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APPLICATION OF ARTIFICIAL INTELLIGENCE IN MEDICINE

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***Abstract*— Artificial intelligence is one of today's most contentious issues. Today's urgent question is about. The question with artificial intelligence is "would it be beneficial or harmful to a person? This study looks into the benefits of artificial intelligence medical applications. It looks into how Artificial Intelligence may help the medical business as well as how patients' lives can be enhanced. This well-known phenomenon has an impact on health when it comes to diagnosis, sicknesses, patient care, error reduction, and virtually being present beside the patients. The report discusses how artificial intelligence may affect medical science. The results of a survey were shared in the publication to learn about people's attitudes toward artificial intelligence in medicine.**

Keywords- patient, medical, human error, clinical diagnosis.

I. INTRODUCTION

Computer systems have had a significant impact on health sciences in this digital age. Intelligent computer systems assist medical practitioners and patients. Among all systems, artificial intelligence is capable of dealing with vast amounts of clinical data and information.

According to Google, Artificial intelligence is the theory and development of computer systems capable of doing activities that ordinarily require human intelligence, such as visual perception, speech recognition, decision making, and language translation. Every sector of medicine is benefiting from artificial intelligence. According to Elliot (2009), artificial intelligence would aid doctors in their operations, making them safer and more effective [1]. In terms of treatment, artificial intelligence will treat 230,000 cancer patients in the United States each year [2]. The purpose of this research paper is to provide a general overview of the interesting topic of artificial intelligence and how it is assisting in medicine. This study article will examine artificial intelligence in medical diagnosis, therapy, and decreasing human errors, as well as the virtual presence of artificial intelligence and its future in medicine.

II. AI IN MEDICAL DIAGNOSIS

Artificial intelligence aids in the rapid and precise diagnosis of medical conditions. Accurate medical diagnosis is one of the most important aspects of treating patients because it is the first step in treating them and helps to reduce mortality rates. Patients will benefit from rapid, accurate, and exact medical diagnoses.

Robots, such as Husky, can detect skin malignancies more correctly and quickly, according to Macdonald (2017) [3]. In several cases, robots have diagnosed ailments with the same accuracy as human doctors. A robot diagnosed 340 brains for MRI and was 100% accurate [4]. Furthermore, AI can identify diseases just by viewing photos of the damaged portions of the patients' bodies.

Blood drawing might be frightening for persons who are scared of needles. Again, it takes a long time and multiple attempts until the nurse discover an adequate vein to perform the treatment. Veebot, a blood-drawing robot, will help healthcare providers complete this process quickly [5]. Veebot takes less than a minute to draw blood, and studies show that it can find veins with 83 per cent accuracy, which is comparable to that of a professional nurse.

Many lives can be saved if a correct medical diagnosis is made. Approximately 400,000 deaths in the United States occur as a result of clinician decision-making errors, which leads to errors in medical diagnosis (Journal of Patient Safety, 2014). When it comes to medical diagnosis, AI can help doctors make better decisions.

AI can notify doctors when a patient's condition deteriorates. According to Bloch-Budzier (2016), AI notified doctors of individuals who had acute kidney damage [6]. As a result, AI is assisting doctors in every way conceivable in their careful diagnosis of patients.

It has been observed that robots are supporting doctors in the diagnosis of cancer. Nowadays, many people die as a result of a misdiagnosed medical condition. According to Baranuik (2016), Google's artificial intelligence, such as DeepMind, will detect oral cancer in one out of every 75 men and one out of every 150 women [7]. As a result, AI is being employed all across the world, particularly in medicine.

Radiology is an essential component of healthcare and is required to diagnose a patient. The Food and Drug

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Administration has approved the first artificial intelligence for medical use. Arterys created cardiac imaging in 2017 [8]. Anna Fernandez, Lead of Health Informatics/Precision Medicine at According to Booz Allen Hamilton, people would have artificial In just three years, intelligence will be available in clinics. Taking over a repetitious task Artificial intelligence will handle routine activities and diagnose uncomplicated cases.

There are currently several robots being tested to see if they can work in the medical area, and the findings are astounding. The use of AI in medical diagnostics has resulted in a drop in mortality rates. Because medical diagnosis is the first stage of treatment, it should be as accurate as feasible. Accurate treatment can be achieved by applying AI in diagnosis.

