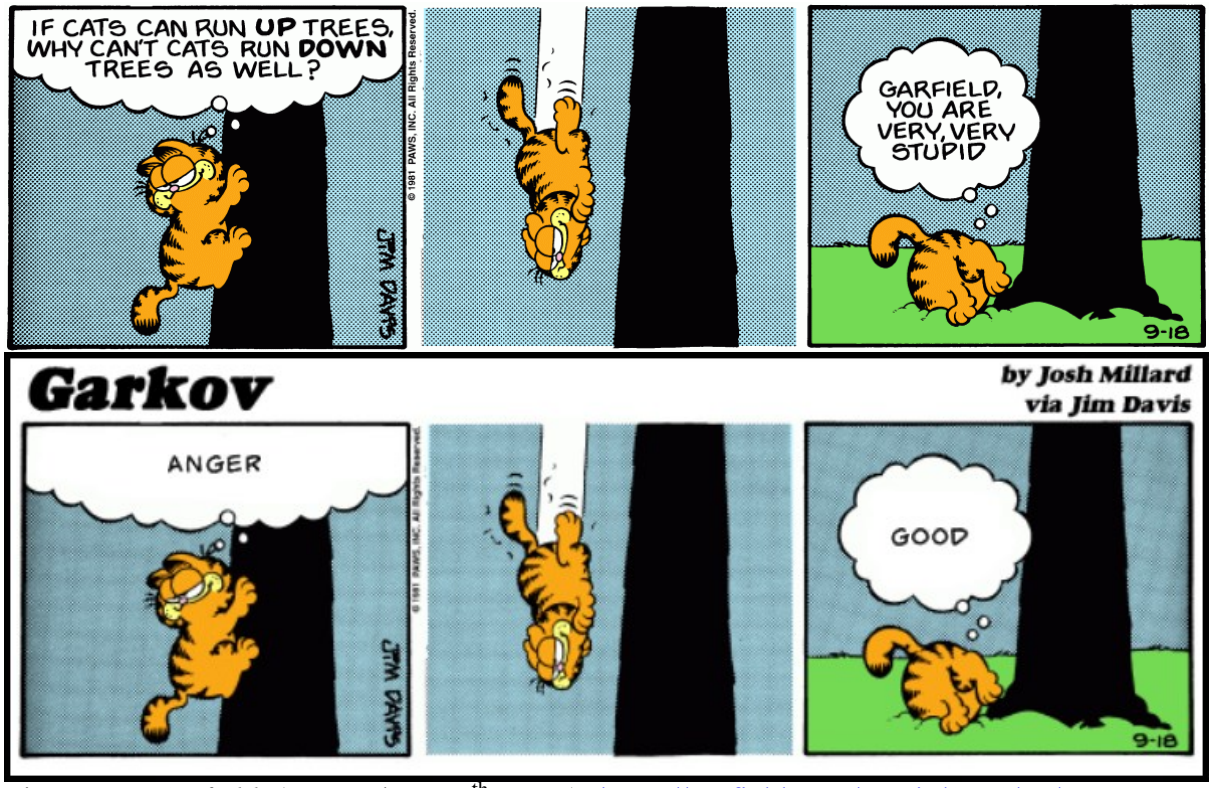

Figure 7. *Garfield* (September 18th 1981) https://garfield.com/comic/1981/09/18 vs *Garkov* (generated February 2nd 2020 at http://joshmillard.com/garkov/) Accessed February 2nd 2020.

In the *Garkov* version, the same strip becomes absurd, changing the mood of the piece. The thought bubbles only express short statements, making it seem as though Garfield is contemplating life and his current emotions, and yet the formulaic art of the comic is in juxtaposition of the text. In the last panel of the original, Garfield is mad at himself, berating himself for taking the plunge on such an inane hypothesis. In the Garkov version, Garfield is happy, considering it good that he has plummeted into the Earth below. He had no fear in his eyes as he jumped down from the tree, and the ever-present smile makes it almost sinister. This change in mood by only altering the dialogue depends upon the existence of intertextuality; the relationship with the original text makes the new dialogue more intriguing; there are no extra explanations describing the events, only raw emotions told in two words. The probability of only these two lines, these specific two words appearing in a *Garkov* strip was small but the AI, based on chance, decided that this was what the comic strip needed to be finished.

