A Novel Realtime Camera Fusion Model for Tracking Smoke Plumes

Huntley, Gene (School: V. Sue Cleveland High School)

Smoke plumes produced by wildfires pose a threat to public safety. However, a lack of accurate real-time information on smoke plumes provided by current methods like satellite imagery leaves communities unable to make informed decisions critical to ensuring the safety of themselves and their families. Despite the current lack of smoke plume information from satellites, there is a lot of photography of smoke plumes. This project aims to provide an accurate and quick method to locate smoke plumes through smartphone cameras to utilize this untapped source of information. This paper proposes a method to calibrate a camera using manual and automatic pixel correspondences, a crucial step for rendering large, homogeneous objects at a distance. After calibration, the proposed method renders a real-time 3D smoke plume with camera imagery. This algorithm proves to be significantly faster than current satellite imagery methods (MODIS and HMS) while providing an improved level of granularity than current surveillance methods.

Awards Won: