DISRUPTOR
By Patrick Nelson ★ **Thought Leader**

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Thought-provoking commentary on technologies that are changing the way mankind does things.

How smartphone sensors can make expensive weather-monitoring equipment obsolete

Collecting weather data, performing earthquake early warnings, and issuing flooding advisories are all tasks that can be crowd-sourced by smartphones.

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Currently, millions of drivers are traveling around our cities collecting data on road traffic with their smartphones. The objective: crowd-sourced traffic conditions.

Drivers simply install an app onto their smartphones. The device collects data, and then the system shares the nuances of traffic jams with other app users for the "common good," as Google's Waze, the app's developer, describes it.

Waze and the GPS sensor

In that case, speed and location is calculated by the smartphone's GPS sensor. Waze has somewhere between 20 and 50 million users, depending on who you listen to.

It's conceivably a superior, and cheaper, arrangement compared to local news choppers whizzing around the morning commute. For one thing, local government doesn't have to pay for sensors, data pipes, and equipment upgrades—the man on the street does it for them.

Weather

This kind of traffic monitoring, as provided by Waze, is only the tip of the iceberg for mass social data collection. Weather forecasting is another sensor-heavy data collecting job, usually performed by government agencies with expensive equipment that lends itself to the crowd-sourced smartphone-as-sensor.

Smartphone barometers

Some smartphones, including Apple's latest iPhone 6, include barometers as part of their feature set. A barometer senses air pressure and is used, in Apple's case, to determine relative elevation—measuring stairs climbed and so on.

A barometer can also be used to detect short-term changes in the weather.

And numerous barometers, spread out over a geographic area, should be able to take air pressure measurements and then help forecasters analyze where troughs, high-pressure zones, and frontal boundaries are. Troughs are indicative of bad weather, for example.

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PressureNet

Toronto-based PressureNet intends to improve weather and climate forecasting by pulling data from "connected atmosphere sensors." In other words, the barometer sensor on your phone, and numerous others. It wants to create a network of "citizen scientists."

These citizen scientists don't need dedicated back-yard, hobbyist, or semi-pro weather stations that can cost several hundreds of dollars in order to contribute. They just activate their smartphone and provide an Internet connection.

API and SDK

An Android library SDK lets any app developer build-in atmospheric data collection for passing on to PressureNet.

The API provides access to data, which PressureNet says contains hundreds of millions of atmospheric pressure measurements.

And with a quarter of the world projected to be using smartphones by 2016, many of whom will be in the data-sparse developing world, even if many devices don't have the required barometer, that's still a lot of sensors floating around.

Earthquakes

It doesn't stop at weather. The GPS and accelerometers in smartphones could be purposed for another altruistic data grab. Earthquake activity can be monitored by smartphones, according to scientists in the American Association for the Advancement of Science's Science Advances publication.

They say that the ubiquitous, global penetration of the smartphone makes it a superior earthquake early warning system (EEW) than expensive "scientific-grade" equipment, partly because smartphones are appearing in poorer countries, which don't have access to specialized EEW. California, for example, has some EEWs.

Floods

And where's it going? Spontaneous tweets about flooding could be used to create real-time flood maps, say some Dutch scientists who have been discussing their project with Megan Rowling of Thomson Reuters Foundation.

And in that case, you wouldn't even need sensors in the phone to augment or replace the existing flood gauge sensors. The researchers at Deltares and Floodtags intend to poll Twitter users for estimates of flood depth. They say they can generate maps within a minute of the message being posted.

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Patrick Nelson

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Patrick Nelson was editor and publisher of the music industry trade publication Producer Report and has written for a number of technology blogs. Nelson wrote the cult-classic novel Sprawlism.

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