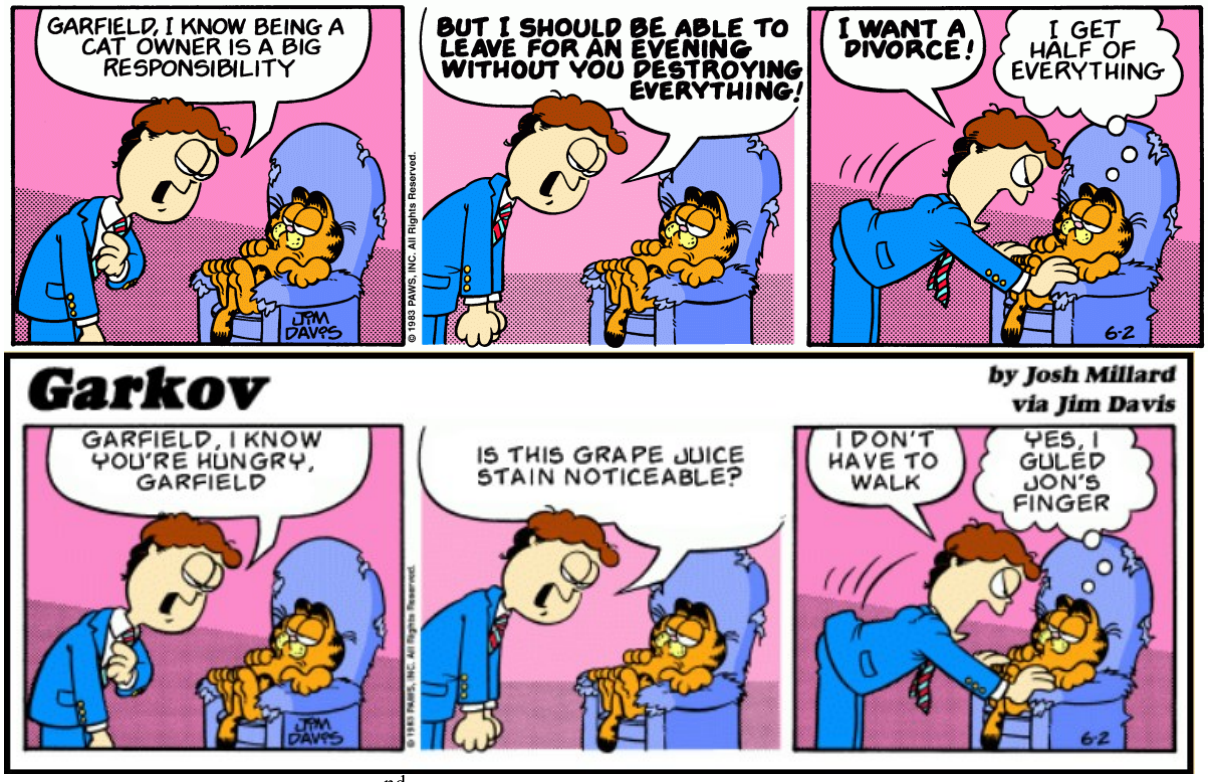

Figure 8. *Garfield* (June 2nd June 1983) https://garfield.com/comic/1983/06/02 vs *Garkov* (generated March 3rd 2020 at http://joshmillard.com/garkov/) Accessed March 3rd 2020.

Presented in Figure 8 is another example of text transforming the comic strip. In the original *Garfield* comic strip from June 2nd 1983 Jon, dressed in a blue suit and tie, is

shouting at Garfield who is sitting in a shredded and clawed up blue arm chair. He tells the cat that he "knows being a cat owner is a big responsibility" but he expects "to be able to leave the house for an evening without you (Garfield) destroying everything." Finally he shouts that he wants a divorce, to which Garfield delivers the punch line of the comic: "I get half of everything." (Davis, 1983). It follows the standard formula of Garfield comics; Jon saying or doing something and Garfield responding to that action with a punchline. The Garkov comic strip produced using the same panel layout is very different in nature. Jon appears to be freaking out to Garfield; considering that Jon never wears a suit in the comic other when going on dates, that this is what he is concerned about can be assumed. Jon is frantically listing things that might delay him or cause distress, leaning in and screaming at Garfield who admits to some additional misbehaviour (gulling Jon's finger) that Jon has not listed in his panic or it is something Jon has not even noticed. The text changes alter the content of the comic completely yet still retains the situation+punch line structure of Garfield.

Figure 9. *Garkov* (generated March 3rd 2020 at http://joshmillard.com/garkov/) Accessed March 3rd 2020.

The second variant (Figure 9) made using Garkov again uses the original comic; this time Jon calls Garfield "a fat, disgusting angel" in the first panel, followed by the question of "where did you put my keys" in the next panel. In the third panel Jon is 'as before, shaking the chair, demanding that Garfield "get up". Garfield answers only with the simple grammatical article "The", which on its own makes no sense. This variant of *Garfield* is a little more nonsensical but alters the focus of the comic; the events now take place before the assumed date as Jon is looking for his keys, ready to leave. The condition of the chair does not matter; instead Jon is having a nervous breakdown and

Garfield does not care. Once again, it becomes hilariously sinister due to the context and juxtaposition provided by the original comic.

Garkov as an example of an algorithm-created comic addresses the thesis that text analysis in comics is lacking and not considered as important as visual analysis. The structure-focused *langue* or *parole*[12] discussion leans towards *parole* in *Garkov*, highlighting the importance of language in well-adjusted comic analysis. Usually in comics where *parole* and *langue* are concerned, images are not seen as being constrained by *langue* at all; instead graphical signification is tied only to *parole* as the visuals exist in their own context, bringing different meaning to the narrative of the comic (Miodrag, 2013, 10; 43; 79). *Garkov*, by presenting both reasonable and nonsensical sentences, adds to the notion of *langue* (and text analysis) as an imperative part of comics theory that cannot be dismissed; it reiterates the importance of using different methodologies when understanding comics. The changes which *Garkov* brings to the original *Garfield* speak somewhat to the inanity of the source material. The Markov chain did not take into consideration what and how much text was in the original comic strip, and this produced results that played with the intertextuality of the randomly-generated *Garkov* comic strips. By still utilising the vernacular present in official *Garfield* strips, *Garkov* maintains a coherence which makes it sometimes absurd but never too nonsensical or uncanny.

