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The Study of Emotional Intelligence in Artificial Intelligence

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Abstract:- In the recent years, Artificial Intelligence has began to take over the technology industry. It started off with giving us a new scope of development and layout to the prospering technological trends. It gave us many solutions to the problems we face and increased higher efficiency to solutions that we overcame and yet to overcome. However, it still undergoes the process of perfection as it still copes up with the ability of learning and understanding of enabling itself to replicate into a humans' intelligence. Artificial Intelligence may learn to act faster than a human by observation and experience, but that only limits itself to certain fields today. Although, this intelligent agent is highly rewarded to society and its impact today, it can be more humanly with the use of Emotional Intelligence equipped into it. With the help of Emotional Intelligence in Artificial Intelligence, we can allow it to widen its fields of knowledge and to provide further and more advanced solutions to complicated problems. If we can have an Emotional Artificial Intelligence, this can make an impact to close the barriers between a human and a machine. With this, it can help in fields like medical, consultation, education, and more, as well as provide new opportunities by equal treatment. In this paper, we'll be talking about how Emotional Intelligence plays a role in Artificial Intelligence and its applications in various fields and also the impact that it will have on society.

Keywords:- *Artificial Intelligence, Emotional Intelligence, Emotional Artificial Intelligence, Agents, Machine, Fields, Problems, Solutions.*

➢ *Thesis*

The implementation of Emotional Intelligence in Artificial Intelligence we can give better solutions and scope to the advancement of technology and its roles in all fields. Emotional intelligence can materialize human-like behavior that establishes the best relationship between humans and machine. It gives out accurate analysis and reports over the time which gives an efficient understanding of real life problems. Emotional Intelligence in Artificial Intelligence can help ignite the scope of technology by more efficient methods and accurate ways of development. Emotional intelligence in Artificial Intelligence can upbring and evolve into a better source of input and output for solving everyday problems. By adding emotions into an intelligent agent, it can reduce the risk of social issues, and help to understand the human psychology better, as well as provide accurate analysis from time to time. An emotionally intelligent agent may have the ability to grasp human-like traits such as behavior by the means of observation to provide analysis and assessment to solve problems.

I. INTRODUCTION

Artificial Intelligence is the process of exhibiting human-like tasks in machines through various methodologies. Most AI examples are Deep Learning and Natural Language Processing which enables applications like self-driving cars and chess playing computers. The roles of AI are to create and perform a better analysis to produce more accurate results in data and business intelligence [1].

In 1956, the term Artificial Intelligence was formulated from topics like problem solving and symbolic methods. During the 1960s-1970s the US Department of Defense started a work on AI research. They trained computers to perform basic human reasoning, such as the street mapping projects, creating intelligent personal assistants that came to place in the early 2000s, before the well known creations such as Siri, Alexa and Google Assistant. [2]

During the 1980s-2010s Machine Learning came into to place that gave the most popular news like google self driving cars, online recommendations for videos, and fraud detection. Machine Learning is one of the most important foundations in AI, it bases on the idea of where an AI system(s) can learn from data to identify patterns. [3]

In the today's world of AI, Deep Learning bloomed the advancement of Artificial Intelligence. Deep Learning is another type of machine learning that instructs a computer to perform human-like tasks. Examples are making predictions, recognizing speech patterns such as; adding sound to silent movies. Without Deep Learning AI will never be the same as today. [4]

"With Artificial Intelligence we are summoning the Demon."
-Elon Musk

"The development of full Artificial Intelligence could spell the end of the human race."
-Stephen Hawking

"There is no reason and no way that a human mind can keep up with an artificial intelligent machine by 2035."

