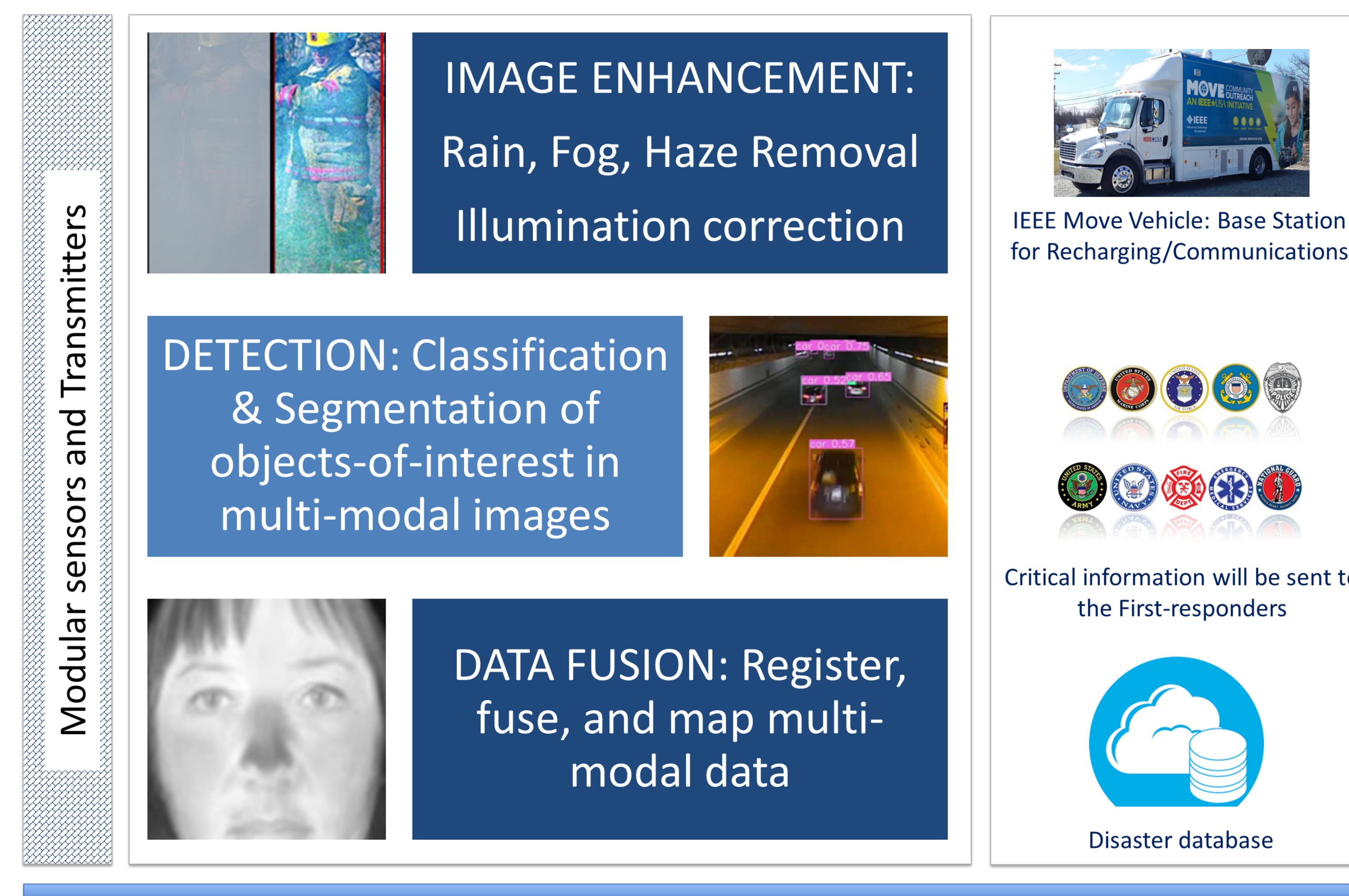# RAPID: A Smart and Mobile Sensor Fusion Framework for Earthquake Hazard Reduction, Situational Assessment, and Relief Efforts/1942053/08-27-2019/Karen Panetta, Tufts University: Karen@ieee.org

Challenges

- Lack of robust and low-cost smart mobile tools for collecting and automatically analyzing data
- Real-time assessment for disasters depends entirely on the human operator's ability.
- Environmental conditions inhibit the human observer's ability to monitor situations for detecting victims and hazards

Smart Mobile Data Sensor Fusion Communication Device

Modular sensors and Transmitters

IMAGE ENHANCEMENT: Rain, Fog, Haze Removal Illumination correction

DETECTION: Classification & Segmentation of objects-of-interest in multi-modal images

DATA FUSION: Register, fuse, and map multi-modal data

IEEE Move Vehicle: Base Station for Recharging/Communications

Critical information will be sent to the First-responders

Disaster database

Solution

- Real-time image enhancement and detection of objects in images subjected to harsh environmental conditions
- AI based data fusion technology for mapping multi-modal information
- Create a Smart Mobile Disaster Data Collection and Assessment tool for detecting and mapping out situational hazards

Scientific Impact

- Advanced data mining and analysis
- Better communication to the public
- Better visualization of disparate source of data
- Develop better practices, and collaborative disaster response strategies
- The new framework will open new pathways for various deep learning tasks and other research fields including, search and rescue, and environmental preservation

Broader Impact

- It has tremendous benefits for saving lives after disasters or conflicts, and preserving the environment
- Can be applied to biomedical industry, remote sensing, and defense advancements technologies
- Provide automated detection capabilities to locate humans and animals from visible or thermal images
- This proposed work's broader social impact is vital for attracting and retaining under-represented groups