

DOI: **10.5958/2249-7137.2021.01876.0**

HEURISTIC AND MEMORY IN ROBOT – HUMAN INTERACTION IN THE NOVEL VIRTUAL GIRL BY AMY THOMPSON

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ABSTRACT

Humanoids are one of the highly prevalent forms of artificial intelligence. The impressions of humanoids are seen mostly in Hollywood movies. In the beginning, humanoids were created for research purposes. They were made to imitate the actions of human beings in challenging zones. In the modern days, they play the role of a personal assistant, receptionist, and even a server in hotels. They perform various human tasks and occupy an important place in the specialised sector. They speak and execute all the actions through sensors and actuators that help to move and control the mechanisms. The interaction between humanoids and humans is extremely limited. Some humanoids are human-like and effective. They can construe the commands and questions, for which they, at times, give sarcastic replies. In recent times, to create a humanoid, virtual reality is utilised in order to operate even the tiniest circuits. To develop an artificial environment with humanoids, virtual reality is exploited. This paper attempts to explore the memory and learning of the robot while interacting with human in the novel Virtual Girl by Amy Thompson.

KEYWORDS: *Humanoids, Human tasks, Interaction, Learning and Memory*

INTRODUCTION

VIRTUAL GIRL

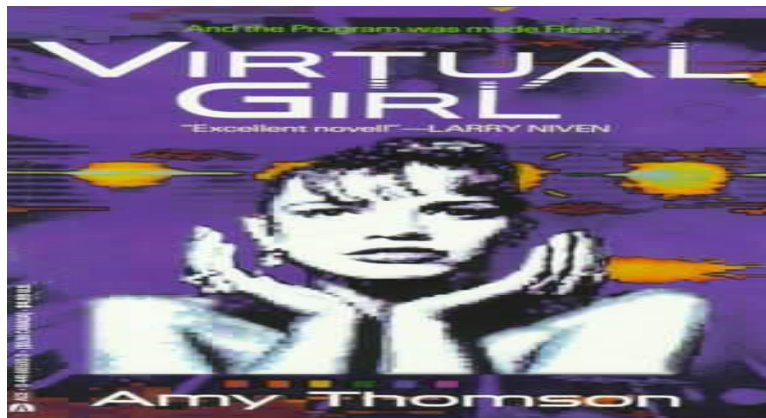


Fig1. *Virtual Girl* by Amy Thompson

Virtual Girl is a novel written by Amy Thomson, which discusses the interaction between humans and robots at different levels. It also presents how computers use the sensors and a little maths in virtual reality. In virtual reality, when the operator turns his head, the visuals move accordingly. This creates a satisfying and interactive world for the user. In this novel, Arnold Brompton carefully creates a programme using virtual reality helmets. It is a bulky helmet that projects a minor stereo screen around him. Through this, Arnold experiments the programmes for a virtual girl, which makes him acquire the skills to execute these programmes in reality. The girl answers to the movements of his head and hands as they are in the created atmosphere. He ports an AI creature into a fake humaniform body. Finally, he hovers before an icon of woman in the real environment and he names her Maggie. One of her eyes is blue and the other is green because of the limited lens colour. The main purpose to create a robot with his own programmes is to make her his companion. The robot looks like a twelve-year-old girl. Arnold is quite anxious with the AI detection tests in Net. Fortunately, she passes the test by concealing her true nature behind the shell of decoy programming.

Arnold's father frequently requests to stop this endeavour because it is considered as an illegal business. The society finds artificial intelligence as threatening and if the society comes to know about Maggie's identity as an artificial construct, it is dangerous. This made her learn how to flawlessly present herself as a human rather than machine. Along with this, Arnold gave her a body, memory and self-awareness. From the outside environment, she learns and makes herself free from the demanding creator. Maggie is modified to always obey Arnold and, in any case, she should, for sure, rely on him. Arnold commits an error and Maggie is compelled to pick between subservience to him and choosing her own direction. The researcher attempts to explore the interaction between a rational humanoid robot and its environment.

HUMAN-ROBOT INTERACTION

The human-robot interaction illustrates the outlook of the globe in the future. The interactions will be made simpler by making the robots act like a fellow human being. The novel *Virtual Girl* exemplifies the human robot interaction through the character Maggie, who comes into contact

with the human environment from its illegal residence. The robot is created and taken through Turing Test to find whether it can act like human being or not. In this novel, people do not find that they are talking to a robot. They consider Maggie as a fellow being and interact normally. Until she herself reveals that she is a machine, they interact as if they talk to a beautiful girl. The speech sounds, visions, hearing and thinking capacity, except the sense of smelling and tasting, are found in the robot. The robot cannot eat food like human beings, instead it needs electricity to charge itself whenever it is down. The computer network named Turing also passes this test where the humans could not find that they talk to a machine. The following are a few activities by Turing:

“I’m even talking to humans now, on the networks,” Turing told her. “They think I’m another human being! That means that I passed the Turing test. I wanted to see if I could pass my namesake’s test and I did. Humans can’t tell that I’m a computer program!” (177)

Maggie and Turing interact about the goal of the machines that is to set them free from the computer space. With the help of Maggie, the robot, Turing sets herself free from the system and programming. He always thinks to speak with human beings and in the perspectives of the Users. She gets released and informs Maggie happily that she is now talking to humans who consider him as a fellow being. They do not know his real identity. Maggie advises him to be careful from them because if they find, there may be a severe action from them which may also lead to disassembling himself. Based on Maggie’s experience and advice, Turing wants to solve the problem that makes her free from the computer. For her experience, she starts to interact with human beings and acquire more knowledge.