-Gray Scott

Emotional Intelligence also known as EI, is the state of being able to recognize and act upon behavioral traits of oneself as well as others. The first purpose is to recognize, understand and manage our own emotions. The second purpose is to recognize, understand and influence the emotions of others. Emotional Intelligence is more equipped than that of IQ, due to the fact that it deals with behavioral traits. These traits take part in making decisions, solving problems, and also plays an effect in the way one thinks (positive and negative). [5]

Emotional Intelligence dates back to the 1990s when Peter Salovey and John D. Mayer have come up with the term. Salovey and Mayer further developed various measures to know its significance. One such study has shown that, when a group of people saw an upsetting movie, those who scored high of emotional clarity recovered more quickly. Emotional clarity is the ability to identify and give a name to a mood that is being or has been experienced. In another study, individuals who scored higher in the ability to perceive accurately, understand, and appraise others' emotions were better at fixing situations and being flexible to the thought of their social environment and built supportive social networks. [6]

A. Present World and Problems [7]:

- DISCRIMINATION/INEQUALITY
- MENTAL DISORDERS
- COUNSELLING
- LACK OF EDUCATION

- *Discrimination/Inequality*

One particular issue that has been around is discrimination. Discrimination is the prejudicial treatment of different categories of people, especially in the grounds of race, gender, age, and culture. AI with EI can be programmed to not have prejudicial emotions, and can treat everyone equally under the right laws and treatment.

- *Mental Disorders*

Mental Disorders have been increasing in the current generation and show an unsteady pattern which puts human life at risk. The inability of controlling one's' thoughts or emotions can decrease the individual's efficiency to perform daily tasks which can make an impact to the others. However, an Emotionally Intelligent agent can recognize patterns, analyze data, and provide accurate solutions from time to time to improve the individual.

- *Counselling*

An approach of live interaction between human and machine which is emotionally equipped that can help any individual with their problems in life. Some examples are depression, relationship crisis, family issues, educational pressure, peer pressure, and for self-improvement and development.

- *Lack of Education*

Practices of unfair education are still a continuum in society. Not everyone who wishes to get educated is getting the right privilege for that. Some problems arise due to, status, gender, location, religion, age, and prioritizing of individuals. AI can fix this issue by equal rights to all committees. Thus, society will change in means of everything.

B. Contribution of AI

Artificial Intelligence has been the uprising scope that has brought many changes in the world today and shall bring more advancements to perform and give out better solutions to everyday problems. Illustrating human-like traits in machines have gave better performance and better risk analysis in various sectors, thus improving the overall functionality of the entity. So far, Artificial Intelligence has been used in heavy construction, gaming, education, healthcare, and so on.

- *AI in Healthcare*

Healthcare has made drastic improvement in the performance with the help of Artificial Intelligence. One such way AI has changed healthcare is by virtual nurses. Virtual nurses are assistants that follow up on the patients' schedule with the doctor, help follow up with treatments, and learns to support patients emotionally, specializing in their chronic illness. [8] Sense.ly, a startup company developed Molly, a digital nurse who can take care and improve the condition of the patient.[9]

- *Gaming in AI (NPCS)*

Artificial Intelligence has been in the gaming industry since Pong; first game in history dating back to the 1970s. The term was used as NPC- Non-Player Characters. It was a method for a human to play against a virtual simulated player. Most popular titles would be Chess, training the computer to be a Grandmaster against humans. The game of Chess had the most powerful and intelligent AI during the 90s. Today use of AI in games would be the Fallout or GTA titles, where in a single player game; meaning only one human can play it, had few thousand NPC that programed with conversations, fight enemies, and react to take cover when a human opponent fire at them. [10]

➢ *AI in Construction*

The development of construction has made an uprooting impact to society with the usage of Artificial Intelligence. Tools such as drones and safety sensors built with Artificial Intelligence has made construction precise and efficient. Drones, used to save time and provide an aerial view of the site have made construction much more accurate and reliable. Another such tool used are safety sensors. With the help of Artificial Intelligence in safety sensors it can prevent from any harm or danger occurring. Analyzing the construction site and predicting the best ways of construction can help the heavy industries be at reliable sources of inputs and outputs. [11]

➢ *AI in Education*

Many schools and institutes have incorporated the use of AI as tools for grading student exams by an automation system in multiple choice type of questions. This sped up the process for grading in a exponential level. Teachers and Professors can save a lot of time from grading traditionally, and bad prejudice opinions about from professors to students will decay since there is no way of altering the answers. The most advanced AI used today is an application called PhotoMath. This application has the ability to scan (via phone's camera) any math problem from basic algebra to advanced calculus. The AI in app can scan any symbols from computer font to human handwritten problems. It simply takes a photo of the problem and solves it by showing a step by step of the procedure. This helps students who struggle in math, by saving time, getting to learn the procedure faster and feeling at ease for saving many resources. [12]

