

# App detects potholes, alerts Boston city officials

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In this Thursday, July 19, 2012 photo Boston Public Works worker Tyrone Odom, of Boston, fills a pothole with asphalt in Boston's Charlestown neighborhood. Boston officials hope a new smartphone application could eventually eliminate the need to send out trucks to survey the hundreds of miles of roadways to figure out the locations of potholes. (AP Photo/Steven Senne)

The next time your car hits a pothole, a new technology could help you immediately tell someone who can do something about it.

Boston officials are testing an app called Street Bump that allows drivers

to automatically report the road hazards to the city as soon as they hear that unfortunate "thud," with their smartphones doing all the work.

The app's developers say their work has already sparked interest from other cities in the U.S., Europe, Africa and elsewhere that are imagining other ways to harness the technology.

Before they even start their trip, drivers using Street Bump fire up the app, then set their smartphones either on the dashboard or in a cup holder. The app takes care of the rest, using the phone's [accelerometer](#) - a motion-detector - to sense when a bump is hit. GPS records the location, and the phone transmits it to a remote servers hosted by Amazon Inc.'s Web services division.

The system filters out things like manhole covers and speed bump using a series of algorithms - including one that can tell if the initial motion is up over a speed bump, as opposed to down into a pothole. If at least three people hit a bump in the same spot, the system recognizes it as a pothole.

As in many northern cities, potholes are a real problem for Boston, where crews patch about 19,000 of them a year following the annual freeze-thaw cycle, according to Matthew Mayrl, chief of staff in the city's public works department.

"So you can imagine that driving 806 miles of roadway and getting an accurate count of where every pothole is a gigantic task," he said.

City officials hope the app might eventually allow them to save money by creating a real-time map of potholes that need to be fixed and eliminating the need to send out city trucks or contract an engineering company to troll hundreds of miles of [roadways](#) looking for damage.

"What this technology allows us to do - because we imagine dozens and hundreds and possibly thousands of people using it - it essentially creates a new way for people to donate their data in solving public-good challenges," said Nigel Jacob, co-chairman of the Boston Mayor's Office of New Urban Mechanics, which manages the project.

Street Bump is different from Boston's first app, Citizen Connect, which required users to actively send a text or tweet, visit a website or call a 24-hour hotline to report a pothole or other nuisances. Other cities, including Honolulu, San Francisco, Washington, D.C., and Columbus, Ohio, have encouraged residents to report potholes using Facebook, Twitter, or special apps that allow residents to request city services using their smartphones.

Street Bump became available for free in the iTunes store in June, and experts are working on the Android version.

Jacob said "a couple of hundred" of users have downloaded the app so far, and developers are still trying to figure out how many will be needed to make the software more useful. The project's next big phase, he said, will be expanding the app to other cities in a couple of months and beginning to analyze the data to figure out ways to refine the app. Authorities intend to launch a campaign on social and other media to encourage more people to use the app, Jacob said, adding that the details have yet to be worked out.

Street Bump, which cost a total of \$45,000 from Boston city coffers and insurer Liberty Mutual Group Inc. to develop the prototype and award experts a prize to craft ways filter out false positives, was conceived by Jacob's office and developed by Worcester Polytechnic Institute professor Fabio Carrera, with help from a group he's working with at the Santa Fe Complex, a community organization in New Mexico.

The first version collected lots of data but couldn't differentiate between potholes and other bumps. So InnoCentive Inc., a Waltham, Mass., crowdsourcing firm, threw the challenge out to a network of 400,000 experts and offered them a share of \$25,000 in prize money donated by Liberty Mutual.

In the end, ideas were incorporated from three places - a group of hackers in Somerville, Mass., that promotes community education and research; the head of the mathematics department at Grand Valley State University in Allendale, Mich.; and a software engineer who did not want to be identified.

There has been so much interest from other cities in the U.S. and abroad that Boston is preparing to release the code to the public by the end of the summer so others can tweak the software for their needs. Proposals include using it for early detection of earthquakes and creating a "black box" for police cruisers that could show whether a vehicle was stationary or moving before a crash to stop people who hit parked police cars from claiming officers crashed into them.

"I think people are really interested in the concept," Jacob said. "Right now, the feedback we've gotten is ... `Very interesting [app](#), how do we use it in our city?'"

**More information:** Online: Street Bump: [bit.ly/MMbA85](http://bit.ly/MMbA85)

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