Twitter Can Help Predict ER Visits

Twitter can be a useful tool for hospitals, according to University of Arizona researchers who observed how asthma-related tweets, analysed alongside other data, can help predict asthma-related emergency room (ER) visits.

The researchers created a model that was able to predict approximately how many asthma sufferers would visit the ER at a large hospital in Dallas on a given day, based on an analysis of data gleaned from electronic medical records (EMRs), air quality sensors and Twitter.

The group observed that as certain air quality measures worsened, asthma visits to the ER went up. Asthma visits also increased as the number of asthma-related tweets went up.

Their findings could help hospital emergency departments in terms of managing staff and resources. "We realised that asthma is one of the biggest traffic generators in the emergency department," says lead author Sudha Ram, a UA professor of management information systems and computer science. "Often what happens is that there are not the right people in the ED to treat these patients, or not the right equipment, and that causes a lot of unforeseen problems."

For this research, Professor Ram and colleagues collected air quality data from environmental sensors in the vicinity of the Dallas hospital over a three-month period. The team also collected and analysed asthma-related tweets containing certain keywords such as "asthma," "inhaler" or "wheezing." After gathering millions of tweets from across the globe, they used text-mining techniques to zoom in on relevant tweets in the ZIP codes where most of the hospital's patients live, according to EMRs.

By analysing tweets and air quality data together, Ram et al. were able to use machine learning algorithms to predict with 75 percent accuracy whether the ER could expect a low, medium or high number of asthma-related visits on a given day.

Prof. Ram's team hopes that their findings will help them create similar predictive models for ER visits related to other chronic conditions, such as diabetes.

The study, to be published in the *IEEE Journal of Biomedical and Health Informatics* , highlights the important role that big data, including streams from social media and environmental sensors, could play in addressing health challenges.

Big data analysis already has been used to predict the spread of contagious disease. For example, the Google Flu Trends Web service estimates when and where flu will spread based on analysis of flu-related Google searches.

The model developed by Prof. Ram and her collaborators is different in that it focuses on a chronic condition. As the professor points out: "People often end up in the emergency room not necessarily for contagious diseases but for complications resulting from chronic conditions like asthma or diabetes or cardiac problems, which cost a lot to our health care system."

Typically, hospitals can make risk predictions about when individual asthma patients might return, based on medical histories. However, the model created by Prof. Ram and her team makes predictions at the population level.

"The CDC gets reports of emergency department visits several weeks after the fact, and then they put out surveillance maps," Prof. Ram explains. "With our new model, we can now do this in almost real time, so that's an important public health surveillance implication."

Source: University of Arizona
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