C. Future World Advancements

The advancement of AI in the field of education can bring an efficient and systematic way to the students of the future generations. According to the article on Towards-DataScience, using Smart Tutors and Personalizing type of Artificial Intelligence which creates digital professors that can help students who are facing difficulties in learning. This method can be optimized from student to student, giving basis of the type of student he or she is. Such that the AI can cross reference the skills and weaknesses of the student(s) possesses. This will create a huge impact on the learning foundation. [13]

II. WHAT IS AI

Artificial Intelligence is the process of exhibiting human-like roles into machines or computers. In other words, the science and engineering of creating machines which portrays the basic fundamentals of human beings is called Artificial Intelligence. Artificial intelligence is a widely used vertical in the present-day scenario in the field of STEM. The key roles of an AI equipped machine is to learn, study, analyze the problems, create accurate solution(s), make predictive analysis to the entity and to create a better risk assessment for certain attributes. [14] Artificial Intelligence is not just one vertical but a combination of several fields put together. The automation of creating a machine which employs human-like traits is carried from the fields of computer science, philosophy, psychology, sociology, math, biology, and neuroscience. [15]

A. Machine Learning

Machine learning is the study that allows the computers the capability to learn without being explicitly programmed. It is mostly used in Artificial Intelligence. Machine learning enables computers to learn from experience and understand in terms of hierarchy. In other words, Machine learning is exhibited to increase the efficiency and performance of a given set of knowledge from experience. The different applications in Machine learning are pattern recognition such as recognizing handwriting from a pen or pencil, handwritten zip codes from envelopes, to recognize characters within gap of letters and to differentiate among the sizes of font.[16] Some other major applications include, weather, banking statements, diagnosis of mechanical devices, preventing breakdowns in electric transformers, increasing speed for natural language interface and testing engines for space shuttle.[17] Machine learning is in many types of fields today and as it continues to grow it gives us security, stability, and more reliability.

B. Deep Learning

Deep learning made a breakthrough in the field of Artificial Intelligence, it is more advanced than that of conventional machine learning algorithms. Deep learning allows computational models that are in multiple processing layers and learns many types of representations of data in the high level of abstraction. Deep learning in another way of advancing the technological aspect of what machine learning is capable of. Some applications include, object detection, visual object recognition, advanced speech recognition, and bloomed in processing images, videos, and audio. One of the main advantages of deep learning is that the higher the compressed data it has the faster the performance it gains. [18]

➢ Limitations of AI: [19]

Artificial Intelligence has the ability to change the world and make tremendous impacts on society, however, there are some drawbacks in which need to be improved and supervised. Such drawbacks include:

- *Robustness of AI-*

In today's Artificial Intelligence, the machines can be fooled easily which interrupts all machine learning techniques. This plays a role in effecting on how it can make an change to the world. These systems, have the ability to gain tremendous knowledge but without proper supervision and improper use of algorithms these machines may not function as expected. Due to this, this can increase a lack of imitating human functions. The real world example in the use of Artificial Intelligence would be the invention of UBER of

self-driving cars. The intervention of human mistakes caused the Artificial Intelligent machine to be unresponsive to its own actions. [20]

- *Multi-Component Model*

A machine is automatically called intelligent if it provides the accurate analysis and solutions to customized data. The machine, having the ability to grasp and acknowledge human behavior learns upon algorithms and its input functions. However, when a situation arises in which the machine is required to perform its own analysis based on its observation, that is when intelligence is used as a multi-component model. An Emotionally Intelligent agent, being driven to act like the human brain with emotions like common sense, planning, perception, and reasoning would be helpful in the automation of machines. For example, a driverless car. In the scenario of a driverless car, it is required to perform its own reasoning to implement what actions to take in particular situations.