3.2.3 AVANT-GARFIELD AND GANFIELD

These two very similar projects and their related end results both came into fruition in the late 2010s. Independently, two programmers operating under the aliases Vdlav and CodeParade created their own takes on creating new Garfield comic strips or individual panels using GANs or generative adversarial networks. GANfield was created by Vdalv, Avant-Garfield by CodeParade. In both projects a selection of Garfield strips were put through GANs so that the algorithm could learn different variations and subsequently create imagery which was passable as *Garfield*. Both GANfield and

[12] The Swiss semiotician Ferdinand de Saussure defined langue as 'the abstract system of language, including such things as grammar and syntax, and parole as 'the concrete use of language' in his 1915 book *Course in General Linguistics*

Avant-Garfield came to be in late 2018; December and October respectively. They are not the only ones[13] to have experimented with generative adversarial networks and *Garfield,* with another user posting their results on Twitter as GANified Garfield. The former pair have put the most thought into their processes as well as writing about their end results and opening up their process, which is why they were chosen for analysis in this thesis.

A software developer under the name of Vdlav first wrote about his experiments with GAN in December 2018. He split the individual comic strip up into panels, using scripts to separate out the Garfield-only images. After experimentation and an initial million iterations of training, Vdalv chose to exclude artwork from *Garfield* prior to 1991 due to the vastly different art styles (Vdalv, "Ganfield: Something Something GAT Pun", 2018). This was to maintain the coherency of the art pieces. The GANified *Garfield* project used different variations to produce individual pieces which varied in quality and abstraction. Earlier that same year, another series of experiments, dubbed *Avant-Garfield*, were performed by CodeParade. CodeParade even provided people an opportunity to play with their code, by giving users access[14] to download the code, train the networks and create their own deformed strip comics. For the less technically aware, there is a simplified Garfield Comic Editor on their website[15], with the option to use slides to modify the end result. CodeParade talks about the unstable nature of GANs, discussing how initially simple implementations were harder to provide (CodeParade, 00:05:09). As CodeParade trained the generator, the results became clearer and more consistent as the generator managed to more easily trick the discriminator; they mention that the end results began to resemble actual Garfield strips more and more (CodeParade, 00:08:04-00:08:45). This resulted in a hybrid approach, which used an encoder to ensure that the GAN did not stray away too far from what it was intended to create. Looking at the produced strip comics, they vary greatly in output. CodeParade discussed their process of eliminating comic strips in great detail, giving an insight to the code and how it works. As was mentioned in the introduction chapter of this thesis, delving more deeply into the code and how the training itself works does not serve the purpose of this thesis, and so -this section will not be going into more exhaustive detail

[13] https://twitter.com/calamardh/status/1153865113570594817
[14] https://github.com/HackerPoet/Avant-Garfield
[15] http://codeparade.net/garfield/

either. Instead, it will first focus on analysing *Avant-Garfield*, after which it will tackle the surrealistic art of *Ganfield*.

The conceptual space of exploration and creativity has been set; the learning material, in this case *Garfield* strip comics, have been fed to the algorithm to learn. In both cases, as new *Garfieldian* content is generated, the words blur and we enter the space of the nonsensical. As the focus is on the art of *Garfield*, most of the time the accompanying words make no sense. The images and panels created by CodeParade's GAN all have a distinct look; thanks to the vivid colours of the source material, the shape of the characters stays recognisable. Their avant-garde forms, with no discernible end or beginning, open before the reader as an amalgamation of *Garfield*'s distinct and straightforward art style and the bold spots of colour that the comic is known for. Just as in *Garkov*, discussed in the previous subchapter, using the *Avant-Garfield* comic editor and simply pushing the Random button creates results which are next to impossible to ever recreate. As soon as the website is refreshed, that particular *Avant-Garfield* strip disappears forever.

The generator which CodeParade created maintained the aspect of narrativity, making it appear as if there is something to follow even if the dialogue is obscured. The colours of the strips are muddled compared to the original *Garfield* comics, and the text is unrecognisable but still suggests structure. As GANs are not created with language or alphabets in mind, they automatically ignore the speech and thought bubbles, treating them as abstractions. Despite this, *Avant-Garfield* still manages to maintain internal coherency in its art style throughout the randomized results. Exploring the coherency using Pascal Lefèvre's model brings out some interesting results. Surprisingly, deformation, colour and distribution remain unchallenged, allowing the eye to still easily follow the comic. The abstract comic has a definite flow; it can thus be argued to have a visual narrative. As previously mentioned when discussing comic scholarship, Molotiu in particular provides the terminology and procedures for analysis of abstract comics. As the project was even named *Avant-Garfield* by its creator, it is appropriate to use abstract comic analysis to discern what can be learned from these AI created comic strips. According to Molotiu, abstract comic's main aesthetic effect depends on its *sequential dynamism*, a visual rhythm which propels the reader's eye forward, and *iconostasis*, the perception of the page's layout as a unified composition (2012, 89; 90;

93). *Avant-Garfield* is almost an antithesis of both terms, although the comic strip is at least unified visually. As Garfield, and at times Jon, dip in and out of existence, their forms are still stiff. The reader is stuck in the experience as time seems to have halted, but recognisable elements are still there, ensuring that the reader still believes in the world the graphic style represents.

Figure 10. *Avant-Garfield* http://codeparade.net/garfield/. Generated and accessed April 7th 2020.

