

AI Application Domain	Primary Function	Representative Intraoperative Use	Typical AI Methods
<b>Anatomy detection and recognition</b>	Identification and delineation of critical structures	Real-time recognition of the RLN, aorta, azygos vein, and lung during dissection	CNN-based deep learning, semantic segmentation, and transfer learning
<b>Surgical phase recognition</b>	Temporal classification of procedural steps	Automated identification of operative phases to provide contextual awareness	Deep learning with CNNs and temporal models (e.g., RNN/LSTM)
<b>Pattern and event detection</b>	Detection of predefined intraoperative risk patterns	Identification of excessive traction, bleeding, smoke, or unsafe tissue handling	Deep learning classification models, CNNs, and active learning
<b>Instrument detection and tracking</b>	Recognition and localization of surgical tools	Real-time tracking of instruments to infer surgical intent and motion	Computer vision and CNN-based object detection
<b>Intraoperative guidance and decision support</b>	Augmented cognition and risk mitigation	Visual overlays, alerts for nerve traction, and anatomy highlighting	AI-augmented computer vision, augmented reality, and ML-based risk models