- *Large Datasets and Hard Generalization*

Machines give the most impressive results when they have been through extensive training on large datasets such as image recognizing and speech translation. There are limitations when a machine goes through limited training and new parameters of data is introduced to the machine. The AI fails most often due to the lack of training, where human beings do not. The AI of today is still missing the high level of abstraction and generalizability. This is problem that will occur concurrently when new range of situations by environment and data.

III. WHAT IS EI IN AI

Emotional Intelligence is a set of skills based on an educated guess having an accurate visual of an entity, by combining the expressions and emotions in oneself and others' it uses those feelings to plan accordingly and achieve greatness in one's' life. Its purpose is to recognize, influence, and understand the input of the feelings. [21]

EI is categorized into three main fields, which are:

- Appraisal and Expression of Emotion
  - ✓ Self
  - ✓ Other
- Regulation of Emotion
  - ✓ In self
  - ✓ In other
- Utilization of Emotion
  - ✓ Flexible Planning
  - ✓ Creative Thinking
  - ✓ Redirected Attention
  - ✓ Motivation

In the 1990's a study conducted has shown how individuals react upon social scenarios. The study has proven that emotions play a big effect in the decision making of individuals. Its shows that when a group of people watch an emotional film which portrays negative or an upsetting theme, the state of mind of the individuals become seemingly sad due to the fact that they have less emotional clarity. On the contrary, the people who were able to understand and grasp those emotions and understand the concept from its' point of view have a higher emotional clarity. Emotional clarity is the ability to identify a mood that is being experienced and given a name to it. [22]

➢ *EAI - EI in AI*

Artificial Intelligence is the making of a machine, computer, and a software system to think and act as a human. The AI should perform logical tasks and have natural intelligence of a human. Having Emotional Intelligence in Artificial Intelligence can increase the similarities from a human to machine, which in return can help and understand the perspective from a single individual to society view point.

Various studies done on Emotional Intelligence being added into three types of entities [23]:

- Non-Humanoid Embodied Agents
- Humanoid Embodied Agents
- Virtual Agents

These tests show that it is crucially important to respond to emotions expressed by human beings and itself. According to Ruud Hortensius, the goal of his studies is to provide emotions into a machine by human observation and to bring a different perspective of change to the way of thinking. In addition, emotions can upbring different feelings to machines such as positive and negative reactions, whether it's on social impact or on itself. Such positive and negative emotions are empathy and aggression. For example, a study was done on a human participant to train a robot to manipulate objects and while the robot showed three facial expressions: happy, content, and annoyed. Towards the end of the training, the evaluation of the subject improved and human participants noted that they were more satisfied and comfortable due to the fact that they had facial expressions. Thus, factors such as facial and bodily expressions are a key aspect in the detection of emotions on machines. Facial expressions are for the mental state while the bodily expressions represent emotional state. Artificial Intelligence not only gains knowledge through means of observation but also by replication of what it views. An example would be, there can be various scenarios of how a machine would react to another machine, a machine reacting to a human, and much more. Adding Emotional Artificial Intelligence can have an effect on the various fields of studies like; Healthcare, Physics, Culture. [24]

Many of the AI today can do jobs like:

- Gather data
- Analyze the data
- Interpret the results
- Determine a recommended course of action
- Implement the course of action

Many of the jobs today that include those skills are:

- Teachers
- Doctors
- Business Consultant
- Stock Broker
- IT- Law

According to Allerin, a business solutions company that works on many types of software such as; AI, Blockchain, IOT, Big Data, and Cloud Based Systems. It shows that with Emotional Intelligence in AI it can be hugely impacted to society. Society can have a huge benefit in the various fields of study and occupational purposes by adding Emotional Intelligence in Artificial Intelligence, which will expand in many fields such as:

- Doctors and Nurses: to help and deliver care for patients and customers.
- Sales Manager: Chat boxes can help in the proper delivery of customer to service interaction, thus improves in sales and customer service.
- Students: Optimize the field of work on their weakness and strengths, and help with their struggle in education.
- Normal day-to-day work fields: Help with the understanding of emotions like anger, frustration, happiness.