III. AI In Medical Treatment

Artificial intelligence can help to shorten treatment times and improve treatment accuracy. One of the most important aspects of the treatment strategy is accuracy. Treatment is critical in the lives of patients. It is better for a patient's mental health if treatment duration may be decreased. Artificial intelligence will most likely assist healthcare is transitioning away from traditional medicines, where one medicine works for all, and toward focused treatments, tailored therapies, and individually created therapeutics. This is known as "Precision Medicine."

According to Baranuik (2016), artificial intelligence is expected to shorten treatment times [7]. Instead of 4 hours, artificial intelligence will complete the treatment in 1 hour. Using artificial intelligence, a better treatment plan and accuracy can be accomplished. Furthermore, Max Planck Institute researchers are working with extremely micro-sized, or less than a millimetre, robots that will swim through a patient's physiological fluid and might be utilised to give medications or other medical assistance. These robots are intended to swim through the bloodstream or across the surface of the eyes [8]. It will be a watershed moment in medical history.

By delivering accurate treatment, AI can help lessen the adverse effects of medications. The use of artificial intelligence (AI) can save patients' lives.

AI can now prescribe drugs using only a smartphone camera [9]. Nowadays, practically everyone owns a smartphone, and if it can be used to administer medication, it will be extremely beneficial to people who are unable to visit doctors. Furthermore, AI will replace Alzheimer patients' memory issues as well as their problem-solving abilities. AI is assisting the medical industry and will continue to do so.

According to Baranuik (2015), Google's AI will treat head and neck cancer [7]. Cancer treatment is a difficult task. AI will assist doctors while also shortening treatment times. Furthermore, oncologists, particularly cancer specialists, would benefit greatly from AI in generating treatment recommendations, as scientists are working hard to make AI successful in treating cancer and tumours.

Pet animals are well known for their ability to decrease stress, loneliness, and redirect focus away from pain. Paro, an interactive robot that resembles a baby harp seal and is clothed in soft artificial fur, makes users feel at ease and as if they are stroking a real animal [8]. It has been discovered that it can alleviate stress in both patients and caregivers.

As a result, artificial intelligence is assisting the medical industry by creating an accurate treatment plan and speeding up the treatment procedure, ultimately saving the lives of many patients. Artificial intelligence can make medical recommendations and make treatment decisions. Artificial intelligence will assist patients.

IV. AI To Reduce Human Errors

According to the Centers for Disease Control and Prevention, medical errors and misdiagnosis were the third top causes of death in the United States in 2016. Using artificial intelligence, human medical errors can be prevented. In the United States, medical errors kill around 400,000 people (Journal of Patient Safety, 2014). It is clear that a large percentage of people die solely as a result of medical errors. AI can help reduce doctor errors and save many lives. When people seek medical help from healthcare professionals and doctors, they are usually given drugs depending on their questions and routine check-ups. Because doctors are human and must diagnose dozens of patients in a single day, this method allows for errors and incorrect diagnoses. However, with advanced artificial intelligence assistance, there will be fewer errors. Artificial intelligence will be able to attend to patients more efficiently since it will be able to diagnose a patient faster than human doctors.

A single person cannot make every decision. Machines, according to Diprose and Buist (2016), are superior to humans alone [10]. Machines are capable of making better judgements than humans. McFarland (2017) claims that AI will not overlook what doctors typically miss [2]. They will completely diagnose patients, resulting in 100 per cent accuracy in diagnosing and treating patients. Because machines are created by humans, any issues that arise can be addressed. As a result, machines are updated and make fewer errors than humans.

AI makes 72 per cent more right diagnoses than doctors, who have a high error rate [11]. Furthermore, AI has the ability to scan hearts with astonishing accuracy.AI is assisting humans in every manner feasible, such as in medicine, to alleviate people's issues. It is possible to conclude that AI has the potential to transform medicine. Furthermore, AI outperforms humans in diagnosis and therapy, potentially reducing human error [10].

According to a 2016 Frost and Sullivan report, the use of artificial intelligence has lowered medical errors by 30 per cent to 40 per cent and treatment costs by up to 50 per cent. According to WHO, medical errors and incorrect medical diagnoses are among the top ten causes of death worldwide, with one in every ten hospital admissions resulting in a

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medical error and one in every 300 admissions resulting in death due to misdiagnosis. In this case, artificial intelligence is without a doubt the most effective way to eliminate these errors and tragic events. Indeed, artificial intelligence has altered our image of healthcare, and it will help healthcare to the greatest extent possible.

