ARTIFICIAL INTELLIGENCE AND THE EMERGENCY SERVICES SECTOR: CASE STUDIES

OVERVIEW

The case studies below offer current examples, per subsector, of efforts underway in developing artificial intelligence (AI) tools and algorithms that may benefit the Emergency Services Sector (ESS).

Fire and Rescue Services

The ALERTCalifornia program is a collaborative effort between the University of California San Diego and the California Department of Forestry and Fire Protection to test an AI program to help alert authorities of wildfires so that firefighting activities can begin before the wildfires grow.

The program involves setting up more than 1,000 high-definition cameras across the state, which will continuously scan the area for any signs of smoke or fire. The captured footage is analyzed by an AI system that can distinguish between regular air particles and those caused by heat, fire, or smoke. If any unusual activity is detected, the relevant authorities are immediately notified to assess the threat level.

Emergency Medical Services

An observational study to evaluate whether a machine learning (ML) framework could increase the recognition of out-of-hospital cardiac arrest (OHCA) by 911 telecommunicators within the first minute of an emergency call, found that ML recognized 36% of OHCA calls within the first minute compared to 25% recognized by 911 telecommunicators. The study concluded that ML has the potential to be a supportive tool during emergency calls. However, the optimal false positive rate settings need to be evaluated in prospective studies.

Arlington County, Va., has implemented AI to manage non-emergency calls in its Emergency Communications Center (ECC). The AI cloud-based contact center service is responsible for handling non-emergency calls and enables residents to connect with the County's ECC for inquiries that are not emergencies. When a resident calls for non-emergency needs, AI will answer and provide verbal assistance. This will lead to faster and more efficient responses to non-emergency inquiries.

Law Enforcement

Researchers at the University of Texas Health Science Center at Houston have received funding from the National Institute of Justice to develop AI algorithms that can analyze elder victimization. These algorithms can help identify the victim, perpetrator, and environmental factors that distinguish financial exploitation from other forms of elder abuse. Moreover, the algorithms can differentiate between "pure" and "hybrid" forms of financial exploitation. The researchers are working to turn these algorithms into web-based applications that can be used by practitioners to quickly identify and intervene in cases of financial exploitation.

The police department in Taylor, Mich., has recently introduced AI-powered robotic police dogs to assist its officers in the field. These robot dogs are equipped with multiple cameras, sensors, and the ability to move through rough terrain. They can carry out inspections, surveillance, and reconnaissance more efficiently and cost-effectively than traditional methods. Furthermore, they can supplement existing resources to enhance crime prevention, safety measures, and enable faster response times to incidents.

Public Works	xView2 is an AI tool for satellite imagery analysis of natural disasters sponsored and developed by the Pentagon's Defense Innovation Unit and Carnegie Mellon University's Software Engineering Institute. It uses machine-learning algorithms in conjunction with satellite imagery to identify building and infrastructure damage in the disaster area and categorize its severity much faster than is possible with traditional methods. xView2 has been used by at least two different ground teams of search and rescue personnel from the United Nation's International Search and Rescue Advisory Group following an earthquake in the area of Adiyaman, Turkey. xView2 has helped speed up the affected areas' search and rescue efforts.
Emergency Management	Counties in South Carolina now have access to a flood evacuation tool that can help researchers, forecasters, and local emergency managers issue flood evacuation warnings, verify safe evacuation routes, coordinate emergency response efforts, and support recovery plans. The tool uses a unique human-AI teaming partnership to create an intelligent model that addresses flood evacuation decisions in isolated rural coastal communities of South Carolina. Current flood evacuation models include geographic information system and infrastructure planning approaches, which do not involve artificial intelligence. However, the flood evacuation tool combines AI, geospatial data, and river hydraulic parameters to forecast floods, identify at-risk roads, and generate evacuation rerouting plans. The flood evacuation tool is free and has been tested in the Lowcountry of South Carolina.

For more information, visit CISA | Emergency Services Sector or email the Emergency Services Sector Management Team at EmergencyServicesSector@cisa.dhs.gov.

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