A STUDY OF ARTIFICIAL INTELLIGENCE AND ROBOTICS

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Abstract-: Abstract- Artificial Intelligence and Robotics are not the new terms; they have been here for last many decades. Creating leisure for human being for lessening their efforts and making easy tasking more easily, AI and robots are gaining their place. This report discusses the nature of AI and robotics along with their applications and uses in real life.

Keywords- Artificial Intelligence, Robotics, AI – programs.

1. INTRODUCTION

Science and technology has evolved a big time in past few decades. What was once just a fragment of our imagination of some our favorite sci-fi literature/movies, has come to reality. Artificial Intelligence (AI) taking roots in our daily lives. It has already had found an impact in more subtle ways. From weather forecasting to Google’s search prediction and voice recognition, AI is taking all over the information technology. AI brings machine-learning algorithms that enable technologies to react and respond in real time. This kind of technology is not the best as many critics indicates that this is not best for human beings as it challenges the law of nature. On the other hand, robots are making steady presence in to human world. Since the invention of robots, work has been divided between humans and robots. Technology has matured to integrate robotic technologies in to the human environment for daily use. With their advanced technology and autonomous, they learn how to do jobs faster and more perfect than humans. Their accuracy and efficiency make them the perfect for a variety of jobs that human can't do. Many IT experts believe that robots are stealing human's jobs but the efficiency is real. Though, this integration cannot be successful without understanding the interaction between humans and robots.

1.2 What is Artificial Intelligence (AI)?

Artificial Intelligence is the field that aims to understand how computers can be made to exhibit intelligence. In any expect of thinking, whether reasoning, perception or action. John McCarthy, defines AI as "Artificial Intelligence is the science and engineering of making intelligence machines, especially intelligence computer programs". It refers to the ability of a computer or computer-enabled robotic system to process information and produce outcomes in a manner similar to the thought process of humans in learning, decision making and solving problems. The goal of AI is to develop system capable of tackling complex problems in ways similar to human’s logics and reasoning.
AI is not a new concept, it times back to Greek civilization. But in modern times, it traces back to 1950's in the time of technology revolution when AI went from fiction to plausible reality. Alan Turing, WWII code breaker is considered to be one of the first people to come up with the idea of machines that think. He is the founder of Turing test, which is still used to test the machine's ability to think. Further, Marvin Minsky was one of the leader thinker of AI in 1960s and 70s. In 1980s the invention of personal computers further sparked the concept of AI more. It took decades for people to understand the concept of AI finally. Physicists like Stephen Hawking worked in this field and continuing the conversation about the potential for AI technology could radically change the course of human history when it comes to big data. The very idea of AI is ability to continually learn from the data it collects. The more data is there to collect and analyze through carefully crafted algorithms, the better machine becomes at predictions.

1.3 APPLICATION AND USES OF ARTIFICIAL INTELLIGENCE

There are many useful applications of AI, here I am discussing a few.

**Speech Recognition**

The ability of the device is to understand a human talking to it. This ensures human has talked to the device or computer system before. Siri, Google, Cortana are all intelligent digital and personal assistants in various devices. They help finding useful information when you ask for it using your voice.

**2. Video Games**

AI in video games has been using since day 1. But the complexity and effectiveness of AI has evolved over past few decades. Resulting in video games characters that learns your behavior, respond to stimuli, and react in unpredictable ways.

**3. Handwriting Recognition**

Human writing transformed into text that can be edited in a palm sized computer or tablet or smartphone. A stylus is used to write on the screen then handwriting recognition software will then change it into a text. **4. Smart Cars**
Google's self-driving and Tesla's autopilots are two examples that bringing up the concept of smart cars. Google developed an algorithm that could potentially let self-driving cars learn to drive in the same way like humans do.

5. Stock Market Predictions
Evolutionary computation's technique has been helping in the field of finance over past decades. EC techniques like Genetic Programming and Genetic Algorithms have been helping traders and investors giving the best solution in trading and portfolio optimization.

6. Fraud Detection
AI is often the technology deployed to monitor credit card fraud. Computers are given a very large sample of purchases and asked to learn to look for signature recognition.

