AI-based Visual Support for Clinical Diagnosis of Pediatric Suprasellar Tumors and Impacts on Decision-Making Confidence

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Summary:

Explaining AI-based predictions is fundamental for the development of clinical decision support systems. A common visual approach for explaining imaging data predictions is to overlay saliency maps onto images to allow users to interpret what visual features are associated with a given prediction. This approach can be difficult to utilize when differentiating nuanced concepts. For example, clinicians in neuro-oncology will commonly have to differentiate between a group of similar brain tumors (i.e., a radiographic differential diagnosis). We hypothesized that visual representations of counterfactual conditions could improve the utility of AI-based predictions in the context of such a clinical task because it is analogous to a heuristic commonly used by clinicians when making decisions under uncertainty. We present an initial pilot study in which two board-certified clinicians participated in a three condition study to explore how counterfactual visualizations impact diagnostic performance, decision-making confidence, and decision-making difficulty.

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