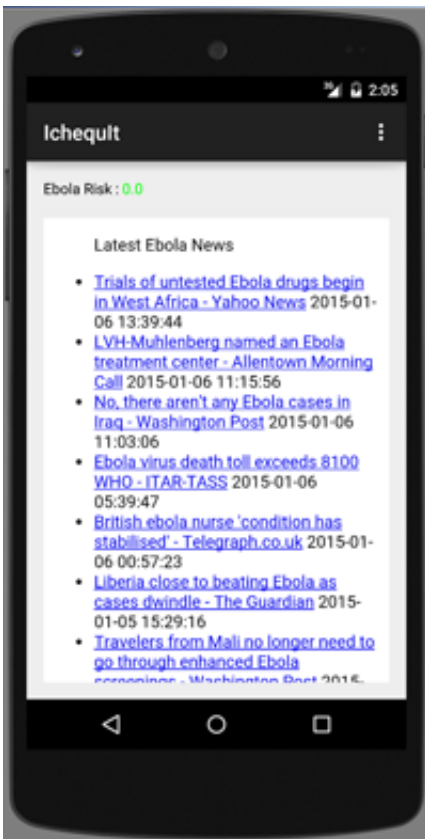# Researchers to design, market smartphone app that gauges Ebola risk

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Credit: University of Kansas

Within six months, your iPhone or Android mobile device could supply a real-time estimate of your likelihood of contact with the deadly Ebola virus. To create the digital tool, researchers at the University of Kansas recently won a rapid-response grant to advance Ebola-related

fundamental research from the National Science Foundation.

By combining data from social media posts and contact-tracing records of Ebola patients from the Centers for Disease Control and Prevention, the app will give a running score of users' danger for contact with Ebola via travel or crossing paths with a known Ebola patient.

For the vast majority of U.S. users, the risk should be virtually nonexistent.

"Our feeling regarding Ebola is that there is a high level of anxiety due to a lack of experience and education from many aspects," said Jun (Luke) Huan, professor of electrical engineering and computer science at KU's Information and Telecommunication Technology Center, who is leading the project. "Our app should help in both cases. It sends updated information of the virus to end users. It also computes a personalized risk score for the user so that the person is informed and updated."

Called "iChequIt," the app will perform several functions. It will alert a user if the person visited a location that a newly reported Ebola patient visited before and assess the risk of the visit. Also, the app will provide Ebola data on any travel plan so that a user can evaluate dangers of potential exposure. Additionally, the app will compile the latest news regarding the Ebola virus from news media and official sources.

While the app will supply data, it isn't meant to advise people how to live their lives.

"There is absolutely no way that we or anyone else could guarantee that the virus information is complete and accurate," Huan said. "Therefore we rely on the end user to take appropriate actions based on the information we provide."

The researcher said "iChequIt" would comb social media posts using a niche crawler that specifically looks for information regarding the disease.

"We'll focus on those messages posted related to Ebola patients, and we're interested in all types of information, including the geographical location, time information and the physical conditions of the patient," said Huan, whose research interests include data science, data mining, machine learning, bioinformatics and health informatics.

While the app would access social networks and government databases, Huan stressed the privacy of users and people in government contact-tracing databases would be guarded closely.

"We take privacy protection very seriously," he said. "All user data are always kept within the user's mobile phone, and no user data will be transmitted to our database server."

The government and social media information will feed into an Ebola Risk Prediction System that uses techniques of risk analysis to generate the estimated risk score for each user. While the app will automate the process, perfecting the technology poses hurdles for researchers.

"There are many technical issues we have to overcome," Huan said. "To perform large-scale crawling and compiling Ebola-related information from the web, social media and from many government reports is challenging. To come up with a risk-assessment model for individuals is non-trivial. Fortunately we have a strong and dedicated interdisciplinary team with experts in data mining, machine learning, information retrieval, privacy and security, health services research and public administration."

For instance, the producers of the app will develop "customized parsers"

to analyze information from relevant sources, like a PDF file or a CDC report. Likewise, they'll use what computer scientists call "ontology," a branch of information science with the aim of controlling vocabulary and other information shared between computers.

The concept for the app was born from a brainstorming session among KU computer scientists after the NSF appealed for technological solutions to the public health crisis posed by Ebola.

"We first sent a white paper to a few NSF program officers," Huan said. "About two weeks later we received a response encouraging us to submit the full proposal, and here we go."

Huan said the system would be applicable to other pandemics such as those caused by avian influenza and severe acute respiratory syndrome, or SARS.

His collaborators on the iChequIt app at KU are Bo Luo and Fengjun Li, both with EECS/ITTC; Alfred Ho with the School of Public Affairs and Administration, and Guoqing Chen, Health Services Research at KU Medical Center.

Provided by University of Kansas