AUDREY Watches Out for First Responders

An AI Case Study

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In an emergency, first responders can experience information overload. A new pilot project testing a voice-activated, human-like reasoning system, powered by artificial intelligence, aims to help. By enhancing situational awareness and sorting through mountains of data in mere seconds, the system will help first responders manage their critical workloads, aiding the responders in what they are most focused on — saving and protecting lives.

The system is the Assistant for Understanding Data through Reasoning, Extraction and Synthesis, or AUDREY, a cloud-based data processing platform that uses human-like reasoning to help first responders synthesize data in an emergency. The system connects with sensors on the first responder's personal protective equipment and information provided by the internet of things through plugin tools.

It's super-charged AI; relying on bio-inspired neural symbolic processing for cognitive reasoning. Moreover, AUDREY learns from the emergency worker, supplementing the knowledge and intuition of a human being with its data-processing and predictive abilities.

"It's a very flexible solution, meaning that it can receive many, many data points and also manage all those different data points very easily," says Denis Gusty, program manager at the Department of Homeland Security's Science & Technology Directorate. "Much better than a single human being could."

AUDREY was born out of a partnership between S&T's Next Generation First Responder Apex program and NASA's Jet Propulsion Laboratory. It launched in June 2017 in a pilot program at the Multi Agency Communications Center in Grant County, Washington. Earlier this year, AUDREY was put to the test again, this time at the Hastings-Quinte Paramedic Services in Ontario, Canada. The goal of this cross-border effort was to work with paramedics and test how AUDREY would react in common emergency scenarios, Gusty says.

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The AUDREY Effect

In one scenario focused on a patient with chest pain, AUDREY performed a number of functions including responding to and transcribing paramedics' voice commands, as well as tracking and validating medication dosage and frequency.

"We actually asked it to automate the completion of the paramedic treatment record at the end of each call," Gusty says. "We set out to do a good bit of work experimenting with AUDREY."

In a real-world situation, that information would be accessible via the cloud to a 911 call center or a hospital.

Field testing has highlighted the system's possibilities as well as revealed opportunities for improvement. Though AI is very helpful to paramedics, the handheld form factor turned out to be impractical.

