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STATEMENT OF PURPOSE:

In this project, an immersive 3D city environment is visualized on Microsoft HoloLens by recreating real world environment while simulating real-life flood scenarios. The system is developed at the Hydroinformatics Group at the University of Iowa lead by Dr. Ibrahim Demir. Interactive hologram provides potential economic and social (i.e. loss of life) impacts of the disaster using HAZUS datasets. Terrain and structural data is retrieved from ArcGIS databases. Hologram allows decision making authorities and public to simultaneously and interactively visualize the potential scenarios to facilitate the process for disaster preparedness, management, and recovery. Emergency routes and evacuation plans can be evaluated and prioritized judging by the flooded paths and the demographics of the people in a certain area. For instance, hologram can clearly depict which buildings accommodate children or houses assets with high economical value while providing the condition of flooding. Furthermore, emergency rescue planners can utilize the system for routing to minimize the risk of lives due to flooding or structural break-down.

DESCRIPTION OF DATA SETS:

HAZUS is a national-scale standardized methodology developed by The Federal Emergency Management Agency (FEMA). It provides datasets that are used to approximate potential losses caused by natural disasters such as floods, tsunamis, hurricanes, and earthquakes. More specifically, HAZUS provides nation-wide information on direct economic and social loss, vehicle data, hazardous materials and agricultural products, transportation systems, lifeline utility systems, essential facilities, and hazard data. HAZUS software and datasets are available online and free to use. ESRI City Engine is a software package to create realistic 3d visualizations of cities by allowing integration with ArcGIS and supporting Esri geodatabase and shapefile format. ArcGIS provides real world terrain data and elevation model for supported areas specified by latitude and longitude. Building and structure information (i.e. height, roof shape, levels, coordinates) are available for selected area to be regenerated in City Engine. City Engine and ArcGIS are commercial products and offer free trials.