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Will Artificial Intelligence Eventually Supplant Surgeons?

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Abstract: ***This systematic review paper examines the current state of research on the potential for artificial intelligence (AI) to supplant surgeons.***
It covers a range of topics, including the capabilities of AI in surgical tasks, the ethical implications of using AI in surgery, and the potential impact on the surgical workforce.
The result and analysis of the paper will evaluate the potential impact of AI on the field of surgery, including possible improvements in efficiency, accuracy, and patient outcomes. The conclusion will summarize the study's findings and discuss the potential for AI to supplant surgeons in specific procedures eventually.
Keywords: Artificial intelligence (AI), surgeons, surgical tasks, ethical implications, workforce impact, capabilities, efficiency, accuracy, and healthcare industry.

I. INTRODUCTION

For questions on paper guidelines, please contact us via e-mail. Artificial intelligence has made significant strides in recent years, with applications in various fields, including healthcare [1].
In particular, the potential for AI to assist or even replace surgeons in specific procedures has generated much interest and debate [2]. While AI may not yet be capable of entirely replacing surgeons, it has the potential to significantly augment their abilities and improve the efficiency and accuracy of specific surgical procedures [3]. There are also concerns about the ethical implications of using AI in surgery and the potential impact on the surgical workforce [4] [5]. This systematic review examines the current state of research on these topics.

II. PROPOSED METHODOLOGY

The proposed methodology for this study includes a review of recent and relevant literature on the current state and capabilities of AI in medicine, focusing on its potential applications in surgery.
A systematic review of academic and professional literature was done utilizing a mixture of electronic database searches and manual searches. The databases searched included PubMed, Scopus, Springer, and the Cochrane Library. The search included studies published in English from 2018 to 2022.
The inclusion criteria for the systematic review of academic and professional literature were studies that focused on the potential for AI to eventually supplant surgeons, including the capabilities of AI in surgical tasks, the ethical implications of using AI in surgery, and the potential impact on surgeons.

A. Algorithm

The following algorithm was used to guide the systematic review process:
1) Develop a research question and inclusion criteria.
2) Conduct electronic database searches and manual searches.
3) Screen titles and abstracts for relevance.
4) Retrieve full-text articles for relevant studies.
5) Assess the quality of the studies using predetermined criteria.
6) Extract data from included studies.
7) Synthesize the data and conclusions.

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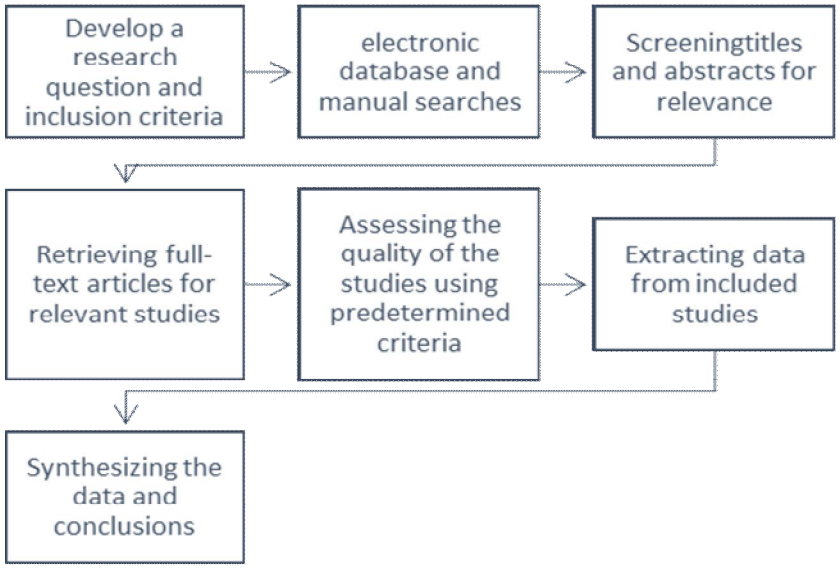
B. Block Diagram



III.RESULT ANALYSIS

A total of 15 studies were incorporated into the literature review. The review results suggest that AI can improve efficiency and accuracy in surgical tasks [6] [7]. AI has the prospects to enhance the abilities of surgeons and improve patient outcomes [8]. For example, AI can assist surgeons in real time by providing information about the patient's anatomy and suggesting the best course of action [9]. It can be utilized for examining large amounts of data, such as electronic health records, to identify patterns and predict patient outcomes [10]. In addition, the reviewed literature also evaluates the potential impact of AI on the field of surgery, including possible improvements in efficiency, accuracy, and patient outcomes.

Regarding efficiency, a considerable body of research depicts that AI can significantly improve the efficiency of specific surgical procedures by automating certain tasks and providing real-time guidance to surgeons [11]. Such realization could potentially reduce the length of surgery and decrease the risk of complications. Regarding accuracy, it is apparent that AI can analyze large amounts of data and make highly accurate predictions, which could potentially lead to improved surgical outcomes [12]. Lastly, concerning patient outcomes for those undergoing surgical treatment, using AI in surgery could improve patient outcomes by reducing the risk of complications and errors among practitioners [13].

