Twenty-year-old Dhruv Patel got into the habit of reading health-based research papers when he was much younger. It was through his readings that the student of Biotechnology at the University of Maryland learnt of the increasing number of brain injuries in the US. Today, Dhruv is in the process of finalising a technology that helps with earlier identification of Alzheimer’s disease, a brain condition that slowly affects memory, thinking ability, and other cognitive functions. “Usually, patients with Alzheimer’s are diagnosed late. Early diagnosis gives patients more time to plan financially, and legally, and they also have the ability to enter into clinical trials, thus giving some hope, while at the same time bringing the rest of the world closer to a cure,” he says.

What drove you to focus on Alzheimer’s?

It started with my research on brain trauma injury, particularly concussions. Though we could not complete our research, we shifted our attention to Alzheimer’s. Equally grave — it affects 50 million people globally — however, research has been stagnant. Someone in my family had probable Alzheimer’s disease, and my co-founder, Synapto, Christopher Look, had his great-grandmother taken away by this it. That drew our focus to it.

How does this technology aid in Alzheimer’s diagnosis?

The device works by analysing a patient’s brainwave on a laptop or computer, using a variety of mathematical analysis and compares it to brainwaves of people who don’t have Alzheimer’s. We have combined portable electroencephalogram (EEG) with machine learning and artificial intelligence (AI). Using machine learning characterisation, the algorithm can then decide, with 85% accuracy, whether the new brainwave belongs to an Alzheimer’s patient or a healthy control patient. Once the analysis is completed, the results are provided to the physician instantly. The idea is to find subtle differences in people who have Alzheimer’s and those who don’t. The intention is also to then decode and study those differences.

When will this technology be available for people in need?

We are in clinical development stages at present. We are looking to conduct a clinical pilot study next year to gather more data and improve the accuracy of the algorithm. Once that’s accomplished, we will submit it to the regulatory agencies. It may take us another two to four years to commercialise the technology.

How long did it take for you to develop this technology?

Well, we are five engineers, and with the amount of research papers we had to read, besides doing our own study, it took us two years to develop this technology. We used Open BCI (an open-source brain-computer interface platform), and also plan to use other software like Memory MD, Matlab and Python.

Is the use of this technology restricted to only Alzheimer’s or can it also be used for other diseases as well?

Currently, the dataset only represents people with Alzheimer’s. However, we have created a platform through which diagnostics can generally be provided for other neurodegenerative diseases as well.

If brought into the market, how will it speed up the diagnosis of Alzheimer’s? Will it be cost-effective as well?

Physicians at present do a cognitive assessment, use a questionnaire method, order MRIs, Cerebral Spinal Fluid (CSF). The problem is that these are not accessible and cannot be used to make the screening routine. Plus, there aren’t enough doctors and money for this. But with this portable technology, the headset device can be connected to any laptop at the physician’s office and used. The data acquisition does not cost anything at all; it is considerably less expensive than MRIs and PET scans. I think it is with EEG, the combination of software and low-cost hardware, that Alzheimer’s diagnosis becomes more accessible to the general public.