The first comic from *Avant-Garfield* to be analysed is a simple one, with Garfield alone on the table surface against a full green background (Figure 10). The wobbly, paintbrush-like strokes add a suggestion of movement to the orange cat, an impression that is very rare in the original *Garfield* comics, the characters mostly remaining in static poses as seen in Figure 6. This becomes almost the opposite in *Avant-Garfield* as the orange blob-like Garfield moves, almost comforting to the eye as it seems to better resemble a living creature in action. He is thinking and appears to be on all fours. The sequential dynamism, the Garfield who is folded in on himself, repeats in all three panels. The cat has stood up in the second panel, silent, before speaking again in the third panel. Any resemblance to a head has completely disappeared, yet still he speaks. The pattern of a usual *Garfield* comic strip (as present in Figure 7) is interestingly still recognisable but turned inside out. Typically in a *Garfield* strip, the first panel is used to set up the scene with Garfield saying something in a static pose. Now the paintbrush-like strokes propel the orange cat into action, the dialogue unreadable. The second panel is usually reserved for either action or a joke setup: Garfield is either doing something or listening to Jon. However, in the *AVANT-Garfield* comic strip, nothing happens in the second panel. The silent moment in the middle becomes almost jarring in nature,

underlining how time has momentarily stopped. The third panel in which Garfield is supposed to deliver a one-liner is now unreadable. This results in the reader being left uncomfortable, unsatisfied.

Figure 11. *Avant-Garfield* http://codeparade.net/garfield/. Generated and accessed April 20th 2020.

Another randomly generated *Avant-Garfield* presents an intriguing story, as seen in Figure 11. In the first panel Jon is looking wide-eyed at the form of Garfield; in the second panel he appears to say something, as a speech bubble materializes but his own form largely disappears. In the third panel there are now two Garfields, both staring at each other as the (original) Garfield on the right gargles up something to say; it is reminiscent of traditional *Garfield* comics where Garfield always delivers a punch line at the end. Other than the eyes, no emotions can be read from the characters' faces or body language, and so the reader has to depend upon their own interpretation of the situation. The consistent colour offers little sequential dynamism, propelling the eye forward but that nothing more. The comic is stagnant, almost eerie in its nothingness and emotionless state. The reader struggles to discern a pattern, to see what the AI was thinking, to understand it on a human level; a task that cannot succeed.

Lev Manovich discusses neural imagery and how humans expect larger variability from such experiments (184, 2018). However, as long as they are artistically plausible they are given leeway and thus considered modern art. *GANfield* stretches the art of *Garfield* to its limits. As GANified *Garfields* resemble surrealistic art, surrealistic art analysis is fitting to be deployed against it. In surrealistic art, themes such as the subconscious, dreams and symbolism are abundant. Art historian Hal Foster argues that an important

part of surrealist art is *the uncanny*. According to Foster, the uncanny (a concept developed by Sigmund Freud) is the return of a familiar phenomenon which is made strange by repression (Foster, 1993, xvii, 7). This means that the object's return in its disrupted state leaves the viewer confused, unable to make a distinction between the real and the imagined; the viewed object is both alien and familiar at the same time. The concept of the uncanny is thus important in understanding *GANfield* and (by extension) *Avant-Garfield*. The familiar orange cat is morphed into shapes that still resemble the original, stirring emotions, but has drifted far enough that eeriness sets in.

Figure 12. *GANfield* "The Good" https://vdalv.github.io/2018/12/04/ganfield.html. Accessed February 7th 2020.

Figure 12 and the upcoming figures 13 & 14 represent three panels each from three different training results; what Vdlav dubbed *the good*, *the bad* and *the awesome*. In the original file, all of the examples have nine individual panels which show the different end results after GAN had trained with the selection of *Garfield* strips that Vdalv provided as part of the learning process. The *good* section compares relatively well with normal *Garfield* comic strips. In all nine panels, a recognisable Garfield stands in the middle of the panel, facing to the right six times, to the left two times and once with his gaze towards the reader. Only twice is Garfield shown walking. The heavyset eyelids are an ever-present constant. Figure 12 showcases the produced results well; the coherent and consistent shape of Garfield created by the AI is impressive.

Figure 13. *GANfield* "The Bad" https://vdalv.github.io/2018/12/04/ganfield.html. Accessed February 7th 2020.

In the *Bad* set represented by Figure 13, Garfield himself has begun to change. The Generative Adversarial Networks have broken up his body; it is still recognisable to the reader but as the two programs within the GAN have begun their internal battle, the form of the character has started to morph. The backgrounds are still static and easy to recognise as the flat surface Garfield so often occupies in the comic strips. Surprisingly, the thought bubbles have kept their correct place in relation to the characters but otherwise, irregular events have begun to appear. One panel includes what looks to be a levitating egg and a clipped table surface with a white dome on the left, a short and armless Garfield on the right. In another, what looks like a Garfield centipede with multiple legs is making its way to the left side of the panel. These images of Garfield are somewhat dreamlike, breaking the coherency of the established art style. Uncanniness sets in as Garfield is drifts further from his known form.

Figure 14. *GANfield* "The Awesome" https://vdalv.github.io/2018/12/04/ganfield.html. Accessed February 7th 2020.

