

## UW student connects technology, social issues

In much of the developing world, digital devices of any kind are not common — but one UW computer scientist is working to change that.



Courtesy Ekgaon

On the floor of a home in India's southern Madurai region, women gather around to record that day's transactions. Small loans helped these women start retail shops or buy additional livestock. The financial information they enter in the phone will automatically get compiled in a central database in India.

For more information about Parikh's project, visit <http://cam.cs.washington.edu/>

For more information about CSE, visit <http://www.cs.washington.edu/>

Tapan Parikh, a Ph.D. candidate in the UW's computer science and engineering department (CSE), has been working on a project for the past six years to bring the latest in information technology to bear on real-world problems.

He wrote a new set of "middleware" that allows cell phones to be used for different applications, including data collection and transmission.

While the hardware remains unchanged, the new software allows the cell phones — in this case, battery-powered Nokia phones — to be used for a variety of purposes by non-governmental organizations, health service groups and local businesses, which are entities that might otherwise lack access to cell phone technology.

"[The] idea is that this is a pretty easy-to-use programming framework that almost anybody could use," Parikh said.

The cell phones, packaged in user-friendly "toolkits," have been deployed since October 2006 to savings and loan associations in villages in rural India to assist with the bookkeeping of microfinance loans.

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These very small, targeted loans help local entrepreneurs start and maintain businesses.

The phones' built-in cameras, microphones and small computers help with accounting and accurate record keeping.

Parikh, who is writing his dissertation on the applications of his middleware, has sought to combine an interest in solving technical problems with tackling larger issues like information technology's impact, or lack thereof, on the developing world, and his work has sparked interest among his colleagues.

"It's starting ... a little subculture of people working on these types of problems within the department, which is nice," he said.

Paul Javid, a computer science and engineering student, met Parikh three years ago and has spent two years working on the middleware project.

In the summer of 2005, Javid traveled to Tamil Nadu in India to conduct usability tests with Parikh, and there gained firsthand experience in applying technology to the field.

"Tapan's research is not easy," Javid said. "He cannot sit in a comfy chair at UW in the beautiful computer science building and [theorize] about how he is going to build systems that are relevant for rural communities."

Instead, Parikh puts in long hours getting his research to become a reality.

"He has to spend a lot of time in environments which require long, long hours of dedicated work," Javid said. "Tapan's research is not 'traditional' computer science research, and it's Tapan's job after he returns from the heat of India to prove to the world that the questions he is answering are relevant not only for the poor, but for the academic community at UW and abroad."

Parikh hopes that his research will motivate others to follow in his footsteps

"That's definitely one of the hopes of this kind of research, to make engineering and computer science ... feel more real and relevant," he said. "So that students that get turned off by the purely technical and mathematical background of computer science can find ways to get involved in a way that's more fulfilling, more globally aware," he said.

The interaction of real global issues and cutting edge technology is what inspired Parikh to begin his project in the in the first place.

"So having work that kind of balances both this global perspective, the opportunity to work with people and also doing technical research and working on technical problems is really the best of all possible worlds for me," he said.

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Ed Lazowska, the Bill and Melinda Gates chair in Computer Science and Engineering at the UW, said he is impressed by what Parikh has accomplished.

"Largely due to Tapan's influence, UW CSE now has a number of faculty members thinking about these sorts of problems, a vibrant seminar series with dozens of students participating, and multiple students, undergraduate and graduate, doing fieldwork in the rural developing world," Parikh said. "This sort of work affords students the opportunity to combine their technical interests with their societal interests, work that can be difficult to balance between these two aspects."

Lazowska said the type of work Parikh is doing is unique.

"Tapan is very unusual in the degree to which he has successfully combined legitimate computer science research with societal impact," Lazowska said. "[His] story is a story of how much influence a single, very special individual can have. It's also a story that illustrates the broad impact of computer science in today's world. It's not just spreadsheets and videogames; it's technologies that, if done right, can change the lives of people in the rural developing world."