1.4 WHAT IS ROBOTICS?
Robotics is a branch of AI. Which is composed of, Mechanical engineering, computer science and Electrical engineering for designing, assembling and application of Robots. Robots are aimed at manipulating the objects by perceiving, selection, affecting, modifying the physical properties of object, destroying it, or to have an effect thereby freeing manpower from doing repetitive functions without getting bored, distracted or exhausted. The aspects of robotics include, mechanical construction of robots to design to perform a task; electrical components which provide power and control; computer programs that determine when, what and how a robot does something.

Components of robots
Robots are constructed with following:

- Power Supply
- Actuators
- Electric motor
- Pneumatic Air Muscles
- Muscle Wires
- Ultrasonic Motors
- Sensors

1.5 COMPUTER VISION
This technology allows robots to see. The computer vision plays a vital role in the domains of safety, health, access, and entertainment. Computer vision helps in extracting, analyzing and grasping useful information from a single image or an range of images. This process involves development of algorithms to accomplish automatic visual comprehension. Hardware of computer vision system involves:

- Power supply
- Image acquisition device such as camera
- A processor
- A software
- A display device for monitoring the system
- Accessories such as camera stand, connectors and cables

1.6 APPLICATION AND USES OF ROBOTS
The application and uses of robots are many, but here I am discussing few of the notable;

1. Space Exploration
Remotely Operated vehicles (ROV) and Remote Manipulative Systems (RMS) are the two major types of robotics that are used by space explorers. Both are used in a variety of space missions. ROVs can be unmanned spacecraft that orbit freely or land when it makes a contact with an outer space surface and explore the terrain. Both have abilities to collect information and take visual footage that would have never been possible.

2. Underwater exploration
ROVs are doing their job here as well. The underwater robots can dive longer and deeper than possible for humans and provide close-up look at marine life. These are equipped with sensors, HD cameras, wheels and other technology to assist scientists.

3. Military services
These state-of-the-art machines save lives by performing extremely dangerous tasks without putting human live at danger. Robots that are used by military are mostly Explosive Ordnance Disposal ESD. These robots have ability of examining suspicious packages and nearby areas and automatically deactivates explosive and mines.

4. Car Production
Robots are used in automobile industries for manufacturing cars. These high-powered machines have mechanical arms with tools, wheels and sensors that make them ideal for assembly line jobs. These robots are not expensive but do tasks, which are impossible for humans.

5. Investigating hazardous environment
Robots have become increasingly important for investigating and researching hazardous environment. these robots are capable of entering a volcano to collect data or buildings that are caught on fire to look for victims and calculate the loss. LEAs, and fire fighter department to locate the victims and loss use scout Throwable Robots. They also can detect grenades and explosives.

1.7 DIFFERENCE BETWEEN AI PROGRAMS AND ROBOTS

<table>
<thead>
<tr>
<th>AI Programs</th>
<th>Robots</th>
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<tbody>
<tr>
<td>They usually operate in computer-stimulated worlds</td>
<td>They operate in real physical world</td>
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<tr>
<td>They input to an AI program is in symbols and rules</td>
<td>Inputs analog signals to robots in a form of images or speech</td>
</tr>
<tr>
<td>They need general purpose computers to operate on</td>
<td>They need special hardware with sensors and effectors</td>
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Figure 1: Difference between AI Programs and Robots

2. EXPERIMENT

Project: Flippy, The dancing robot

2.1 MATERIAL:
Geared DC motors with lead, 3XAA battery holder with cover and switch, Mini breadboard, AA batteries, 2 corks, 2popsicle sticks, double--sided foam tape, duct tape o electric tape, scissors, screwdrivers, glue, rubber bands, twist ties, string, modeling clay, camera.

2.3 PROCEDURE
Gather all the equipment to build the robot. First step is putting the batteries in the battery holder. Press corks on the motor shafts. Use duct tape to tape a popsicle stick to the cork. Use the double side foam tape to tape the motors to the battery. Mount the breadboard on top of the motor. Then connect the battery to the breadboard and connect one motor wires with breadboard. And test the first
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circuit. Now, connect the second motor wires with breadboard and test your circuit again.

\textbf{Result}

The design of robot is complete. Start by turning your robot on and putting it in an open space on the floor. The robot is successfully dances and trembles around.

\textbf{3. CONCLUSION}

Artificial Intelligence and Robotics are here to do wonders. As we learnt that within few decades these technologies have played a major in different fields from manufacturing to commercializing. These technologies especially robots have lessen the human efforts. They are replacing humans in different position and in different fields. One can consider the future of AI and Robotics in the future, as they are going to revolutionize the IT, industries, and many other sectors.

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