



Street Bump app detects potholes, tells city officials

By **John D. Sutter**, CNN

(CNN) - Here's the problem with the [whole Gov 2.0 movement](#): People are lazy.

Plenty of apps - [SeeClickFix](#) among them - allow diligent, digitally minded citizens to snap photos of potholes and send them to city hall. But that takes effort and, let's be honest, it's not something many people will follow through with.

Further, the pothole data that comes from these apps can be haphazard and, by definition, is subjective. One person's pothole could be another's divot.

Perhaps the digital sensors in smartphones can do a better job all by themselves.

That's the idea behind [Street Bump](#), an Android app piloted by the City of Boston. The app, which should be available to the public this summer, makes the smartphone's accelerometer do the job of sensing potholes. If you're driving and you hit a pothole while the app is loaded, Street Bump pairs up data about the size of the bump with a GPS coordinate - and sends that to a city database.

The hope, said Nigel Jacob, co-chair of the mayor's office of [New Urban Mechanics](#), which is managing this project, is that Boston and other cities soon will have a "real-time" map of road conditions, allowing them to catch potholes - "pre-potholes," as the city says - earlier and to prioritize road repairs more broadly.

Ultimately, that will save the city money, he said. (For the curious, the city *does* have enough money to fix the potholes it finds with this app, he said. I'd wondered if ignorance might be bliss.)

The app initially was developed and tested last year. But it didn't work. Jacob and his co-chair, Chris Osgood, drove cars around the city - their sights set on hitting potholes (Once, they popped a tire). Their Android phones registered the bumps, but the data was a mess. Potholes showed up as indistinguishable from railroad tracks and other normal driving obstacles. Further, if they moved the phone - taking it out of a pocket or tossing it up on the dash - its accelerometer registered similar bumps, too. Street Bump found plenty of bumps. But who knows how many were potholes.

Discouraged by the muddy data, the city decided to launch a global challenge in partnership with a group called [InnoCentive](#). Liberty Mutual donated \$25,000 in prize money for the group or groups that could use equations to distinguish between a pothole-y bump and all those other run-of-the-road vibrations.

Three winners were announced, and the city is working to implement their algorithmic solutions now.

Ed Aboufadel, chair of the math department at Grand Valley State University (and who has an [awesome picture of himself](#) dressed up as Neo from "The Matrix"), worked on the project with undergraduate students. In an e-mail, he said the app shows promise but that it isn't able to perfectly detect potholes using the algorithms he helped develop:

For our method, we could detect practically all the potholes in the test data that was provided by the City of Boston, but we also found some "false positives" – railroad crossings, speed bumps, and the like.

Smartphone accelerometers are also inconsistent, which makes the data difficult to analyze. He said:

An issue with this method of data collection is that the sensors on smartphones are not as sophisticated as ones that engineers might use in research and other projects, so you have to do your best with the data. For instance, with the version of the Street Bump app from last summer, data was recorded 3-5 times per second, as opposed to 300 times per second with more sophisticated equipment.

Another problem, according to Jacob and Osgood, from the city, is that the app drains a phone's battery life quickly - as fast as a couple of hours in some cases.

They'd planned for drivers to keep the app running in the background all the time, but they've since decided app users should only turn the program on when they're going on a drive. This serves three functions: One, they won't kill their batteries; two, they'll realize they're "volunteering" their phone's time, and may feel good about that; and three, they'll know when the city is aware of their GPS location. Phone data is anonymous, they said, but privacy could be a concern - as it almost always is with location-aware services.

Despite all these obstacles, the city is confident developers will be able to work out the kinks in time for this summer's release. The code behind the app and the algorithms used to analyze it will be released as open source, so cities around the world can pick this up if they'd like. An iPhone version may be in the works, too.

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