Home | News & Analysis | Products & Suppliers | Standards Library | Reference Library | Engineering Community | Stay Informed

Engineering 360
Powered by IEEE GlobalSpec

News & Analysis | Search News & Analysis | **GO**

IEEE
Acquired Engineering360

HOME   NEWS & ANALYSIS   TECHNOLOGY   ELECTRONICS   PASSIVE COMPONENTS   ARTICLE

Share

Passive Components

Researchers Employing Big Data to Predict Severe Weather Conditions

Marie Donlon

22 June 2017

Researchers from Penn State College of Information Sciences and Technology (IST) and AccuWeather are using big data to help predict dangerous weather conditions.

Using a new method for identifying bow echoes (often associated with violent winds) in radar images, researchers have published their findings in the journal *Applied Soft Computing.*

"It was inevitable for meteorology to combine big data, computer vision, and data mining algorithms to seek faster, more robust and accurate results," said doctoral student Mohammad Mahdi Kamani.
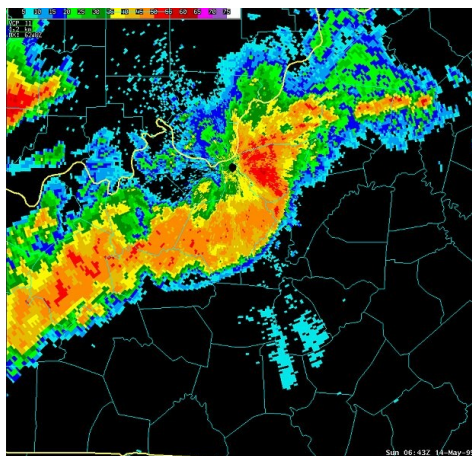
"I think computer-based methods can provide a third eye to the meteorologists, helping them look at things they don't have the time or energy for," said IST professor James Wang. Concerning bow echoes, automatic detection would be critical to identifying severe weather, saving both lives and resources.

Researchers have developed a new approach for identifying bow echoes in radar images, a phenomenon associated with fierce and violent winds. Image credit: NOAA

AccuWeather forensic meteorologist Stephen Wistar explained, "[i]n a line of thunderstorms, a bow echo is one part that moves faster than the other." As indicated by the name, once formed, the weather conditions resemble the shape of a bow. "It can get really exaggerated," he said. "It's important because that's where you are likely to get serious damage, where trees will come down and roofs get blown off."

However, it is easy for forecasters to often overlook the weather conditions as they begin to form. "Once it gets to the blatantly obvious point, (a bow echo) jumps out to a meteorologist," he said. "But on an active weather day? They may not notice it's just starting to bow."

Consequently, researchers have automated bow echo detection using historical data available from the National Oceanic and Atmosphere Administration (NOAA), making them identifiable as soon as they start to form. Wang said, "[t]hat's our project's fundamental goal—to provide assistance to the meteorologist so they can make decisions quicker and with better accuracy."

Using NOAA radar imagery, the algorithm scans the entire United States, immediately issuing an alert when the formation of a bow echo is determined.

Upcoming Events

Jul 17, 2017
Chicago, IL
International Conference on Graphene & Semiconductors

Aug 9, 2017
Mexico City, Mexico
2017 BICSI CALA District DataNet Mexico Conference & Exhibition

Aug 27, 2017
Philadelphia, PA
International Conference on Highway Pavements & Airfield Technology

Sep 24, 2017
Las Vegas, Nevada

"But this is just the first step," Kamani commented before adding that they hope to one day forecast bow echoes before they even form. "The end goal is to have more time to alert people to evacuate or be ready for the straight line winds."

"If you can get even a 10, 15 minute jump and get a warning out earlier pinned down to a certain location instead of entire counties, that's a huge benefit," Wistar said. "That could be a real jump for meteorologists if it's possible. It's really exciting to see this progress."

Imagining the future of meteorology, the researchers see potential for the application of big data. "There's so much we can do," Wang said. "If we can predict severe thunderstorms better, we can save lives every year."

Discussion – 0 comments

By posting a comment you confirm that you have read and accept our Posting Rules and Terms of Use.

Powered by CR4, the Engineering Community

Add your comment

PASSIVE COMPONENTS

Researchers Urge Wearable Device Designers to Consider Baby Boomers
PASSIVE COMPONENTS

A New Method for Reducing Lawn Watering
PASSIVE COMPONENTS

Detecting Hazardous Radioactive Substances from Even Greater Distances
PASSIVE COMPONENTS

Autonomous Machines On Track Toward Greater Independence
PASSIVE COMPONENTS

Catfishes Beware!
PASSIVE COMPONENTS

Engineering360
Editorial Team
Client Services
Advertising
Terms of Use

360 Websites
Datasheets360
Electronics360

Home | Site Map | Accessibility | Nondiscrimination Policy | Privacy & Opting Out of Cookies

Engineering Newsletter Signup

Get the Engineering360

Specs & Techs Newsletter