In the medical industry, mistakes are unavoidable. However, with the assistance of AI, this issue can be mitigated. It also aids the medical industry by making all medical treatments quick and simple.

V. Virtual Presence Of AI

Doctors can interact with patients and colleagues without physically being present by using a remote presence robot. AI can be of considerable assistance to patients who require the services of a doctor almost all of the time. Doctors cannot always be present with their patients, but machines can. AI may currently function as a virtual presence robot. They can appropriately serve patients and support them in their treatment.

Borukhovich (2015) asserts that artificial intelligence (AI) can remind patients to take their medications [9]. The most crucial thing for a patient is medicine. AI can assist in the treatment of patients by reminding them to take medications.

Furthermore, anyone may require the services of a doctor at any time. AI can assist in this regard. People will require doctors whenever and wherever they need them, and AI will help them by acting as pocket doctors [12]. Pocket doctors, such as smartphone apps, can be accessed at any time of day or night. It will benefit patients who become ill late at night when no doctor is accessible. As a result, people will benefit greatly from AI's virtual presence.

AI will be able to prescribe prescriptions [9] and monitor whether patients are taking the correct medications [13]. Individuals who are constantly reliant on others, such as Alzheimer's patients, may benefit from this. People can benefit from AI by being reminded to take their medications. Doctors are not always able to contact patients after they have been discharged. AI can also tackle this problem. Machines will follow up with post-discharge patients [13], allowing patients' health to recover more swiftly. Patients who have been discharged are unlikely to take care of themselves. As a result, AI will look after them and keep them healthy.

IBM's Watson AI program has been developed and is being used in cardiology and cancer care. Microsoft has also announced the formation of a new healthcare branch at its Cambridge research site as part of its plans to enter the health business with artificial intelligence software. Monitoring devices, which can help keep patients out of hospitals, are included in its research goals, as are extensive investigations into illnesses such as diabetes.

To summarize, virtually present AI is a big aid to both patients and doctors. Doctors will be relieved of excessive work and would have more spare time.

VI. Future Of AI In Medicine

AI will reshape healthcare. AI has a promising future, and it will benefit both doctors and patients. It may even be used to substitute doctors. AI can now accomplish practically everything in medicine with 100 per cent accuracy, including diagnosis, therapy planning, and patient assistance.

From IBM Watson to Philips, Agfa, Siemens, and GE, major healthcare companies have already begun to incorporate artificial intelligence into their medical imaging software systems. In 2017, the US Food and Drug Administration (FDA) approved the first tablet with a digital ingestion tracking device. This medication, known as Abilify MyCite, was created by the Japanese company Otsuka Pharmaceutical. It is supplemented with a wearable patch created by Proteus Digital Health. With the patient's permission, the patch connects with the ingestible sensor to detect whether or not the drug has been consumed; the information is then sent to the patient's smartphone or tablet.

The goal is to assess drug adherence in the treatment of schizophrenia, as well as in the acute treatment of manic and bipolar I disease.

According to Baranuik (2016), Google's AI will examine 700 radiation patients' MRI and CT scans [7]. Furthermore, it will be able to distinguish between healthy and malignant tissues. Scientists are attempting to advance AI's role in the future. AI is fast advancing, and it is believed that it will benefit humanity more in the future.

One of the most crucial aspects of medicine is surgery. Elliot (2009) predicted that surgery would be scarless in ten years [1]. It signifies that there will be no need to cut the skin and that surgery will be performed. People nowadays complain about scars that are left behind as a result of surgery. AI will be used to solve this challenge. Furthermore, AI will be the exclusive source of diagnosis and treatment [10]. AI can identify diseases with 100 per cent accuracy and make exact treatment decisions.

Artificial intelligence will transform smartphones into cancer scanners [14]. There are medical apps, such as Drugs & Medications and Ada-Personal Health Companion, that can give medications. These programmes are accessible at any time and from any location. If a person becomes ill and no one is available to transport him to a doctor, these apps can provide first assistance. These applications will become more advanced in the future, and people will be benefited, maybe saving countless lives. To summarize, the promising future of AI in medicine will benefit not only patients but also doctors.