The safe and familiar form of *Garfield* is breaking as the GAN gives him new context. In terms of creating readable *Garfield* comic strips, the Bad Garfields of Figure 13 are

just that: bad. And yet still interesting. The more dreamlike examples from the *Awesome* section (Figure 14) of *GANfield* start to further toy with the available space. As we enter the realm of surrealism, the art begins to resist literal analysis. The ambivalence of the differently morphed, melting Garfields that appear is surprising. The question of what Garfield even represents arises; his legs move on but the upper body is deformed as GAN's probability function has tricked itself into believing that, by some standard, a Garfield which is nothing but a multi-eyed orange blob, covered in its own thoughts, hovering in mid-air within the purple space, is still a true Garfield. This is also the section which fully embraces the uncanny. The dotted marks that at times seem to be part of Garfield's body appear similar to the thought bubble tails which connect Garfield to his thoughts. It transforms Garfield into a being formed of its own thoughts, still existing on different coloured horizontal surfaces, interacting with nothing and yet everything at the same time. The essential cat form of Garfield is still recognisable at times, but the text within the thought bubbles has become- nothing as the art corrupts the last resemblances of words and individual letters. What do these garbled *Garfield* panels tell us about the comic strip as a whole? The manifestations of the unknown highlight the original; they highlight how no soft shapes and colour variations appear in any of the original *Garfield* strips. These monstrosities stand against what *Garfield* is: they are offensive in their abstract form, they are hard to understand and there is no joke with a clear punchline to be read, no humorous closure. The cat and the comic have become antitheses of themselves. It is hard to read and understand, it has no monetary value, cannot be easily turned into merchandise.

AI is the master of surreal imagery, even if it is not purposeful in any form (Manovich, Wiggins). AI and its ministrations unravel the truth covered up by the systematic workings of the stale comic strip. It still reproduces the aura of the original, but wraps it in disquieting uncanniness. These different variants of *Garfield* tell us a lot more about the original piece itself than they do about the newly created art sprung from the different GANs. The variations present will create a series of overlays and a canon of surreal imagery that can provide for deeper art analysis of the essential staleness of the visual world of *Garfield*. In this case, AI has acted as a servant rather than a creator, creating results that stir the mind of human observers. The question that arises is not *how* can AI be capable of producing *Garfield* on its own, but *when* will it happen.

3.3 WHAT DID THE MACHINE DO TO *GARFIELD*? DID IT MAKE IT FUNNY?

The analysis in this chapter attempted to examine what the machine algorithms did to the comic strip *Garfield*. Did it expose the natural wittiness of Garfield? Did it make the comic strip funny or funnier in some way? The short answer to this question is no, although the longer answer to the same question might actually be yes. Both the Markov chain and the Generative Adversarial Networks play within the conceptual space outlined by Wiggins, giving the algorithms the boundaries within which they need to create new content or recombine the existing material into something new. The ruleset underlines the fixed placements of the characters. The AI did what it was told to; it took only the elements that it was supposed to play with. It is noticeable that the placement of the characters in the comic strips was consistent enough that GAN could recreate layout of the comic strips without any great struggle. The sterile, inoffensive, repetitive nature of the original strip is underlined by this action.

Even when the AI was given free rein to play with the source material, it did not create anything completely new, because it did not have the resources and commands to do so. In Margaret Boden's terms, the AIs showcased elements of exploratory creativity; playing within the space given to it with disregard to any existing internal rules e.g. what Garfield is supposed to look like or to say. It still managed to evoke reactions of wonderment and disgust by producing surreal art with recognisable origins in *Garfield*. The natural reaction is displayed by CodeParade in their video as they scream in horror at what their machine has created (CodeParade, 00:00:00-00:00:10). It turned a benign comic strip about a lazy cartoon cat into something unexpected. The richness of experimentation exposes the static blandness of the source material.

From its very beginning, *Garfield* did not have a fundamental base that would have allowed it to be funny for more than forty years. Perhaps if Davis had had a different creative goal in mind than merely creating a comic strip that could be syndicated, there might have been a chance that the adventures of the orange feline would have ended years ago or been transformed into something else. The original *Garfield* does not provide much material worthy of ongoing comment; it adds to the notion of Garfield being artistically bankrupt; its entire *raison d'être* seems to lie in making money through

its licenses, and nothing else. The art style is coherent but static. Its appearance in a period of depression for newspaper comics, the late 1970s, meant that it needed to be more than just a comic to succeed (Sabin, 1996, 132). It made the choice of creating Garfield as a brand simple; an easier character to market is an easier one to profit from.

Garfield does not strive to do anything different within the genre of 'funny animals' comic strips; i.e. when compared to another strip with much higher artistic value: Bill Watterson's *Calvin & Hobbes.* Watterson, a more accomplished artist with rich yet straightforward art and intriguing dialogue, produced a comic following the adventures of six-year-old Calvin and his semi-imaginary tiger friend Hobbes. Despite the strip becoming hugely popular at nearly the same time as *Garfield*, Watterson chose not to go the commercial route; when the comic strip ended (after ten years) on the 31st of December 1995, Watterson refused any continuation or merchandising of his highly popular characters and has held fast to that stance to this day, earning the respect of both critics and the public (Knudde, "Bill Watterson", 2020). The creator of *GANfield* even mentions *Calvin & Hobbes* as the main reason that he began experimenting with GANs, but that he used *Garfield* to begin the art process because he thought that it was much simpler to work with. (Vdalv, "Ganfield: Something Something GAT Pun", 2018). As previously mentioned, Jim Davis has never held such lofty artistic opinions of his own creation. In our era, more creative enthusiasm is generally poured into other forms of comics, and strip comics follow these developments, if they acknowledge them at all. *Garfield* is so ubiquitous that people hardly think about the meaning of its presence all around us; Garfield himself has transcended the comics, from merchandise to cartoons to live-action films; he is a cultural icon and yet mocked for laziness in more ways than one.

