Map901: Building Rich Interior Hazard Maps for First Responders

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Problem Statement

- First responders need detailed interior building maps to navigate safely and quickly during emergencies/crisis.
- Project objective: build a catalog of 3D maps with clear identification of safety-related objects
  - capture point cloud, camera images and other sensor data
  - annotate maps with automatically extracted objects of interest, e.g., exits and fire extinguishers

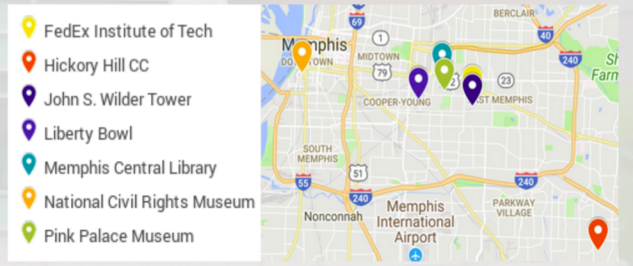
Technical Concept

- Survey 7 buildings in Memphis (1.86m sqft) using GVI LiDAR backpack, 360° camera, GPS, temperature, humidity, and sound sensors
- Leverage Deep Neural Networks to extract objects from data


Velodyne Puck 3D LiDAR


Z Cam S1 Camera


GVI LiBackpack



Milestones and Deliverables

- Data catalog for public safety users and researchers at data.memphistn.gov
  - Point cloud (ASPR LAS 1.4-R13 with point data format 7)
  - 360° image data (MOV format, 4K images)
  - GPS, IMU, temp/humidity/sound
- Automated object identification method
- ArcGIS based app for first responders
- Two buildings for future research access
  - Memphis Central Library
  - FedEx Institute of Technology at U. Memphis

Impact

- Enable efficient annotation of 3D point cloud indoor maps for smart buildings
- Support public safety agencies during crisis events
  - Integrated with AR and VR
- Facilitate other research efforts
  - indoor localization/navigation
  - indoor location-based services

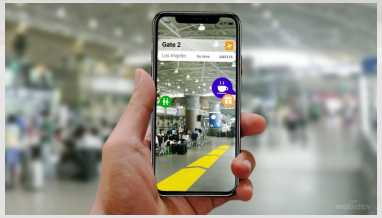


Image sources: https://tinyurl.com/y8hg8ke8, https://tinyurl.com/y8olb6ab, https://tinyurl.com/y8oostrf