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VII. Primary Research Analysis

A. Introduction

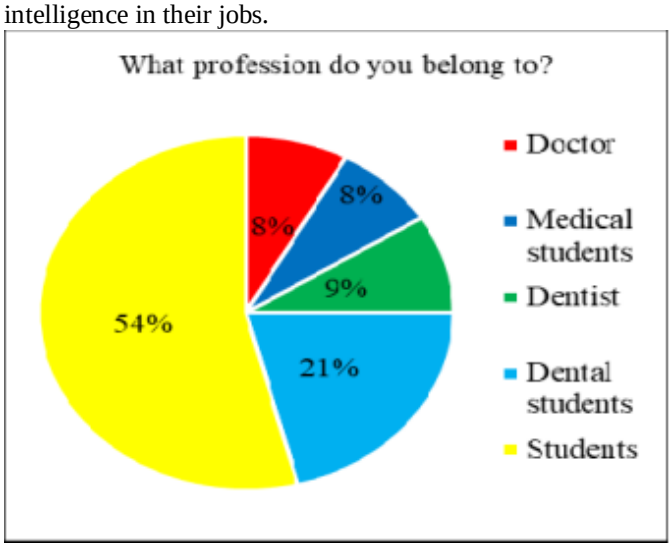
This study was designed to assess people's attitudes on artificial intelligence in medicine and if they believed AI was beneficial to medicine. The survey sought information on the demographics of those who used artificial intelligence in their professional lives, as well as their experiences with artificial intelligence, perspectives on the future of artificial intelligence, which areas of medicine artificial intelligence most supports, and whether artificial intelligence is dangerous to people.

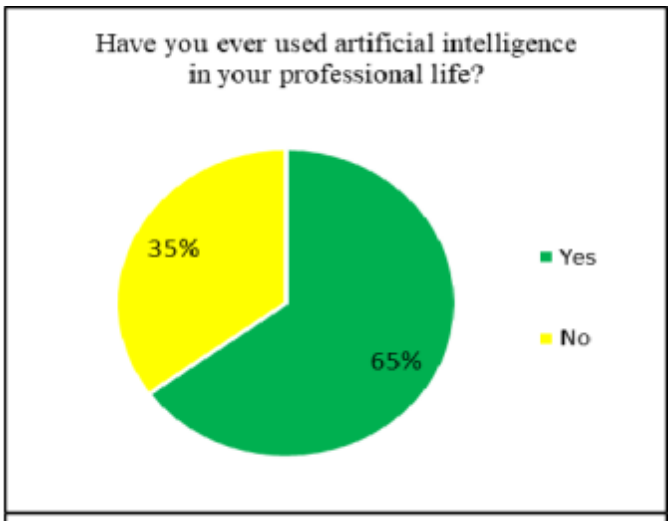
B. Method

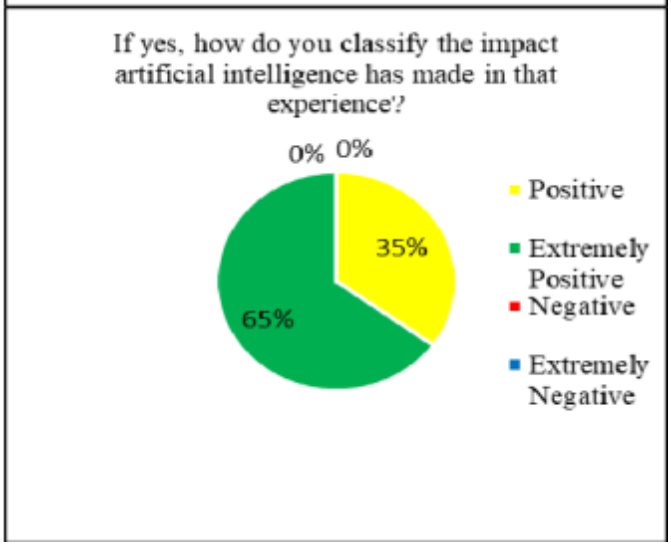
Between May 4th and 6th, 2017, 68 people from all over the world were polled. SurveyMonkey was used to develop the survey, which was then disseminated on WhatsApp, Twitter, Facebook, and other social media platforms. Doctors, medical students, dentistry students, and all others responded.