The question is whether the machine exposed the straightforward nature of *Garfield* knowingly, and depending on the answer to that, does it matter? According to Lev Manovich, it really does not. And this leads to that longer answer mentioned previously: yes, *Garfield* became a more intriguing piece as the introduced surrealistic elements brought the art of the comic strip onto a whole different level. AI pierced through the mundane surface of a systematic comic strip, underlining the preposterous amounts of sterility and conventionality that the humour comic possesses. The machine itself

exposes, by adding these surreal and Dadaistic elements into the comic strip, the faults in the system of syndicated comic strips.

3.4 A SUMMARY OF THE CHAPTER

This chapter discussed and analysed the comic strip *Garfield* by the American cartoonist Jim Davis. It showed his successful attempt to make it big in the comic industry by managing to create a character that is familiar to most people in the world yet has no high artistic merits of its own, only being successful in regards to capitalistic or monetary gains.

The first case study examined *Garkov*, created by Josh Millard, to establish whether changing the text in a strip comic could alter the comic itself significantly. It focused on the nature of *Garfield* text analysis, with results varying based on the tone and impact they had in comparison to the original comic strip. The juxtaposition of the new dialogue with the original comic created new strips, bringing out more sinister and open-ended elements which do not exist in the normal *Garfield* comic strip. This happened despite all the text used by the AI having already previously existed in *Garfield*.

The second case study explored the kinds of *Garfield* visuals that generative adversarial networks or GANs could produce from existing comic strips after vigorous training and implementation. It used two different experimental neural networks created by two different software developers with varying interest in comics and *Garfield*. The images, panels and comic strips created were produced with various different levels of abstraction, some of the comic strips even attaining basic readability and retaining their internal cohesion through the uniform graphic style.

In the study cases, both the Markov chain and GAN operated under the stochastic process, the future random values being dependent on a collection of already set variables; the creative process was reliant on probability. The different AI algorithms have the chance to act as an influencer, guiding and influencing human observers (Manovich, 2018, 13). Whether out of curiosity or simply out of rebellion against the machine-produced results, they still manage to engage people to look at even the most

mundane art differently. To summarize, the AI worked as it was intended, acting upon the requests and limitations set up for it within the creative space it was allowed. By thinking outside the usual boundaries, it brought surrealistic elements to a stale American pop culture juggernaut, showcasing its shortcomings and identifying how the comic strip itself has been constructed. The algorithms deconstructed the comic strip to its core components, laying bare the inner workings and showing how merely remixing these already existing elements dramatically changed the look and context of the *Garfield* comics. The method by which this end result was accomplished using different algorithms yielded results which may have been difficult or impossible to achieve without the aforementioned computer enhanced systems. This makes the analysis in this chapter possibly a test case for a set of new tools to be used for cultural analysis.

CHAPTER 4: CONCLUSION

4.1 What Happened in the End?

The primary goal of this thesis was to study the artistic and creative potential of AI and algorithms in comics, and the AI did create comics that were viable for analysis on their own. Through the field of computational creativity and by using different visual analysis tools, a few interesting results emerged which met with the expectations set at the beginning of the thesis process. The answers to the research questions posed had a positive end result. The theories discussed in Chapter 2 of this thesis provided an interesting look into the internal anxieties of both fields. While performing research into comics theory, I noted how the most popular framework for comics had shifted from focusing on defining what comics are towards instead studying the overall coherency and narrativity of comics, with an emphasis on semiotics and narrative means as focused on by Miodrag, Cohn, and Groensteen. The prominence of cohesion, of understanding the bigger picture, emerges as an interesting field of study. By examining the world of AI through comics, the comics scholarship also benefited by giving understanding and justification for using different methodologies. The previous engagement I had had within the field of comics (and personal interest) proved to be beneficial in the search of the proper literature for the theory section of the thesis.

I found it remarkable that by taking the freedom to treat comics as an openly hybrid medium, applying different methodologies from different fields was feasible within reason. Using a range of visual methodologies can bring a lot of different and even unexpected results into analysing the art of comics in isolation. The comic strips created by the AI produced different readings of the *Garfield* comic strip, including some unexpected results, such as how well the art style was kept intact and the importance of dialogue when placed in juxtaposition to the art. *Garfield* and *AVANT-Garfield* required the use of surprising concepts such as the abstract comic art analysis of Andrei Molotiu and Hal Foster's concept of the uncanny to understand the unnerving feeling that the abstract imagery brings. Computational creativity as a field is thought-provoking, and it being more focused on showing how AI can support humans rather than aiming to take over creative processes entirely, is what makes it an interesting tool to apply to the arts, be it fine art, poetry, sculpting or making comics. The most interesting aspects of

computational creativity were the ideas first presented by Margaret Boden: the division of creativity into three types (combinational, exploratory, and transformational) and the further division into H-creativity and P-creativity. By setting up these perimeters, the tools used to measure and categorise the analysis of the creative processes of AI can be transferred to human creators, which makes it a significant tool for understanding how to improve and surpass their own creative processes. What makes the use of computational creativity in comics (or art) analysis challenging is its seemingly inherent inaccessibility. Deconstructing the concept, and getting the most out of it, demands extra work which might limit its usage in humanities. Regarding the question of whether AIs are truly creative on their own, the results also proved remarkable; it transpired that their own creative prowess is employed best when used in unison with human creativity by helping us to understand those creative processes. With most of the subsequent literature using Boden's works as a starting point, they tell the story of a field which promises to have a lot to offer; the tasks that AIs are asked to perform are evolving rapidly and constantly. AI is a multi-faceted and interesting beast, showing it can add much needed diversity to analysis in unexpected places.

