

How A Mobile App May Someday Help Diagnose Alzheimer's Disease

By Gina Jordan

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Wendy Nader remembers when her mom started showing obvious [signs of Alzheimer's disease](#).

"I would talk to her on the phone and she would repeat what she had just told me two or three times in one conversation," Nader said. "When she started doing that, it was a huge red flag. It wasn't too long after that, that she started getting lost."

Nader's mom, in her early 70's at the time, would drive to a Miami mall or bank where she was a regular – only to forget where she was.

After that, Nader recalls that it took another year or two of excluding certain ailments before doctors arrived at the diagnosis of Alzheimer's.

Despite medical and technological advancements since her mother's diagnosis 13 years ago, researchers are still on a quest to catch this disease and others like it much sooner.

The solution may come in an application downloaded on your cell phone.

"We are developing a mobile app which we think can be used for early detection of Alzheimer's," said Gary Tyson, computer science professor at Florida State University (FSU) in Tallahassee.

Tyson directs [the mobile lab where researchers develop smart phone apps](#).

In this case, researchers theorize that patients in the earliest stages of any number of diseases – like Parkinson's, Huntington's, Dystonia – experience changes in the way they walk, or their gait. The changes would likely be undetectable to the patient or anyone else for months.



Credit Leon Brown/FSU

Doctoral candidate Leon Brown analyzes a graph measuring the user's gait.



Credit Gina Jordan/WLRN

Dr. Gary Tyson is working with faculty in neuroscience at FSU to develop an app that could lead to early diagnosis of illnesses like Alzheimer's.

But a cell phone app designed to give doctors a snapshot of how a patient's gait has changed over time could lead to early diagnosis and intervention.

"There are a number of studies on Alzheimer's that actually show that before you have cognitive loss, you actually have other portions of the brain that are assaulted, including motor skills," Tyson said.

So, the team chose to analyze walking patterns because it's something most people do everyday.

"If we see that the efficiency of your gait - your efficiency of walking - is degraded over a six month period, we think that if you have a degenerative disease, you'll see that more so than if you're just doing normal aging," Tyson said.

"If a patient had the device and the data was downloaded at regular intervals into the physician's computer, you will see something that a patient himself or herself would just have no perception is going on," said Pradeep Bhide, director of [the Center for Brain Repair](#) at the FSU College of Medicine. "Therefore, an early intervention would be possible, and this is exactly what is needed right now."

Smart phones are chock full of sensors that make this kind of measurement possible.

Fitness apps already measure the number of steps a user takes. This app goes further, keeping a log of the user's footfalls over time.

There are some downsides, though.

Researchers haven't determined where the phone should be located to get an accurate reading. Should it be in a pocket, on a belt loop, or taped to a leg? When that's been decided, the user will have to keep the phone in the same place every day when walking.

An app that continuously monitors the user will quickly drain the phone's battery. The solution is to "wake up" the phone periodically to check for footfalls. If the user is walking, the app will take a measurement for a minute or two.

The team hasn't established how to capture the necessary information and get it to the doctor in a way that's useful in evaluating the patient.

Someone with memory problems may have trouble keeping track of a cell phone.



Credit Gina Jordan/WLRN

Dr. Pradeep Bhide directs the Center for Brain Repair at the FSU College of Medicine. He says the app could be a major advancement in healthcare for movement disorders like Dystonia, Parkinson's and Huntington's.

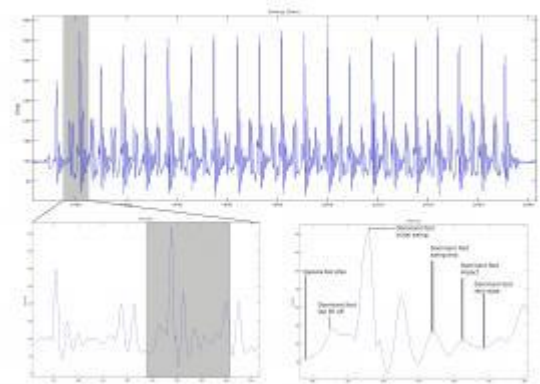
The app doesn't have a name yet, and just to be clear - it cannot diagnose an illness. That's for the doctor to figure out.

"We certainly don't want to write an app that will tell a person we think you have Alzheimer's," Tyson said. "We think as a diagnostic tool, it's best to put in the hands of a physician who could then give it to a patient."

Tyson says they're ready to give the app to doctors now. "The real research at this point is how to convey the information we're already capturing in a way that's most efficient for the doctor to use," Tyson said.

The app team is conducting the work through grants, funding from industry and lots of student volunteers.

The version being developed for doctors doesn't have a price yet, but a free version that measures the efficiency of any user's walk could be available within six months.



Credit Leon Brown/FSU

These graphs show how the app - and its researchers - measure subtle changes in a person's gait.