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Medical image Analysis and Computer

Medical image analysis is a very useful tool for the healthcare field, it is used to view patients for diagnosis, monitoring, or treatment of medical conditions. It contains some main components that help to process images and understand them like x-ray vision, ultrasound, nuclear imaging, etc. Computer vision is a field where it helps understand computers to identify objects and all types of images, it is spread out in many different parts of the industry. In the industry of healthcare it uses machine learning and neural networks to teach computers to find meaningful information from digital images and videos. Computer vision in medical image analysis helps recognize patterns, make diagnosis in medical imaging with less error and more accurate results.

For example the application of robotic surgery is a medical image analysis that helps doctors and surgeons to carry out their operations in a timely manner that is more precise and practical than using bare hands. The surgeons controls the machine from a distance and makes it more flexible for them. Robotic surgery uses reinforcement learning, which is an algorithm that learns through expert demonstration, trial and error, and hybrid approach. Scientists found out that using expert demonstration trains the models better and faster. The machine contains a camera arm, mechanical arms with surgical instruments, and gives the surgeon a 3D view of the procedure. It has computer vision, which means it can see structures like blood vessels, tissues, and nerve bundles, causing less risk to the patient. It was created to help surgeons during the procedure and make it safer for patients. It aims to solve problems with human-error, make smaller incisions to prevent infection, and reduce risk with better handling.

Some benefits of AI in the field include more accurate results, better performance, logical deduction meaning they use rules and previous facts to draw conclusions, and it is less expensive than hiring people for the job. Also with the help of computer vision, patients feel less pain with better outcomes in applications like robotic surgeries where hip replacement, kidney transplants, and gallbladder removal can occur. The computer vision has the ability to extract information not visible to the human eye, making it more easier and faster for both doctors and patients.

Expert systems also have limitations and challenges, for the medical image analysis, they lack intuition, meaning they don’t have the gut feeling that people do and this leads to slower decision-making. Also, the machines are only good as the quality of their data is based, leading to inaccurate information and poor performance if the knowledge is not properly analyzed. There are many more defects like lack  of emotion and linear thinking. Ethic considerations are how many people rather have a doctor, because they have doubts and suspicion with the machines. Concerns about how technology is developing to fast and they feel the pressure to adapt it into their daily lives. Also, considering how movies represent AI as the enemy of humanity, many feel like it will rebel against us causing the fallout of humans, making them feel unsafe and alerted around AI. If expert systems have large amounts of data of patients, it cannot contain the patient’s personal information and leaks it out to the public, making them vulnerable. Some future improvements that could be made for the expert systems are installing new features to make machines secure and safer, educating people about the potential and benefits that AI has, and how many lives it could save.

In conclusion, many have the achievement of making medical image analysis and computer vision work together in applications like robotic surgery. It could also be available or normalized in most hospitals, but one can’t say how it will have an effect on patients.  We found that AI in the healthcare system has its benefits and limitations like any other technology and will get good and bad comments about it. Development of several medical software that offers interactive healthcare services like anytime appointments with doctors can give patients better experience, care, and outcomes. The future generations will expand technology and along with it hopefully normalize AI in hospitals to save more lives. Competency in AI to the point that it presents an assistive favorable to humans rather than substituting them and grow anxiety within them. Overall, medical image analysis and computer vision applications seem that they will take a longer time to improve their presences, but technology is being used more and advancing rapidly enough to make them more efficient and reliable for people.

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