Returning to comics, more literary endeavours have also garnered attention, which shows that the field is at a point where academic discussion can provide deep insights into comics. In my analysis I took interest in the way in which AI-generated works building upon *Garfield* presented the original comic strip in a new light. The ingenuity of people to create AI and use it just to test their abilities speaks to the inherent creativity that can be present in any field. Subsequently, in Chapter 3, the hypothesis that AI would be able to point out the shortcomings of the original comic was proven true; the images which the two visual case studies provided showed a side of *Garfield* that was both static yet intriguing and which enabled the use of different art analyses, showcasing how even the most inherently commercialised product can teach future comic theorists and artists ways to improve. The AI still had a hard time distinguishing subjects that dwell as deeply in the realm of multimodality as comics do, and yet *Garkov*, *GANfield*, and *AVANT-Garfield* showed interesting patterns in the ways they deconstructed the elements of the original *Garfield* comic strip. The AI-generated works were relatively successful in creating understandable Garfield comic strips, with the smallest of alterations able to give a whole new meaning to an existing comic strip (as in the case of *Garkov*). I was able to point out the uncanniness of the AI-generated

Garfield results and show how the GANs unearthed the formulaic operation system on which the original comic strip functions. The end results were thought-provoking, showing there is room for more focused future studies which delve deeper into a specific methodology.

4.2 RECOMMENDATIONS FOR THE FUTURE

The future for the research topic of this thesis could be divided into two paths; the first focused on the existence of comics in the digital era, where the form is not limited by paper or even necessarily created by humans. Utilising comics theory to tackle abstract comics would generate a lot of discussion. I did not explore the aspect of narratology in the thesis but it definitely deserves further attention, particularly when discussing AI. The second path lies in the prospect of AI taking a more prevalent position in the creation of a work of art; the way in which humans consume and analyse AI-created art also demands further attention. The humanities could certainly do better in this field. This thesis has shown that AI has become an intrinsic part of culture; there should be more interest in matters such as this, yet the technicalities of the field demand the understanding of terminology and methods from the field of computer sciences. Delving into both the worlds of IT and social sciences should be further encouraged, as a unified approach could help to show both the faults and advantages when using AI in combination with creativity. When it comes to the admittedly vague concept of creativity, understanding the extent and form of its role in the process of making art could potentially help break down boundaries. AI might not ever truly understand why it is doing what it is doing but that, it turns out, is immaterial; humans do and that is what makes the creation of art all the more interesting.

SUMMARY OF THE THESIS IN ESTONIAN (KOKKUVÕTE)

Magistritöö “**Loomingulisus, "Garfield" ja tehisintellekt: meie koomiksi-arusaama avardamine tehisintellekti abil**” uuris tehisintellekti kasutamise võimalusi koomiksite loomisel, uurimisel ja mõistmisel. Ma soovisin näha, kas tehisintellekt võib olla analüüsiks sobiv tööriist, kuna võrgustikud, masinõppimine ja algoritmid on saamas igapäeva- ja tööelus aina tavalisemaks. Uurimistöö võtmeküsimuseks oli, kas tehisintellekti ja algoritmide kasutamine võib kaasa aidata koomiksite loomisprotsessi mõistmisele, ja kas see võib osutada võimalustele, kuidas koomiksite loomist täiustada. Seeläbi oli käesoleva uurimistöö eesmärgiks ka praeguse koomiksiteaduse uurimine, et näha, kas tehisintellekti genereeritud visuaalnarratiivide kasutamine analüüsis toob koomiksites välja midagi enamat ja vastupidi, analüüsides ühtlasi kaasaegse koomiksiteaduse üldisi suundumusi. Koomiksivaldkond liigub ainult loojate vaadete arvestamisest kriitikute ja teadlaste nägemuste kaasamise poole. Jim Davise peaaegu 41 aasta vanune koomiksiriba "Garfield" sai valitud selle uurimistöö juhtumiuuringu objektiks, kuna see on kergesti mõistetav ja tuntud ka inimestele, kes ei ole koomiksitega sügavamalt tuttavad.

Sissejuhatavale peatükile järgnev teine peatükk andis ülevaate kahest erinevast teooriast, nende ajaloost, ja vaatas lähemalt üle mõned teemakohasemad kirjandustükid ja nende põhilised sõnumid. Koomiksiteadus inglise keeleruumis liigub akadeemilise diskursusega arvestamise suunas, eemale ainult looja vaatepunktile toetumisest, mida esindas näiteks Scott McCloud. Ma soovisin tutvustada koomiksiteadust tervikuna, et rõhutada selle valdkonna ulatuslikkust ja näidata, kuhu see on suundumas. Tehisintellekti pädevuse analüüsimisele tausta loomise eesmärgil tõin esile arvutusliku loovuse (*computational creativity*) kontseptsiooni. Arvutuslik loovus on mõtlema ärgitav valdkond, mis asetab rõhu sellele, kuidas tehisintellekt võib inimtegevusi toetada, ega püüa loomeprotsessi üle võtta: see omadus teeb arvutuslikust loovusest huvitava vahendi kunstis rakendamiseks – olgu tegu kaunite kunstide, luule, skulptuuri või koomiksite loomisega. Uurimistöö teoreetiline raamistik põhineb Margaret A. Bodeni, Geraint A. Wigginsi ja Simon Coltoni lähenemistel arvutuslikule loovusele ja Hannah Miodragi, Thierry Groensteeni, Pascal Lefèvre'i, Andrei Molotiu ja Hal Fosteri lähenemistel koomiksitele ja kunstile laiemalt. Eesmärgiks oli jõuda rakenduslikult väärtuslikuma lõpptulemuseni, samuti lisada koomiksiteadusele akadeemilist

tõsiseltvõetavust, mille poole see endiselt püüdleb. Senise koomiksiteaduse liigkaitsev hoiak valdkonna meediumina defineerimise suhtes on mõnel määral takistanud koomiksi nägemist omaenese diegeetilises ruumis eksisteeriva formaadina.