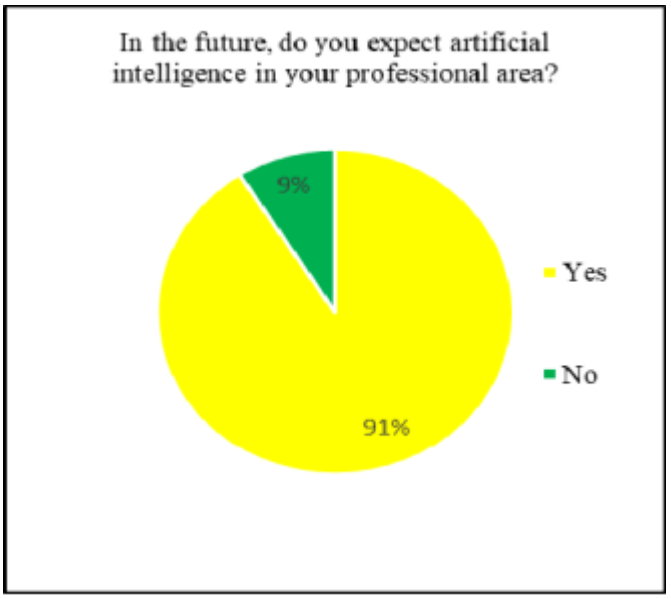
C. Findings

According to the poll, the majority of respondents (54 per cent) were students who indicated that they had (65 per cent) employed artificial intelligence in their work lives and had a very positive experience (65 per cent). Furthermore, 91.18 per cent of participants anticipate the use of artificial intelligence in their jobs.









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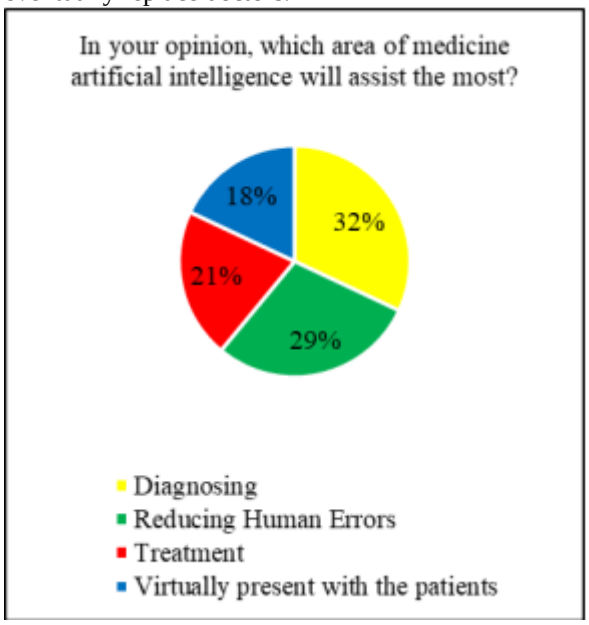
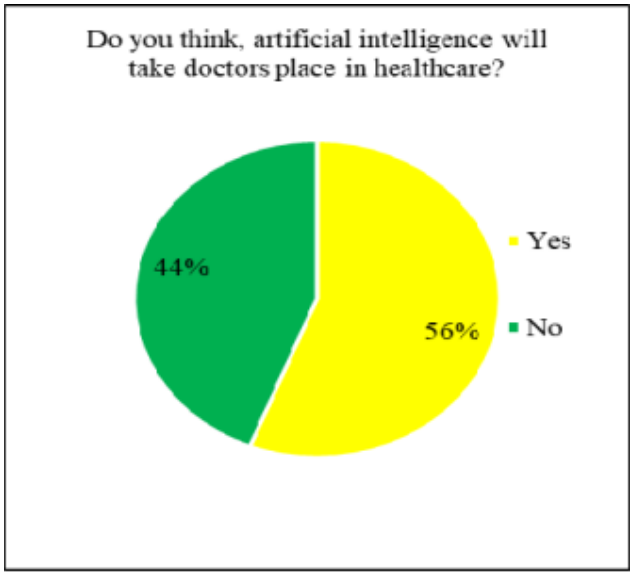
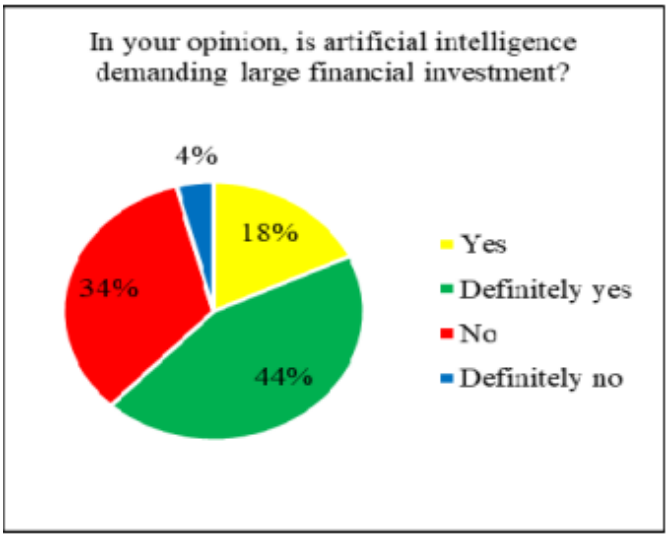
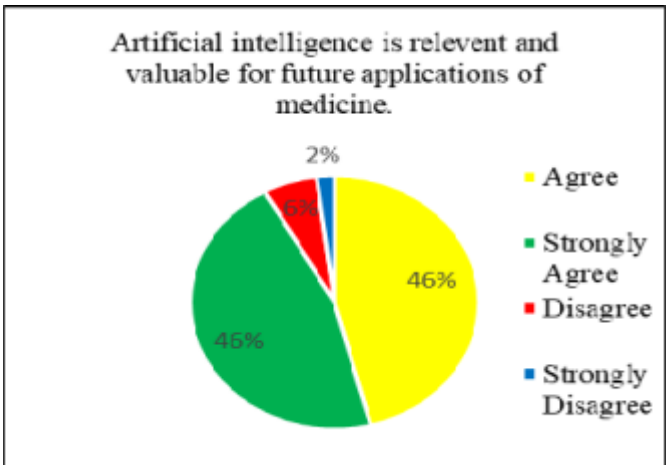
Similarly, 32.35 per cent believed that artificial intelligence would be most useful in diagnosing. More than half of those polled thought artificial intelligence would eventually replace doctors.