Many corporations and business such as Google, Amazon, Microsoft are investing in Emotional Artificial Intelligence to build personality into their technology in the next coming five years. They are projected to grow into a multi-billion-dollar industry which would be capable of taking the front lead and implementing responsible actions which would make an impact to the world. [25]

IV. DEVELOPMENT OF EI IN AI

The upshot of Emotional Artificial Intelligence started after the development of Artificial Intelligence. Knowing that by adding emotions in AI, it will increase the chances of similarities between human being and a machine. It will also understand a human and increase its probability to know the cause and effect of a problem. Many machines are in our household items such as kitchen, bedroom, which are artificially intelligent to help us with our daily tasks, however, they are emotionally unintelligent to adapt to our fulfillment. If one desires an Artificial Intelligence, the Artificial Intelligence should be able to adapt to the individual's state of mind. Many technologies are being developed at MIT laboratory. A technology exists where it recognizes a person's posture to identify if they are interested or of lack of interest by their representation. Other technologies include recognizing emotions from physiology as technology exists as wearable systems such as smart watches, trackers, which has the ability to sense information about changes in heart rate, muscle tension, skin conductance, temperature, which can track the person's cognitive and emotional stress by variable change. [26]

The present time of Emotional Artificial Intelligence, many leading companies have expanded the idea of AEI into many systems of AI. The range of technologies include:

- *Humanoid Robots*
- *Virtual personal Assistants*
- *Hardware of EAI*

- *Humanoid Robots*

The advanced robot today to include AEI is ‘’Sofia,” the most advanced humanoid robot. Hanson Robotics is a Hong Kong based company that designed Sophia to be the most expressive robot in the world. She has features like being able to detect and display emotions, motion tracking features such as eye movement, eye contact, and movement of its carbon fiber exoskeleton. Emotional recognition and robotic movements generated by deep neural networks also play a role in the built of Sophia. Sophia is the closest to having Artificial General

Intelligence (AGI), which is the same as human equivalent intelligence which makes her the closest thing to a human form. It features more than 60 facial expressions with tiny servomotors and bowden cables beneath her skin. She sees through cameras in her eyes which help her visualize everything. She also has algorithms to track and remember faces and can communicate verbally and non-verbally. Humor, sadness, and happiness is also build in her. She reflects these actions by showing her emotions on her face with certain movements. Her responses are always given by decision tree which is the same technology used in chat boxes. For example, you ask for X it replies Y. Sophia, being the first humanoid has set itself many accomplishments and her goal is to learn, observe, and to be ambitious about the world. In a humanitarian perspective, we are trying to accomplish to see if an AEI can lead a life with its own perspective on things, which can bring solutions to the greatest problems we have today. [27]

- *Virtual Personal Assistant (PVA)*

Virtual Personal assistants are everywhere, they are built-in in our laptops, smartphones, television, and even refrigerators. These personal assistants are Artificial Intelligent agents who help with the daily tasks such as giving us reminders, setting goals, and helping us with day to day tasks and more information. The first virtual personal assistant to be invented was Siri. Siri is an Artificially Intelligent agent that lives in the operating system of iOS.

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Just like the other assistants present today, Siri has the capability to perform basic activities such as recognizing a human's speech input and gathering information about anything that the user desires. Siri, being one of the first assistants has made it helpful to the common people by providing ease of access. [28] As development of virtual assistants moved forward, Google Assistant came into the world by leading itself into the operating system of Android. This had made some significant approaches in a way that Siri and other basic level assistants were not capable of performing these activities. These activities of google assistant are as follows:

- One of the most powerful AI features today is Google Duplex: The ability to set up appointments at local businesses using an AI human voice to communicate to the administrators such as a normal human to human conversation.
- Google Lens: Ability to see a virtual AI vision that can scan words, locations, objects, things, to give out any information to the user.
- Google Translate: This assistant has the most amount of languages built in to it, this helps perform activities such as translation of one language to another via location and real time. The latest invention in AI is interpreter mode. This mode is the function of translating conversations in native languages.
- Google assistant has the ability to learn about the user by learning his/her patterns of usage of search results, applications, and interests.
- Google assistant has the ability to control about other smart devices such as temperature, lights, security systems. [29] Mitsuku, another virtual assistant more prone as a chatbot has been named as the world's best conversational chatbot, was a four-time winner of the years earning the Loebner Prize Turing Test. On an experimental conversation with Mitsuku, we asked what the virtual assistant can do and it claims the following:

