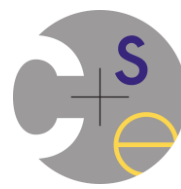




COMPUTING FOR DEVELOPMENT

at the
University of Washington's
Department of Computer Science & Engineering



Research in information and communication technologies for development (ICTD) is a new and important area in computing research. Systems deployed in highly resource-constrained environments (unsophisticated users, lack of reliable power, expensive or non-existent data connectivity, etc.) must be designed to be much more robust than those designed for the developed world. This leads to a fuller exploration of the design space not only in terms of the physical design but also the system architecture and its robustness to a variety of possible failures. Often designs developed for these contexts find application in the developed world as well – whether in underserved communities or in contexts that require more robust systems.

Our work is based on partnerships with organizations that work on the ground to provide sustainable services to real people in a wide range of application domains including public health, education, environmental monitoring, human rights monitoring, and nature mapping. All our work products are in the public domain and we work hard to create communities around our open source software artifacts. Thus, our focus is on making our partner organizations more effective and efficient at what they do and ensure that our work finds a future sustained by a larger community of developers.

Our partners include PATH (Program for Appropriate Technology in Health), the UW Institute for Health Metrics and Evaluation, Global2Local (a partnership of Swedish Hospital and HealthPoint), AMPATH (Academic Model Providing Access to Healthcare), UW Department of Global Health (and its NGO-arm ITECH), VillageReach, among others. Our work is currently supported by Google Research, the National Science Foundation under the Smart Health and Wellbeing cross-cutting program, and the Jerre D. Noe Endowed Professorship.

The following provides a short list of projects in which we are currently engaged. For more up-to-date information please refer to the website of our umbrella group for ICTD research at UW, Change (change.washington.edu).

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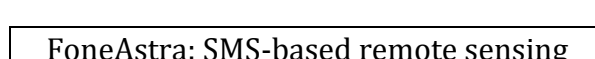
Digital Study Hall



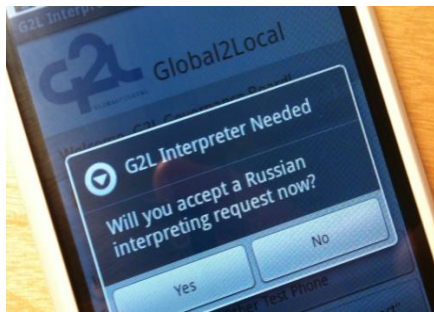
To address the lack of trained teachers, facilitated video instruction is being used in primary schools in rural India. Video lessons are used in a hybrid model of instruction that includes viewing of expert teachers and in class activities conducted by the local teacher.

Open Data Kit (opendatakit.org)

Open Data Kit is a collection of tools for mobile data collection and decision support, including an Android phone client and a cloud data repository. It is now in use on six continents by over 10,000 users in more than 100 organizations and has spurred the development of several companies providing ODK support.



Global2Local Interpreter Service



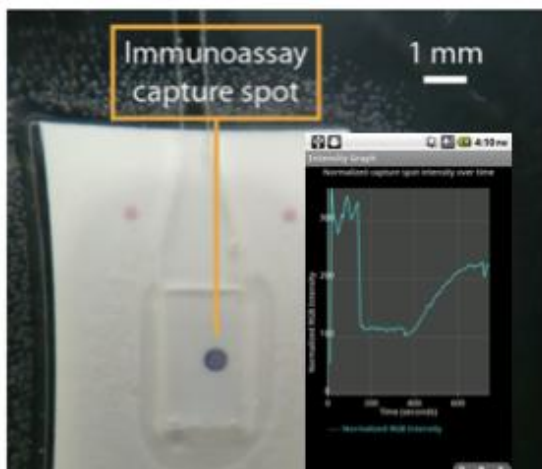
The community of SeaTac (just south of Seattle) has a population that speaks over 60 languages. Interpreters are a key element to the delivery of social services and must be recruited from the community they understand. The G2L interpreter service provides a way for interpreters to sign-up and gets tasks while maintaining the anonymity of all parties involved.