However, these 44% people also agree that artificial intelligence necessitates a significant financial commitment. Even though 42% of respondents answered that artificial intelligence was not hazardous to humans, they all agreed (46.27%) that artificial intelligence was relevant and significant to future medicine.





Last but not least, they (50 per cent) hoped to contribute to the advancement of artificial intelligence.

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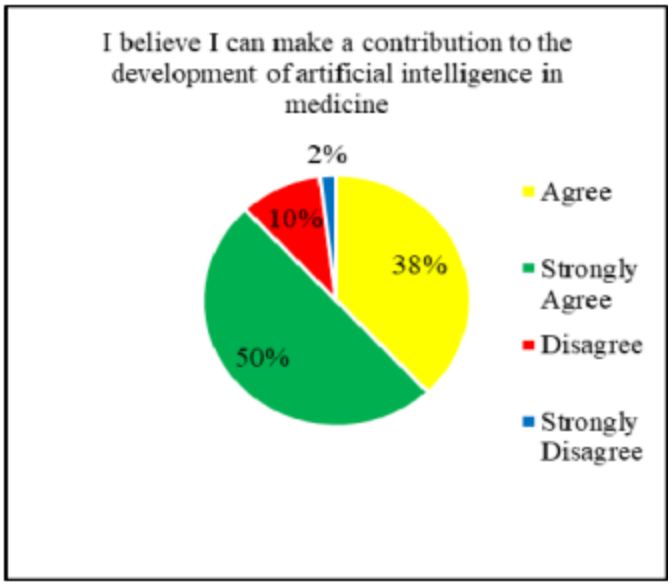

D. Conclusion of the findings

This survey focused on the current and future applications of artificial intelligence. It confirmed that the majority of participants (32.35 per cent) believe that artificial intelligence will aid in diagnosis. It also confirmed that 42% of respondents feel artificial intelligence is not harmful to humans. As a result, artificial intelligence has a bright future ahead of it. There were also several limitations to the survey, such as the limited sample size of only 68 participants and only 2 days to survey, which made it difficult for the survey to be more accurate.

VIII. CONCLUSION AND FUTURE WORK

Doctors are being replaced by AI, which is lowering mortality rates. AI will disrupt the traditional job of doctors in the next years. It is assisting in the resolution of various healthcare issues. As a result, AI will be useful in diagnosing and treating diseases, eliminating human errors, and digitally interacting with patients. More research is needed to determine AI's ability to take risks. It will assist people in determining how much risk AI is willing to accept because there are several dangerous duties in medicine. Nonetheless, there are reasons to believe that the time has come for artificial intelligence to transform the clinic into a far higher capacity and lower cost information processing care service.

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