

The Felix Project: ‘This Is Our Moment’



Deep learning is able to recognize critical structures after being trained on 120 normal cases, notes Fishman. “There are a lot of challenges ahead but the work looks very promising,” he says.

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A pancreatic cancer diagnosis is among the toughest in all of medicine, both for patient and doctor. It is the third most deadly form of cancer. It has a high mortality rate, and most patients receive their diagnoses too late for curative surgery.

“Often, the patient presented with vague symptoms six or nine months earlier, but the tumor wasn’t detected. By the time they receive a diagnosis, 80 percent of pancreatic cancers aren’t resectable,” says Elliot Fishman. That’s why he is helping to head up The Felix Project, an effort to use sophisticated computer programs that teach themselves to read CT scans to look for early signs of pancreatic cancer. The algorithms belong to a branch of artificial intelligence known as machine learning, or deep learning, as it is sometimes called.

Not surprisingly, the work is far from easy. The programs must first be trained to distinguish the pancreas from the other organs of the abdomen. Eventually they will be trained to look for any slight abnormality within the pancreas—a minuscule

enlargement, a minor change in surface texture, a bump where no bump should be—to spot cancers far sooner than humans alone can do.

“We’re not looking to replace radiologists. It’s more like a second reader,” Fishman says. “Our goal is early detection, which means better outcomes for our patients.”

Fishman is not doing it alone. He is part of a group of the best Johns Hopkins has to offer: molecular oncologist Bert Vogelstein, molecular geneticist Ken Kinzler, radiologists Karen Horton and Linda Chu, pathologist Ralph Hruban, and machine learning expert Alan

Yuille, who holds a joint appointment in cognitive science and computer science. The team has also tapped into the expertise of leading visual imaging and machine learning companies like Nvidia and Pixar.

“For us, this is the highest priority,” Fishman says. “It’s our Manhattan Project. We meet weekly to chart our progress and make certain we are moving ahead.”

One of the biggest challenges is simply getting the computer to “recognize normal”—a healthy pancreas. “Each ‘normal’ takes three hours to complete, and we need many of them to establish the baseline. So far, we have about

90 percent accuracy in our programs spotting the pancreas on a CT scan,” Fishman says. “That’s good, but we need better.”

For Fishman, the most important lesson in the multiyear, multimillion-dollar Felix Project so far has been perseverance—to press on, regardless. Noting that the project is named after the “felix felicitis” potion in the Harry Potter books, which gives drinkers success in everything they do, Fishman says: “This is our moment. It’s a mission to make a difference in people’s lives.”