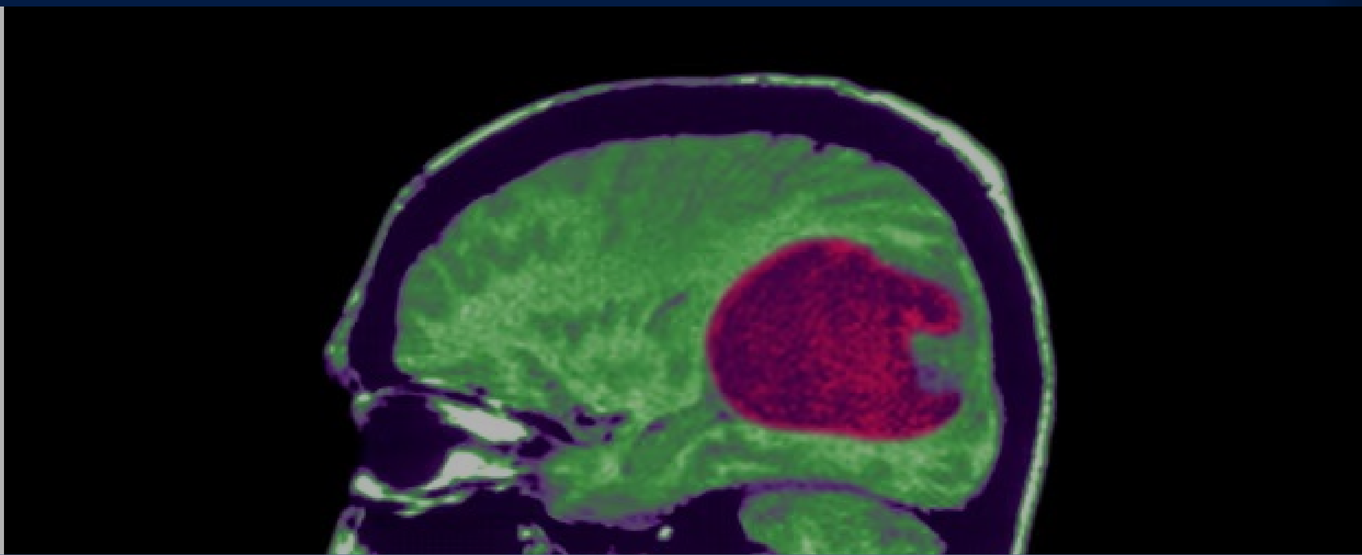

according to a study released this week by Harvard Medical School.

Neuroscience researchers for decades have struggled to understand gliomas, an umbrella term for the most common brain tumor in cancer patients. One particularly aggressive type of glioma is responsible for the death of Beau Biden and the Arizona senator John McCain.

"Different kinds of gliomas require different kinds of surgery." said Kun-Hsing Yu, a professor at Harvard Medical School who helped author the study.

To safely remove a glioma without damaging the surrounding brain tissue, neurosurgeons need a wealth of information that often cannot be gleaned until a patient is on the operating table.

"When operating on brain cancer patients, doctors send a piece of sample to the pathology lab to get real-time, immediate feedback," said Yu. "A pathologist can help tell them whether they are cutting the correct tissue, or what kind of specific cancer the patient has."

In state-of-the-art medical facilities, Yu said a pathologist typically completes their analysis of a brain tissue sample within 10 to 15 minutes. That work happens when a patient's skull is open on the surgical table.

"This process is not error proof," he said, explaining that pathologists have to drop everything to prioritize samples from active surgeries. "People are under stress, and the quality of the slide is sometimes not great, so occasionally we will have misdiagnosis arising from this fast process."

Yu and his team found that machine learning - a branch of artificial intelligence in which technology learns patterns without explicit instructions from a programmer - can help make the analysis of a glioma faster and more accurate. The technology would reduce the time that patients are in the operating room.

Dr Dan Cahill, a neurosurgeon at Massachusetts General Hospital, said the accuracy of the new machine learning tool is "impressive, certainly much better than" the traditional techniques of analyzing the molecular makeup of a glioma.

Cahill said "the optimal type of surgery is different for each patient, and is significantly influenced by the sub-type of glioma".

Machine learning could also inform how doctors like Cahill utilize other breakthroughs in brain cancer treatment. One of the most reliable methods of treating aggressive gliomas involves inserting tumor-killing drugs directly into the brain during surgery. Yu and the co-authors of the study believe their technology can help determine the invasiveness of a particular tumor in the operating room, thereby helping doctors quickly and confidently decide to inject the drugs.

Yu estimates that the technology in his study will not be ready for clinical use for several years - the tool will still need to be greenlit by the Food and Drug Administration.

But the Harvard study is not entirely novel - scientists in the United Kingdom have also been looking to artificial intelligence as a tool for improving cancer treatment and detection. Earlier this year, a team of medical researchers in London developed an artificial intelligence tool that can identify whether abnormal growths found on CT scans are cancerous.

Also in London, a software startup called Kheiron Medical Technologies, co-founded by Hungarian computer scientist Peter Kecskemethy, develops AI tools to help radiologists detect breast cancer.

"We need AI to solve cancer, and it can be solved with AI," said Kecskemethy.

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