However, using AI in surgery still has significant limitations and challenges. For example, AI systems require considerable training and data input to function effectively, and there are concerns about the potential for bias in the data used to train these systems [14]. Additionally, the high cost of implementing AI systems may limit their widespread adoption in the medical field [14]. Again, there are ethical concerns about using AI in surgery and the potential impact on the surgical workforce [15]. Consequently, the review found a need for further research on these topics to understand the potential for AI to supplant surgeons.

IV.CONCLUSION

Overall, this systematic review of academic and professional literature has examined the current state of research on the potential for artificial intelligence (AI) to supplant surgeons eventually. The potential for AI to eventually replace surgeons in specific procedures is a transformative development in healthcare. While there are still many challenges and ethical considerations to be addressed, the potential benefits of using AI in surgery are significant.

The systematic review revealed that AI could improve efficiency and accuracy in surgical tasks. While AI can enhance the capabilities of surgeons and improve patient outcomes, it is unlikely to replace surgeons fully in the near future. Als, while AI can assist surgeons in various tasks, the complex nature of surgical procedures and the importance of human judgment and decision-making make it unlikely that AI will be able to supplant surgeons in the foreseeable future. As AI technology continues to develop, it is vital for the medical profession to carefully consider more potential impacts and ensure that AI is used ethically and in a manner that benefits both patients and healthcare providers.

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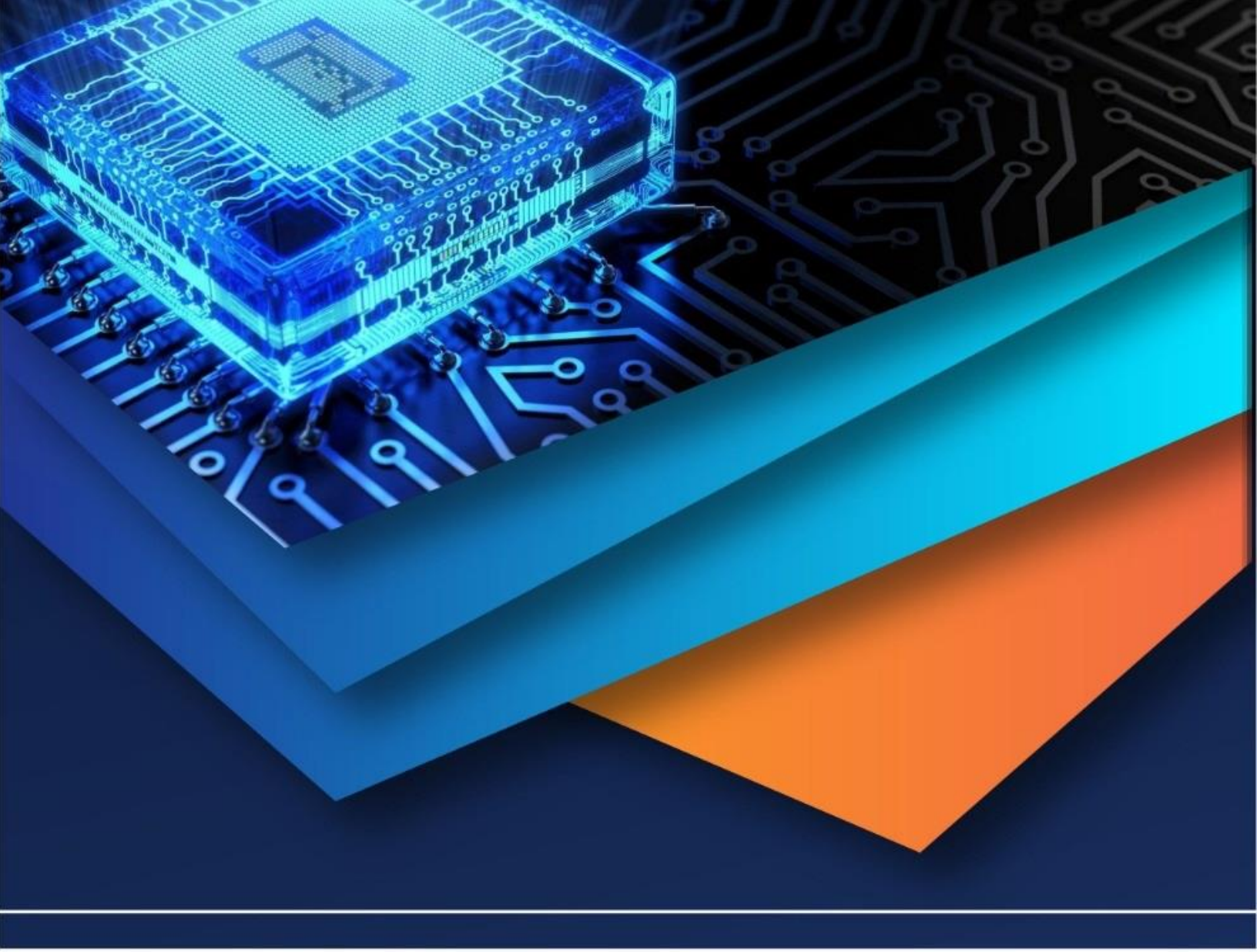

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