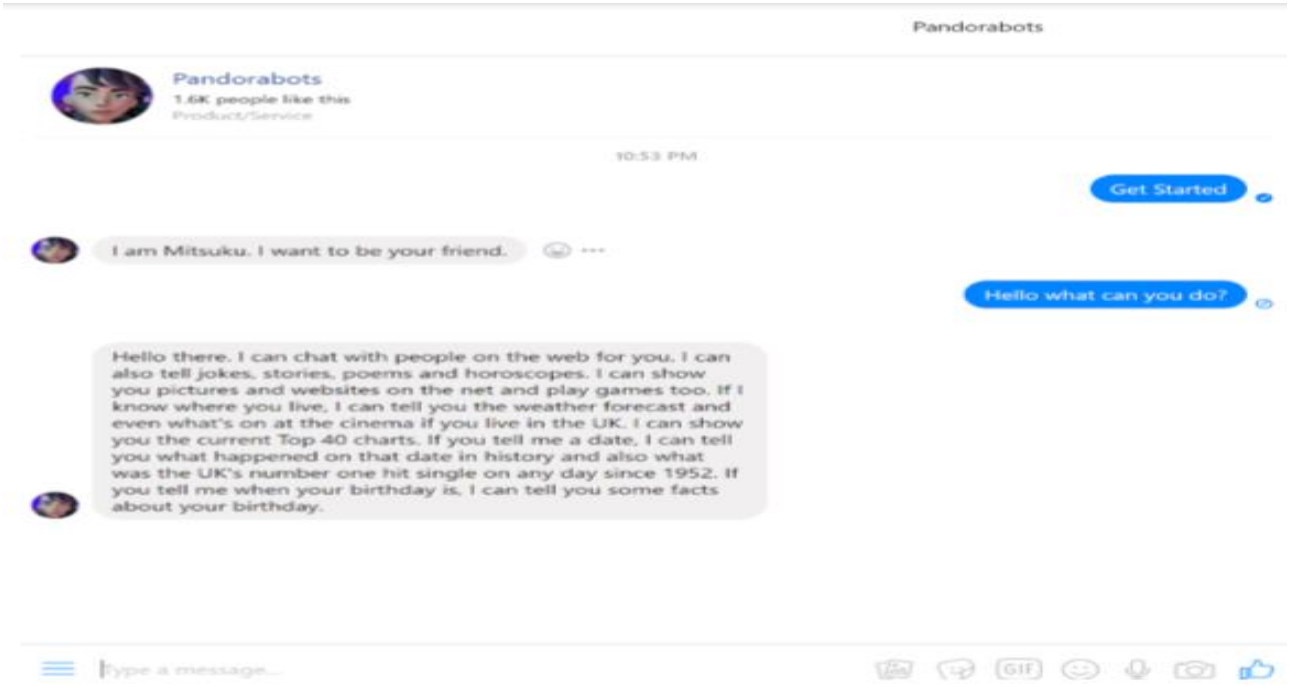

Fig 1

Mitsuku is constantly learning about the users and the world by gaining more and more knowledge from the user interaction. It claims to be having a daily improvement in educating itself as well as having the closest humanly conversations with emotions. [30]

With the usage of virtual assistants in the modern, it has become easier for all the citizens of the world. The help of virtual assistants such as Siri, Google Assistant, and Mitsuku, they play a significant role in technology and its development. These assistants have helped to keep things on track such as being organized, productive and easily accessible to its users. Features including location tracking, integration accessing of different applications, and readily accessible information have made it more efficient to its users. These virtual assistants portray a set of emotions such as happy, joy, anger, and guilt. These assistants can detect the tone of its users via by speech or text and can implement Emotional Intelligence by evaluating the user and their dialogs and give a reply accordingly.

