Title : Artificial intelligence-driven precision surgery: revolutionizing complex procedures

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Abstract: A key technology that drives these innovations is AI-enhanced image processing. It can take preoperative imaging data from MRI and CT scans and transform them into three-dimensional reconstructions showing incredible detail of the surgical field. These algorithms can, then, process this data to identify structures that are critical, such as nerves, blood vessels, and tumors, with much greater accuracy than conventional imaging techniques[5]. This is going to help surgeons both at the preoperative planning stage in better preparing for the surgical approach and also, during the intraoperative stages, when the surgeon could be receiving ongoing, real-time updates about their position and status regarding such critical anatomical features. For example, through integration of AI models in robotic-assisted surgery, can help in keeping an accurate trajectory during surgeries, which is critically important when millimeters could mean the difference between success and severe complications, such as in brain surgeries or spinal procedures

Keywords: Artificial Intelligence (AI) ,Precision Surgery, Machine Learning ,Data Analytics ,Intraoperative Guidance, Neurosurgery, Surgical Precision, Patient Outcomes

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