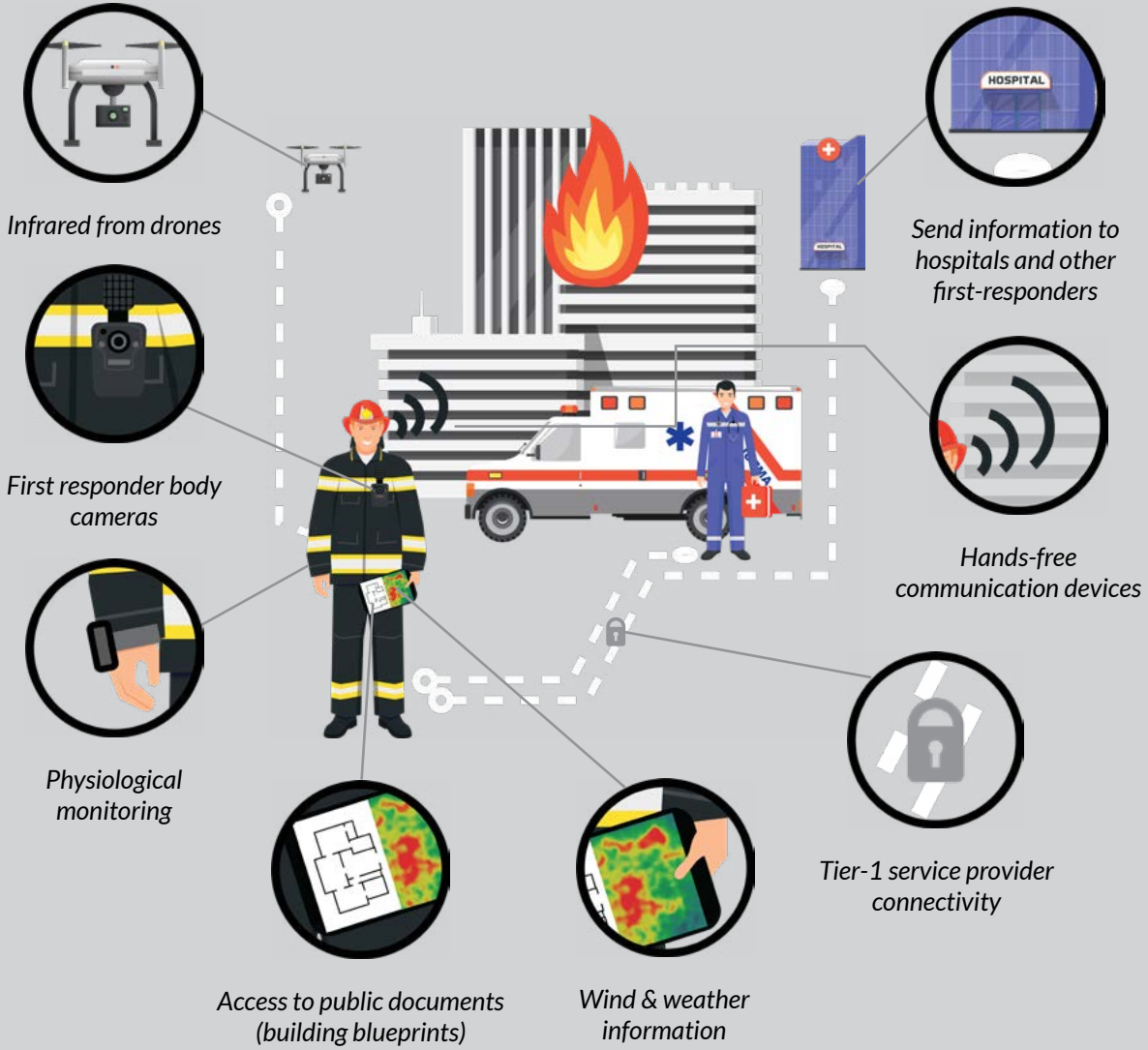
"That's basically what you do in an experiment," Gusty says. "We didn't expect everything to work 100% fine, but we also expect to learn a lot from the mistakes. What we really demonstrated was the art of the possible. There were some instances where AUDREY didn't do very well, so we went back to tweak some of the technology."

AUDREY has wide applications for first responders. Firefighters, police and emergency medical technicians all have their own particular protocols when they arrive on scene.

"If you think about the fire chief or the incident commander, he or she has a lot to be aware of," Gusty says. "Not only are they managing the incident, but they also have to manage all their firefighters and their equipment. That's a lot of data being thrown at one person."

How It Works

AUDREY aims to use machine learning tools to improve situational awareness for first responders and supporting staff by tapping petabytes of data from multiple resources, and turning this data into actionable insights in real-time.



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An AI-Fueled Future for First Responders

He adds: "Artificial intelligence, I see it playing a major role in this situation where it's actually monitoring and evaluating all the data from not only the incident, but all the firefighters as well including respiratory rates, heart rates, stuff of that nature where you don't want any of your firefighters to go down in a serious incident where their lives are at risk."

AI, however, won't be making any life-changing decisions anytime soon. Snap judgments will still be the human's responsibility, Gusty says.

"I think you have to take a step back and look at the big picture here. Artificial intelligence can definitely be used to help sift through all the big data out there and be able to find that needle in the haystack, be able to find that relevant piece of information that [first responders] are looking for," he says.

Gusty notes there isn't a firm timeline yet on future deployments for AUDREY. But he wouldlike to make the system available to state and local first responders after some additional testing and development.

"When we as human beings come into this world, we have a pretty much blank slate," Gusty says. "As we grow and get older, we start absorbing more and more information. Our brains start growing, our memories start growing and all those data points continue to grow. Artificial intelligence isn't that much different. You have to teach it to do what you want it to do. I just see as we start implementing artificial intelligence, it's just going to continue to learn and get better and better."

To learn more about how AI is aiding federal government, check out the MachineKind podcast from GAI, Dell Technologies and NVIDIA at http://bit.ly/machine-kind.