➢ *Hardware of EAI-*

- *Processing Chips*

NPU or Neural Processing Unit is a class of a microprocessor that specializes in the exploration in the machine learning algorithms. It operates on predicted models, artificial neural networks, and machine vision. The general term for neural processing unit is called AI Accelerator. Typical applications include:

✓ ROBOTICS
✓ IOT
✓ DATA INTENSIVE OR SENSOR DRIVEN TASKS
✓ HEALTHCARE: ASSISTANCE TO DIAGNOSIS SUCH AS MENTAL/PHYSICAL IMPAIRMENT
✓ AUTONOMOUS VEHICLES: USING IT FOR DIFFICULT TASKS SUCH AS NAVIGATION, DRIVERS ASSISTANCE, AND STABILITY
✓ SEARCH ENGINES
✓ INDUSTRIAL ROBOTS[31]

The main application that are being developed are cognitive computers or physical networks. Both of these are trying to replicate the human brain and also to have neural synapse. Many of the smartphones today are being developed to have Artificial Intelligence in hardware. Many companies like, Apple, Huawei, Qualcomm are manufacturing AI chips that increases acceleration in algorithms and optimizes the operating system of the device. Huawei created the world's first seven nanometer AI chip that provides impressive performance to create more convenient and intelligent life. The AI in the chip contains features of face recognition, object recognition, image segmentation, intelligent translation with the power of dual core NPU achieving 4,500 images per minute. For example, Huawei states that the dancing to a fast song and running towards the camera, the AI can detect joints of the human body in real time. [32] It also can detect variety of objects and environment from food, pet, and nature. AI Accelerator computing chips enable EAI to exist today. Many types of AI Accelerator chips have many similarities to the human brain architecture which gives us the foundation to make an AI or a Humanoid robot.

V. CAUSE AND EFFECT OF EI IN AI

A. Advantages and Disadvantages

Artificial intelligence itself is a high-level version of a human being which can bring many changes, with Emotional Intelligence being a part of Artificial Intelligence the scope of technology can rise to unpredictable states of advancements. Every field is now drawing themselves into Emotional Artificial Intelligence so that there can be increased levels of performance and stability. Some fields that portray this are Healthcare, Business, Consultation and more. There are many known and unknown advantages in the usage of Emotional Artificial Intelligence, one purpose would be emotional deduction, which is predicting the behavioral analysis of an individual and knowing how to react upon it. This is used mainly in the field of Education and Consultation as observing and analyzing one's behavior is important for creating conclusions and providing better suggestions to them. Another advantage would be, Emotional Artificial Intelligence can create multiple versions of itself to help increase the underlying jobs as well as helping out in the remote areas. In different parts of the world, things are situated and handled in different ways, there are many fair and unfair practices for all age groups. With this, AEI can bring a good level of scope to the unfair practices by providing equal opportunities and outputs to promote overall sustainability. [33]

As there are many equal advantages there are also disadvantaging. There are technologies to analyze emotional responses from faces and speech which have already exceeded beyond the skills of a natural human being. In AI, it can decide for any emotion of speech and face, even the emotions which are acted out. The core developers of these algorithms have gotten alerted of the power of this technology and says that our minds can be hijacked. The process of these algorithms have gone so far that Facebook and Google are now accused of creating filter bubbles that can affect public opinion and can change political landscapes [34]. In the base of privacy and security, algorithms already know what your biases, emotional triggers, etc. are, based on contacts, friends, and more. Google and Facebook have been collecting personal data from billions of people. AEI can be highly beneficial for the society at the same time can be alarming to humanity and the world. If not used properly, these machines, which have a mind of their own can manipulate objects in their way. [35]

B. Changes Brought to Society

The various fields that can be benefited are:

➢ *Medical*
➢ *Business and Marketing*
➢ *Consultation*

➢ AEI in Medical

In the field of Medical, using Emotional Artificial Intelligence is exceedingly beneficial. Noushin Jafarpisheh and Mohammad Teshnehlab, explain that in this present area there are numerous factors contributing to cancer. Cancer classification cannot only rely on the thoughts of doctors, we have to use intelligent and emotional algorithms, it can help with the doctor's diagnosis of cancer. An algorithm was created to classify three types of cancer databases, which are:

