



ENERGY

Predicting future floods

🕒 MAY 31, 2018 >>> BY KATE HAYDEN | STAFF WRITER

The next time communities are hit by a massive flood, researchers at the University of Iowa’s hydrosience and engineering department hope critical information could be reached with a quick ask of Alexa.

That wasn’t the case in 2008. June 2018 marks 10 years since floodwaters devastated a number of northeast Iowa communities. At the time, Iowans could barely wait for the water to recede before recovery mode kicked in: Across the state, damage to homes, commercial property, infrastructure and agriculture was estimated at nearly \$10 billion by the U.S. Department of Commerce, the National Weather Service and the National Oceanic and Atmospheric Administration.

With the consequences of those floods fresh in mind, the state established the Iowa Flood Center in 2009 — which in turn launched the Iowa Flood Information System (IFIS) in 2011. IFIS now provides inundation maps for more than 20 flood-prone communities — and continues to develop new maps in the rest of the state. Inundation maps allow users to see forecasted flood crest levels and anticipate before the water hits how it will affect their own home or business.

IFIS currently has more than 300,000 users accessing real-time flood-risk data, said Ibrahim Demir, an assistant professor and associate research engineer for the hydrosience and engineering department.

“IFIS is more active during heavy rainfall events and flooding season. In 2016, we had very heavy flooding and activity in Cedar Rapids, so in four or five days we had over 100,000 users accessing the system,” Demir said.

IFIS uses more than 600 real-time stream and river sensors to track water levels constantly. For the last five years, Demir and a team of student researchers have been studying ways to bring IFIS into daily life for more Iowa residents — like “Siri for a flood expert,” Demir said.

In April, the team launched the first version of Flood Expert.

“The idea is to create an artificial intelligence system for flooding, more like a flood expert that you can talk to 24/7,” Demir said. “You can say, ‘What is the flood condition for Iowa City at 5 p.m. tomorrow?’ or ‘What will be the forecast for Iowa City at 5 p.m. two days from now?’”

“Very detailed and data analytic questions could be asked. You could say, ‘What is the potential flood damage for Cedar Rapids at a 25-foot flood scenario?’ It could give you the number of buildings, number of dollars’ damage, structural damage, and all this detailed data, instantly.”

Researchers are connecting Flood Expert to the main IFIS infrastructure, so Flood Expert can begin machine-learning concepts based on data already collected by IFIS.

“It’s a work in progress,” Demir said.

Eventually he thinks Flood Expert’s AI technology will expand to other states with a resource such as IFIS. The team expects to make Flood Expert available as a downloadable app, but is striving to make Flood Expert a seamless extension for users of social media platforms and smart assistant devices like Amazon Echo, Demir added.

“We have very strong prototypes and demos for conferences. We are both working on the resource side, but we are trying to bring our research public and make it more useful and actionable to the public.”

Updates to IFIS won’t end after Alexa and Echo can take command, however. Demir and other researchers are still looking ahead at how technology like augmented reality can inform disaster relief and citywide evacuation efforts in the future.

The team is working with the Iowa Department of Transportation to create a routing system that can give directions to residents or emergency responders when roads are inaccessible due to flooding.

“We have some applications that use augmented reality and holograms, so if you have these applications, you can bring a 3-D city environment — more like a hologram — on your table like in science fiction movies,” Demir said. “You can create this holographic environment with cities, with flood maps and demographic information about flood loss and damage.”

The Iowa Flood Center funds IFIS and regular maintenance out of the center’s \$1.3 million general budget each year. Funding for Demir’s research comes from outside agencies including the Department of Homeland Security and NASA, but not from the Iowa Flood Center or directly from the state, he said.

“I’m working with the Flood Center to bring these capabilities to IFIS,” Demir said. “I’m trying to make my research benefit IFIS and the general public in Iowa.”



• Tagged [innovationIOWA Magazine](#), [Iowa City](#), [Iowa Flood Center](#), [Iowa Flood Information Center](#), [University of Iowa](#)

← Q&A Ron Cox

Q&A: Brent H. Shanks →

SEARCH

Search ... 🔍

SIGN UP

IN YOUR INBOX EVERY THURSDAY
Click to receive the innovationIOWA eNewsletter!

VIEW THE MAGAZINE



The 2018 edition of innovationIOWA magazine was published on June 1.
Check out the magazine!

GET INVOLVED

Have a story to tell? **Talk to Kate Hayden**
katehayden@bpccdm.com
(515) 228-3478

Want to advertise? **Talk to Sara Brown**
sarabrown@bpccdm.com
(515) 240-0316

LATEST POSTS

GIA welcomes ten insurtech startups to Des Moines on Tuesday
🕒 JANUARY 9, 2019

TAI TechBrew: AM announces 2019 schedule
🕒 JANUARY 8, 2019

Iowa AG joins \$1.5 million settlement with Neiman Marcus over data breach
🕒 JANUARY 8, 2019



ABOUT US

innovationIOWA is an extension of the Des Moines Business Record that fuels Iowa’s innovative spirit through coverage of Iowa’s entrepreneurial ecosystem in an annual publication, weekly eNewsletter and ongoing coverage in the Business Record. [Learn more](#)

SEARCH

Search ... 🔍

FIND US

The Depot on Fourth
100 4th Street
Des Moines, IA 50309

(515) 288-3336

businessrecord.com

Copyright © BPC 2019, All rights reserved. Reproduction or use without permission of editorial or graphic content in any manner is strictly prohibited.