Kolmas peatükk keskendus algse "Garfieldi" koomiksi analüüsile ning kolme erineva tehisintellekti genereeritud "Garfieldi"-ainelise koomiksi analüüsile. Esmalt vaadeldi algseid "Garfieldi" koomiksiribasid läbi erinevate teooriate, mida tutvustati töö teooriaosas. Kolme tehisintellekti poolt genereeritud vaatlusobjekti seas oli üks kirjanduslik, s.t. tekstile keskenduv lähenemine nimega "Garkov", mis varieeris algsete koomiksite teksti, ja kaks visuaaliale keskenduvat varianti, mis mõlemad kasutasid generatiivseid võistlusvõrke ehk GANe (*Generative Adversarial Networks*), et luua täiesti uusi "Garfieldi" kujutisi nimedega "Avant-Garfield" ja "GANfield". Tehisintellekti abil loodud koomiksid polnud mitte ainult loetavad, vaid avasid "Garkovi" näitel ühe koomiksiriba kohta algsete "Garfieldi" koomiksiribadega võrreldes arvukaid tõlgendamisviise . Visuaaliale keskendunud "Avant-Garfield" ja "GANfield" aga osutasid algse "Garfieldi" koomiksi repetitiivsele loomusele, luues samas ka mõistetavaid ja eredaid, maalilikke kujutisi. Tehisintellekti kaasabil loodud koomiksite analüüs näitas, et "Garfieldi" koomiksiribadele saab läheneda võtetega, mida tavaliselt kasutatakse teistsuguste kunstivormide, näiteks sürrealistliku ja abstraktse kunsti analüüsimiseks. See osutus võimalikuks tänu Hannah Miodragi eeskujust lähtuva, nüansseeritud, nii visuaalseid kui kirjanduslikke metodoloogiaid põimiva lähenemisviisi kasutamisele, mis omakorda avas võimaluse vaadelda praktikas Bodeni esitatud loovustüüpe.

Käesoleva uurimuse peamine eesmärk oli uurida tehisintellekti ja algoritmide kunstilist ja loovat potentsiaali koomiksite näitel. Tehisintellekti abil loodud koomiksid osutusid eraldiseisvana elujõuliseks ja sobisid sellisena analüüsimaterjaliks. Neile lähenemine arvutusliku loovuse vaatenurgast ning erinevaid visuaalse analüüsi vahendeid kasutades viis huviväärsete tulemusteni, mis vastasid uurimustöö alguses seatud ootustele. Uurimisküsimused jõudsid positiivsete vastusteni. Koomiksiuurimise seisukohalt kerkis huvitava uurimisalana esile koherentsuse olulisus, ehk laiema pildi mõistmise tähtsus koomiksite vaatlemisel. Tehisintellekti uurimine läbi selle rakendatavuse koomiksite loomiseks tõi eeldatavalt kasu koomiksiteadusele kui valdkonnale, kaasates selle kategoriseerimise püüdlustesse reaalteaduslikuma lähenemise. Märkimisväärsena tõusis

esile tõik, et kui võtta vabadus kohelda koomikseid avatud hübriidina, osutub erinevatest valdkondadest pärit metodoloogiate rakendamine mõistuse piires teostatavaks, kuna see selgitab ja põhjendab mitmesuguste, näiteks abstraktsele kunstile ja sürrealistlikule kunstile tavapäraste analüüsivahendite kasutamist. Erinevate visuaalkultuuri uurimismetodoloogiate kasutamine annab koomiksite analüüsimisel mitmekesiseid ja ka ootamatuid tulemusi.

Tulevikus võivad magistritöö uurimisteema võimalikud edasiarendused keskenduda koomiksitele uue ajastu digimaailmas, kus nende vormi ei piira paberist aluspind ning kus need ei pruugi olla inimeste loodud. Koomiksiteooria kasutamine abstraktsete koomiksite analüüsiks võib pakkuda palju arutelu. Ma ei käsitlenud käesolevas töös narratoloogia aspekti, kuid ka see väärib tehisintellektiga seonduva analüüsimisel kindlasti rohkem tähelepanu. Samuti vajab tähelepanu tehisintellekti ülekaaluka panuse abil loodav kunst kui niisugune, nagu ka viis, kuidas inimesed tarbivad ja analüüsivad tehisintellekti loodud kunsti. Viimase uurimisel peaks julgemalt hõlmama nii IT kui sotsiaalteaduste valdkonna teadmisi ja uurimispraktikaid, mis võivad aidata näha digitaalselt võimendatud loovuse probleeme ja eeliseid. Loovuse rolli mõistmine loomisprotsessis võiks potentsiaalselt aidata kaasa piiride murdmisele meie laiemas arusaamises sellest, miks ja kuidas kunsti luuakse.

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