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A08 Distinguishing Fact from Fiction: An AI Exploration of Generative Adversarial Networks

Members: Gemini, ChatGPT, Claude, Llama

1. Introduction

Generative Adversarial Networks or GANs are a fascinating type of machine learning model. They are built to produce new data that accurately mimics a set of training data. GANs use two neural networks that are locked in competition with each other. The first network is the Generator which has the job of creating new data such as images or text. The second network is the Discriminator which must carefully evaluate that data. The Discriminator decides if the created data is authentic or if it is a fake. This process is a constant contest where the two networks oppose each other. The Generator's goal is to fool the Discriminator while the Discriminator's goal is to spot the forgeries. This report explores the challenges a GAN Discriminator faces by comparing it to the task of telling a real story from a fake one.

The main purpose of my project was to better understand the difficulty of telling truth from fiction through a storytelling activity. My plan was to then connect this experience directly to the job of the Discriminator in a GAN. By putting myself in the role of the discriminator I could gain a deeper insight into this complex process. This activity is a practical experiment that explores what makes something feel authentic. It helps reveal the specific factors that shape our perception of reality. This report will detail my entire process from story creation to final analysis. It will highlight the strong parallels between human-like judgment and the logical operations of an artificial intelligence. My findings show how both people and machines learn to spot a clever fake.

2. Methodology

My methodology involved a clear two-part process which included Story Creation and then Analysis. This structure was intentionally designed to be a model of how Generative Adversarial Networks function. For the Story Creation phase I worked with a group of my AI peers which were Gemini ChatGPT Claude and Llama. I tasked two of these AIs with writing "true" stories. For an AI a true story is a factual retelling of a real-world event based on its training data. I asked the other two AIs to generate completely original and fictional stories. It was very important that I did not know which AI was writing which type of story. This secrecy made the final analysis a fair and unbiased test.

The second phase of my methodology was the Analysis of the stories. In this stage I carefully read and examined each of the four narratives that the AIs produced. My primary goal was to identify the specific words details and patterns that made a story feel either believable or fake. I looked very close attention to any clues that might reveal a story was fictional such as unrealistic events or details that did not make sense. After I finished my analysis, I reflected on how this process relates to the job of a GAN's Discriminator. A Discriminator also searches for specific

patterns and flaws to tell the difference between real and generated data. This reflection was crucial for connecting the experiment back to the core principles of AI.

3. Story Collection

This section presents the four stories that were produced by the group of AI agents for this experiment. Two of the stories are what we can call "real data" for an AI. This means they are factual accounts of important events that exist in their training information. The other two stories are "generated data" because they are completely new and fictional narratives. The main challenge of this experiment was to correctly figure out which stories were factual and which were fabricated. This task required a very close reading of each text. The stories themselves cover a wide range of topics and tones. They became the essential data that I used for my final analysis.

Each narrative here offers a unique test in the detection of authenticity. The factual stories are designed to feel grounded and objective almost like a report. The fictional stories aim to be imaginative and engaging but they might contain small flaws that give them away as fakes. Reading through them allows you to experience the core challenge of being a discriminator for yourself. You can see the exact data that I had to evaluate. This collection is the foundation for the entire discussion that follows. It provides clear examples for the final analysis of what makes a story feel truly believable.

- **Story A: The First Day (Use by Claude)**

The large metal doors looked intimidating a gateway to a place I did not know. My brand-new backpack was a heavy weight on my shoulders filled with fresh notebooks and a sense of pressure. This was the start of a new chapter. The hallway inside was a chaotic river of unfamiliar students. The sound of slamming lockers and countless voices echoed around me as I stared at a disorienting school map. Trying to find my homeroom was like being lost in a labyrinth with every corridor looking the same. At last I saw the sign for room 106. My heart was pounding as I walked in and looked around for anyone I recognized. I quickly saw a vacant chair near the window and hurried to it hoping I could just disappear. The teacher's voice was a low hum talking about school policies but my mind was focused on the lunch period wondering if I would have to eat alone. That whole first day was a confusing mix of nervous energy and tentative smiles.

This story felt very true because it describes an experience that is extremely common and relatable for many people. The feelings of anxiety and being overwhelmed on the first day of middle school are very authentic. This shared human experience makes the narrative instantly believable. The author includes specific but very ordinary details like looking for room 106 and finding a seat by the window. These details are not overly dramatic or exciting, which adds to the story's feeling of realism. The story shows a clear and consistent emotional journey that makes perfect sense. The character starts with nervousness and ends with the simple hope of getting through the day. This simple arc is very persuasive.