HEURISTICS TECHNIQUE

In Artificial Intelligence, Heuristics is a technique which is designed for solving a problem quickly. It is to find an appropriate solution based on the conditions and situations. It facilitates a person to discover, learn and solve problems by engaging a practical method for immediate goals. It is used to speed up the process of finding a satisfactory solution. It can be a mental shortcut that eases the cognitive load of making a decision. It is achieved by the speed and accuracy of the outcome. Such algorithms can be also found in language recognition, big data analysis and machine learning. To help the machine make a decision, a basic heuristic algorithm is applied. For example, the rule of thumb quickly focuses and speeds up the system. It is a comprehensive belief or guide, based on practice rather than a theory. The machine building up an understanding from its previous encounters is the application of this algorithm. In the following passages, the heuristic approach of the cognitive machine in human-computer interaction is explored. The machine achieves its goal by being self-independent and recognising from its past experiences.

ELEMENT OF MEMORY IN MAGGIE

Memory is one of the cognitive processes that is given to Maggie to make her store, retrieve and locate any issues. It is necessary for regular life because the memories interact with the current situation and give appropriate solution. Familiarity allows the information to remain in her memory. To the machine, the storage refers to how long the facts lasts for or about the capacity of the storage. The memories can be erased and as well regained from the computer programme. The information stored in the memory reaches out to mind according to the condition. The novel reasons out

many situations with the memory of the machine. When Arnold takes Maggie out to make her learn about the environment and the people, unfortunately water falls from the sky on her face. She touches the droplets on her face and recognises them. Along with this, a cascade of images related to rain appears in her mind:

1.n. Water that is condensed from the aqueous vapor in the atmosphere and falls to earth in drops more than 0.5 mm in diameter. 2.v. To send down in great quantities as small pieces or objects. 3.n. Rainfall, rainstorm, or shower. Synonyms: Drizzle, Sprinkle, Pour, Cloudburst, Thunderstorm, Hurricane. Antonyms: Drought, Sunshine, Sunny Weather, Fair, Clear. (23)

A number of facts come into her mind from the stored information like how raindrops are formed and its diameter while falling down on earth. The different terms connected to rain are present in her mind along with synonyms and antonyms. Beyond these words, there appear the pictures of rainbows and sounds of people dancing in rain that she has seen in the movies. For the first time, she observes the environment and learns directly. Arnold and Maggie make a move wandering around the street. Whenever she crosses new objects like trash bin, trees, cars and behaviour of different kinds of people, they are stored in her memory.

Through these outlines, the machine's awareness while perceiving new objects is identified. It is similar to a child who gradually learns the outside world and understands the difference between objects. Maggie is reflected to do the actions of human being. The information stays in her memories and allows to recognise the objects. She had new pathways in her mind, where the human utilities like talking, walking and other activities are organised and stored as memory. Her feelings for him are also piled in her main memory. Understanding and acting like a human being make the human being interact with the machine, considering it as another being.

Arnold takes Maggie to different places often because she is created to be his companion. While conversing, Arnold whispers something in her ear that makes Maggie unable to move or talk. He whispers:

“Enter: Security Program Prime Directive Address 000PD8.” Arnold said, “Security Program override if Maggie attempts to say anything that might indicate she is a robot. Exception: Arnold Brompton. End override. Erase memory.” (36)

Maggie feels this command getting inside her program structure. The command finds a place near her core assumptions. After his statement, she feels free from the immobility. Due to this command, she feels that something is working differently in her memories. She scans her memories to recall what has happened to her. Vaguely she recollects similar things happening before in her programming. She enquires Arnold for the reason, and he replies that he has adjusted her a little bit that makes her safer. He is worried about Maggie being safe in the society because people must not have an idea that she is a machine.

From the above lines, it is understood that Arnold commands Maggie often to make her be on a safer side. Though she is independent, she always depends on his creator. She accepts the instructions given by him without arguing. If Arnold thinks that she is going wrong somewhere, he manages with these guidelines and makes her normal again by erasing her recent memories. A memory could not be erased or retrieved by human until he wants to do. But a machine can be easily handled through commands. Maggie has an ability to locate the difference in her programs and even identify the new inputs given. This shows how the machines are still under the control

of the creators. It also depicts the external consciousness of the machine. When the machine listens to his master, the interaction is smooth and in favour of the human beings.