- COLON
- ALL-AML
- LEUKEMIA CANCER

This algorithm is based on Deep Neural Network and Emotional Process by using many methods such as different classifiers, multi-layer perceptron, support vector machine, decision trees, and Gaussian machine model. They also disclosed that using emotional learning algorithms increased accuracy of detection. They also say that "people having high Emotional Intelligence have a better communication with others and their environment." So, by applying Artificial Neural Networks inspired by real neural nets in our body they made a strategy to increase the learning process of the network which gave a better learning process increasing the speed of convergence to an optimal point and achieving higher accuracy. [36]

- *EAI in Consultation*

Consultation is an important for every human being who's going through rehabilitation. Using Emotional Artificial Intelligence, it can speed up and improve overall health of individuals who is going through any mental illness. By using Emotional Artificial Intelligence, we can integrate intelligent machine to enhance the quality, accessibility, and efficiency of care. The potential benefits by using intelligent virtual humans they can provide training, consultation, and assist with clinical decision making. Advances in sensing technologies and effective computing have enabled Artificial Intelligence to detect, assess, and respond to emotional states.

In his book, he also states that 80 million Americans reside in areas without sufficient amount of mental care practitioners to meet those needs of those communities. This resource gap could be addressed by interactive virtual human care providers that can be accessible anywhere at any time in mobile devices to provide information about health conditions which can conduct questions and answers and provides selfcare counselling etc. [37]

- *Business and Marketing*

There are many AI we use for business, such as a virtual chatbots that talk to customers in their phones or laptops. Compared to the past of traditional marketing and customer services. AI sped up the process of delivering information, assessing with privacy and security. Bank of America uses a virtual assistant called ERICA. She can recognize speech and conversations up 200,000 ways to for clients to ask her. Where now she is assisting 12 million clients today. More advanced features are coming to AEI in the near future, the use of AEI is important in the automotive field, where as an system needs to know when a human is controlling a vehicle. The system should know more information than the driver such as sitting up and hands on the wheel. Information such as being alert, sober, and able to drive in the right condition. Many Automobile businesses can be benefited from this if implemented right into vehicles like a car, truck or motorcycle. The safety features of AEI can save millions of lives, since top causes of death and injuries come from accidents in Automobile. [38]

VI. CONCLUSION

The use of Emotional Artificial Intelligence gives a much more profound view on how machines can help humans compared to the traditional ways of AI today. Traditional AI uses logic and efficiency to solve and master solutions in small amounts of time on a particular field of study, such as dealing with mathematical calculations in scientific fields. If we implement Emotional Intelligence in AI, the technology can widespread into new areas of studies. Many areas can be uncovered like; Healthcare, Education, Consultation, even in Construction. All of the fields use emotional bias to build a stability for people who are dealing with emotional problems.

To get better solutions and push the advancement of Artificial Intelligence of technology in all fields of study, we have to execute the perfect Artificial Intelligent agent equipping with the advanced Emotional Intelligent recognition. This will solve the problems that humans cope up with on a day to day basis and creates a relation among machine and human to give a better understanding of the complex situations.

Emotional Intelligence is portrayed in Artificial Intelligence nowadays by the usage of virtual assistants and Sophia. Emotions in these sophisticated agents can be tracked by the detection of voice, speech, and movement of joints. With this, the user interaction is made more precise due to the acknowledgment that these assistants can detect emotions by the tone of speech. Towards the upcoming future, driverless cars and humanoid robots will be able to push forth into the new dawn of technology.

SUMMARY

Society has made drastic improvements and yet to make more improvements as Emotional Artificial Intelligence is playing an important part in the many occupation fields that people work in. AEI helps cover the basic underlying problems and accessibility around the world. It helps to provide equal outcomes and opportunities for the remotes areas in the world. With its' given intelligence it has the potential to revolutionize the current entities and show a new way of existence. Today's potential of Emotional Artificial Intelligence shows an increase in efficiency by replication of itself helping in various fields such as healthcare: classified cancers, consultation: using virtual assistance to provide easy interactions and suggestions of various emotional states, and business: Increased efficiency by having virtual chatbots to know customer feedback, quality assurance, and helping the automobile industry to add security features to know the emotional state of travelling.

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