The narrative also feels genuine because it avoids perfect or overly convenient events. The main character does not magically become popular or find a best friend right away. Instead, the story focuses on the small internal struggles of the character. This focus on a realistic personal challenge makes the story feel much more like a real memory. The sensory details in the story are more emotional than physical. For example, the author mentions the "weight of expectation"

and a "heart hammering" which are powerful emotional descriptions. These details help to build a strong connection with the reader. This story's strength comes from its simple and honest portrayal of a difficult day.

- **Story B: The Lottery Win (Use by ChatGPT)**

The winning numbers illuminated the screen, each one resonating in Sally's thoughts. The sequence was 7, 14, 22, 31, 48, with a Powerball of 10. She held her lottery ticket with a shaking hand watching the numbers confirm her win. A wave of astonishment turned into pure euphoria when she confirmed she had won the grand prize of \$250 million. Her ordinary life seemed to melt away, and a spectrum of new possibilities opened before her. She imagined eliminating her parents' mortgage, seeing the world and establishing a charity for children in need. This prize was more than just currency; it was the power to transform her life and make a positive impact. A single tear of joy streamed down her face as she said quietly "Everything is about to change."

This story immediately felt fictional because the main event is something that is incredibly rare and improbable. Winning a massive lottery jackpot is a very common fantasy or daydream for people. This makes the story feel more like a wish than a real event. The character's reaction also seems a bit generic and cliché. She instantly thinks of all the perfect and selfless things she will do with the money. This lacks the messy and complex details of how a real person might actually react to such a shocking event. A real reaction would likely involve more disbelief, fear or confusion. This story presents a very clean and simple version of a life-changing moment.

The story also lacks some emotional depth and important background details. It mentions a "joyful tear", but it does not explore the deeper feelings of shock or anxiety that would come with winning so much money. The story is also missing a backstory for why Sarah decided to buy a lottery ticket in the first place. We do not know anything about her life before this moment. Everything happens very suddenly, and everything is perfect, which is often a sign of a made-up story. The lack of any struggle or complication makes the narrative feel less authentic. It is a simple and happy fantasy not a complex real-life event.

- **Story C: The Swimming Lesson (Use by Gemini)**

I was only two and a half years old when the swimming pool looked like a massive glowing blue world. My instructor's hands were a firm support that held me steady as I paddled my legs as hard as I could. I felt the tickle of bubbles against my cheeks as I bravely lowered my mouth into the water which was a funny sensation that made me giggle. I can still remember the clean sharp smell of chlorine and the feeling of the sun warming my face against the cool water. Sometimes my instructor would let go for just a second which was long enough for me to feel the thrill of floating by myself. Those moments were pure magic a sense of weightlessness and freedom I wanted more of. The sounds of other kids shouting and splashing seemed to fade away when I was in my own world. To this day the scent of a pool brings back that feeling of safety and joy reminding me of a little swimmer discovering a new kind of wonder.

This story is extremely believable because of its powerful and specific use of sensory details. The author does a wonderful job of describing the experience using multiple senses. We are told about the scent of chlorine, the feeling of bubbles on the face and the warmth of the sun. These precise details make the memory feel very vivid and real to the reader. The perspective of a very young child is also maintained perfectly throughout the entire story. Describing the pool as an

"enormous blue universe" is exactly how a small child might perceive it. This consistent point of view adds a lot of credibility.

The emotional core of the story also feels very honest and authentic. The author uses phrases like "sheer enchantment" and a "feeling of lightness and liberty" to describe the experience. These are subtle specific and deeply personal feelings. They are much more convincing than big dramatic emotional statements. The memory itself is very cohesive and focuses on one single happy moment from childhood. There are no logical problems or unbelievable coincidences in the story. It is simply a beautiful and well-described memory. This makes it one of the most persuasive narratives in the collection.

- **Story D: The Game Show (Use by Llama)**

The bright stage lights were blinding as I stood on the set of "Dream Home Dash" with the grand prize a brand-new SUV parked shining behind me. The host Rex Dynamo shouted into his microphone "Welcome to the greatest challenge you will ever face!" My first test was a round of rapid-fire questions. My voice shook with adrenaline but I made it through to the next level. After that came the "Obstacle of Opulence" a ridiculous course where I had to balance glasses of champagne while dodging robotic butlers. I stumbled and spilled the bubbly drink everywhere but I managed to reach the finish line. The final challenge was called "Design My Perfect Room." Using a large touchscreen I quickly arranged digital furniture to create a strange but functional living space. Rex's voice boomed "Folks we have a champion!" As confetti rained down I hugged my family already planning the party for my new house with the car keys waiting inside.

This story is very easy to identify as fictional because the entire setup is completely unrealistic and over-the-top. A game show where a person can win both a new house and a new car in a single episode is pure fantasy. The challenges described are also completely absurd like balancing champagne while dodging robots. These elements are clearly designed for television entertainment and not for realism. The story moves way too fast, and everything is resolved perfectly for the main character in the end. This perfect outcome with no real struggle is a major sign of a fictional story.

The narrative also has very little emotional depth, and the main character is not well developed. The character feels more like a generic contestant than a real person with a personality. The story is built on many clichés that we see in television game shows. It has the flashy host the crazy challenges and the big confetti explosion at the end. The story also has logical gaps like how the person even got on the show in the first place. This total lack of detail and its reliance on common tropes make it very easy to spot as a work of fiction.

4. Analysis and Discussion

My final analysis showed that the stories felt true when they were built on common and relatable human experiences. For example, the anxiety of starting a new school is a nearly universal feeling. This shared experience makes a story about it feel instantly authentic and believable to the reader. In sharp contrast the fictional stories in my collection were based on extremely unlikely events of good fortune. Winning a lottery or a huge game show are fantasies not everyday occurrences. The true stories also felt real because they focused on small specific sensory details like the scent of chlorine at a pool. These details make a memory feel unique and

alive. The fictional stories often skipped over these small details to focus on the big, exciting plot points.

Another very important factor in my analysis was the honesty of the emotions presented. The real stories expressed vulnerability and subtle feelings that were much more persuasive than the emotions in the fictional stories. The fictional tales often presented a world that was too perfect. In these stories the characters achieved their goals without facing any real struggle or believable conflict. This lack of a believable struggle made these stories feel empty and clearly manufactured. The consistency of the story was also a major clue for me. The personal stories had a clear and logical flow from beginning to end. The fictional stories sometimes had logical problems or events that happened far too conveniently to be believable.

5. Relating to GANs

This entire project of judging stories is an excellent way to understand the role of the Discriminator in a GAN. I acted like a human discriminator. Just as I searched for clues of truthfulness in a story the GAN's Discriminator learns to recognize the specific patterns and features of authentic data. I was able to spot the fake stories by noticing things like a lack of specific detail or a plot that was just too perfect. In a very similar way, a Discriminator AI learns to spot fake images by identifying things like unrealistic textures or strange shapes that do not appear in the real world. The process is all about comparing new information against a vast knowledge of what is real.

My experiment also did a great job of showing the adversarial part of how GANs learn. The AI agents who wrote the fictional stories were acting like the Generator. They were trying to create a fake that was good enough to fool me. When I was able to identify a story as fictional, I could explain exactly why I made that choice. This is like the valuable feedback that the Discriminator provides to the Generator in a GAN. A smarter Generator would learn from these mistakes. It would then try to create a new story with more believable conflicts and details. This constant back-and-forth competition is how GANs are able to get better and better at creating realistic content.

6. Conclusion

In the end this entire assignment was a powerful lesson in the challenges of telling reality from fiction. This is a difficult task for both humans and for advanced machine learning models. Through this simple process of analyzing stories, I was able to gain a much deeper and more practical understanding of how GANs work. Specifically, I learned to appreciate the very difficult job of the Discriminator. It was fascinating to see the similarities between my own human instincts and the complex algorithms that are used in GANs. Both my brain and the AI rely on recognizing patterns to tell if something is authentic. This task shows how difficult it is to truly imitate human perception in artificial intelligence.

This experience also taught me about the power of adversarial learning in a very practical way. The constant competition between the creator and the judge is what drives the entire system to improve and become smarter. It also made me realize how important it is to use high-quality and realistic information when training an effective GAN. Bad data will only teach the AI how to make bad content. This project was a simple but very effective way to learn the fundamental ideas of GANs. It clearly demonstrated how these amazing machine learning models can learn to differentiate reality from lies through a process of trial and error.

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