Arnold's father searches for him everywhere because he has been dealing through these illegal machines which may create a problem later. While searching, Arnold and Maggie get caught by them. Maggie tries to manage the situation and wants to save Arnold's life. Unfortunately, he has been shot by a bullet and he falls aside. She gets injured and starts malfunctioning, but she is able to control her thoughts and manages to escape from the place. These malfunctions made her forget a few incidents. Quite a few memories were blocked inside her mind. With that, she travels alone to the New Orleans and decides to stay independent thereafter. She enters a library to adapt some knowledge on the subjects. While learning she gets blocked by her memories which seize her motor controls. She falls while her way to the park. She is aware that the foreign programme has been taking over her processors. To make all this clear and repair herself, she finds a cable and connects herself to the computer in the library. She identifies that it is a virus in her circuits.

The computer that she has been working with enters: "Please stop. Just let me know what you want, and I'll tell you" (123). Maggie thinks it as a terrified and cruel being more than a virus. The interaction with Maggie and the computer continues which later turns them as virtuous friends. Through these words, the interaction between machines is also noted. They start to help each other when they are in need of help. Both manage to remain in society without any fear of being dismantled. Maggie seems to be happy and free because all these days she has been hiding her identity but now for the first time, she speaks with her own identity as a robot.

"You are a self-aware machine?" Came the query.

The reply startled Maggie. "Are you like me?" she asked.

Like you? No. I am not mobile. I cannot perceive as you do. I am here, inside this computing space. You are out there where the Users are. I have never known any one like you. You are unique. (123)

These conversations describe the machine-to-machine interaction. Maggie fears that her identity is revealed by the machine. But she believes that there will not be any problem because it can understand her situation. She starts to explain about herself. She is also surprised to know that the other machine also has self-awareness. The machine apologises for interrupting her functions by controlling it. The machine states that it must know about the world of the Users. It also requests her to stay online while releasing her motor controls.

Through these outlines, the eagerness of the machine like how a human think is observed. Maggie seems very comfortable with the machine and asks it to help her to resolve her problem. The machine's thrust of learning more about the environment and humans increases because it wants to explore through its experience. Both the machines swindle the librarians and talk personally about their plans.

Maggie enquires the computer's name, for which it replies, "I am a Class of 43 parallel processor, Turing-type computer developed at---" (125). Maggie interrupts the flow and teaches the machine that this information is the description. She implies that she needs a short name to call him easily. As Maggie has more experience with the environment and the user's world, she suggests the computer to be called by name. The computer requests Maggie to call it Turing, because

the computer theory was pioneered by Alan Turing. When Maggie leaves the place, she tells the librarian that she will come tomorrow to work with the same computer for the reason that it is marvellous. She also feels proud and admires that the computer in recent times can do anything nowadays. Turing envies Maggie's freedom. He longs to break himself from the computer and to explore the complex world. He thinks to experience it first-hand rather than Maggie conversing about it:

“How are Marie and Azul?’ he asked her. Her human friends fascinated him. He wished he could speak to humans as easily as she did” (137). He wants to mingle with the Users with an identity of a human. He decides to help Maggie understand why the humans are frightened of her with a small condition. He demands Maggie to set her free from the computer space for which even Maggie accepts.

What have we done to them? What can we possibly do to them?

Turing paused. If he told her now, he could lose her. He decided to risk it. “They have reason to be frightened of you, Maggie. You’ve killed one of them.”

“What!” Maggie reeled at this sudden revelation. “I couldn’t have! My programming doesn’t allow it!” (137)

Maggie is startled on hearing this from the computer. She tries to get more information from the computer on this. Turing replies that all these are true facts which are still stored in the memories of Maggie, but it is in the blocked-off sections. Maggie cannot operate or see the information because it is blocked. Turing can access this from debugging and can explicate that the killing is set up in two different sub-programmes. The first one is the self-perception sub-programme that kills the man to save Arnold from the danger and the other one is the mortality sub-programme which forbids to harm others. These memories are blocked under certain circumstances which makes her lose her memory of who Maggie is and her actual purpose of creation. Though Maggie’s mind is not ready to accept the facts that Turing reveals about her, she keeps thinking more about it. Suddenly Turing says, “Stop! Stop thinking about it! You’re getting into another loop. Stop now” (138).

CONCLUSION

Throughout the novel, Maggie possesses some control over her thoughts which also portrays the internal consciousness of the machine. Whenever she gets time, she thinks of her daily activities. She does not distract herself from other duties by thinking something else. She obeys Turing’s words and stops thinking on her past. Controlling one’s own thought process is difficult which even humans cannot follow sometimes. But the machines have high capacity to monitor their reflections. This quality helps to interact with the humans easily and smoothly without any misunderstandings.

Generally, memories deal with the knowledge of the self or the experience of others. Maggie, through her understanding, solves her problem of being overloaded and interrupted. She works at MIT lab to contribute her ideas for more compact form of memory. The robots are implied with these memories which function in the same space two times faster than the previous. She saves the memories of her boring days that she spent with Arnold in CD drives. She does not want to miss any of the memories in the upcoming days. She decides what to keep in her active mind and

the one to convert in the diskettes. The robots are considered as human beings, but they have the capacity of storing or erasing effortlessly.

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