e-IMCI: Triage of Childhood Illnesses



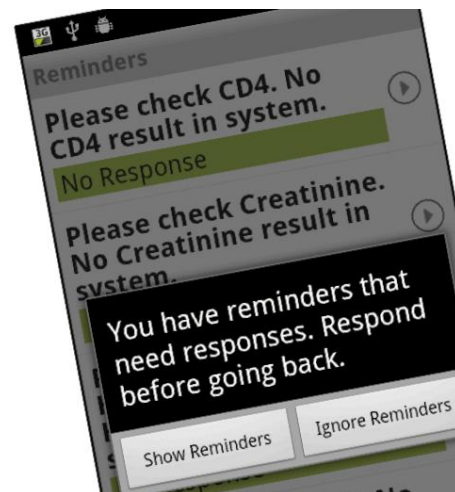
Lack of skilled physicians means lesser-trained personnel must provide triage. WHO protocols such as IMCI can be digitized onto phones so that their flowcharts are easier to navigate and more likely to be adhered to by clinicians (30% more often) and lead to better care for children.

Point-of-care Diagnostics



Mobile phone cameras and computer vision can be used to read chemical reactions on paper assay systems. This enables simple blood and sputum tests to be carried out in the field with results immediately available while the patient is still present.

ODK Clinic: Automatic Care Reminders



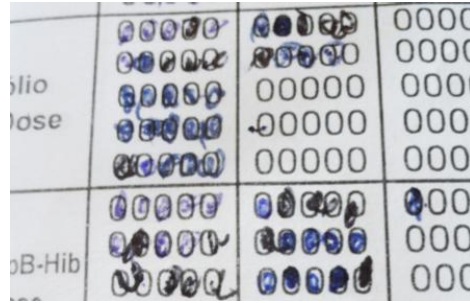
By connecting a mobile phone to electronic medical records (in this case, OpenMRS, at AMPATH in Kenya), doctors can be provided with reminders about important aspects of patient care so that key measurements are not missed. The system is currently in deployment and showing greatly improved adherence to care protocols.

Star-bus: Real-time Bus Information



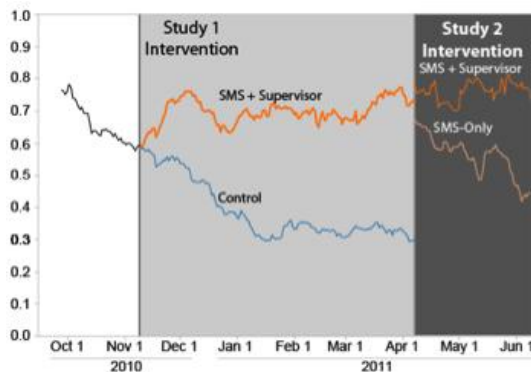
In many countries (such as Kyrgyzstan), bus services are highly decentralized and schedules are chaotic. Star-bus uses a GSM/GPS unit mounted on a bus to provide location data over SMS to a central server that can then answer queries about expected arrival times at different locations.

mScan: Digitizing Paper Forms



Paper is still the cheapest way to collect basic information from relatively unskilled workers. Mobile phone cameras provide a quick way to digitize the information on “bubble” forms and other structured paper instruments so that data entry is instantaneous and less error-prone.

CommCare: Supervision of CHWs



Community health workers (CHWs) require constant supervision as they are often volunteers from the community (as with several groups we work with in Tanzania). CommCare provides reminders of when patients need follow-up visits and has been shown to sustainably change on-time performance from 30 to 70%.

Flash Heat Pasteurization of Breast Milk



The HIV virus can be eliminated from human breast milk by pasteurization. A flash heating process ensures the HIV virus is denatured without destroying important nutrients in human breast milk. This process must be monitored to ensure it is done properly. Phone-connected sensors can be used to check the temperature of the milk and provide a user interface for the user. This is now being tested in South Africa.