Using smartphones to monitor Fire Weather

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Abstract:

Rapidly changing weather conditions that can induce extreme fire regimes is a problem faced by many countries around the world. Getting information about fire risk to the fire managers on the ground in real time is crucial for fire management and will allow crews to rapidly access areas before they get out of control.

While most fires today are started by people, the weather conditions will determine if and how fast the fire will spread. In particular, research has shown that the relative humidity is the prime weather parameter that is closest related to the dryness of vegetation. Hence, monitoring the relative humidity via smartphone sensors carried by the public may supply additional important information about the fire risk at high spatial resolution.

We have received data from a company in the UK called OpenSignal, who have developed an App called WeatherSignal. This company has collected almost 4 years of data from smartphones of more than 40,000 users per day around the globe. While each phone may be different, with different sensors, and the person may be moving with the phone, we have found that these large amounts of data allow us to obtain useful information. In November 2016 Israel was also faced with extremely dry vegetation due to the dry weather, resulting in explosive fires that spread rapidly. Comparing data collected in November 2013 to 2016 from smartphones around Israel, we were able to detect the extreme low humidities in November 2016,

exactly during the dates that extreme dry weather dominated the region. Combining relative humidity data with temperature data, wind speed and direction (from smartphones and weather stations) can give us real time indicators for firefighters.