



Full Scale Airport Security Checkpoint Surveillance using a Camera Network

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Overview



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- We constructed a full-scale simulation of an airport security screening checkpoint.
- The simulation environment was observed by a network of 19 cameras.
- We designed algorithms for the accurate real-time tracking of all passengers and bags, automatically maintaining which bags belonged to each passenger.
- The overall goal is to automatically verify expected behavior and detect abnormal behavior.

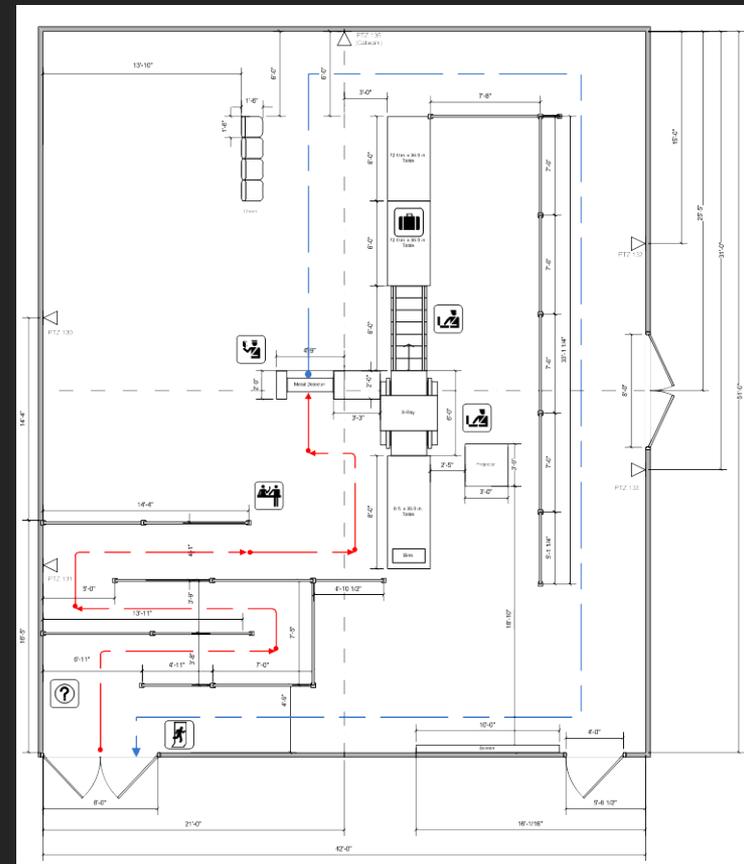
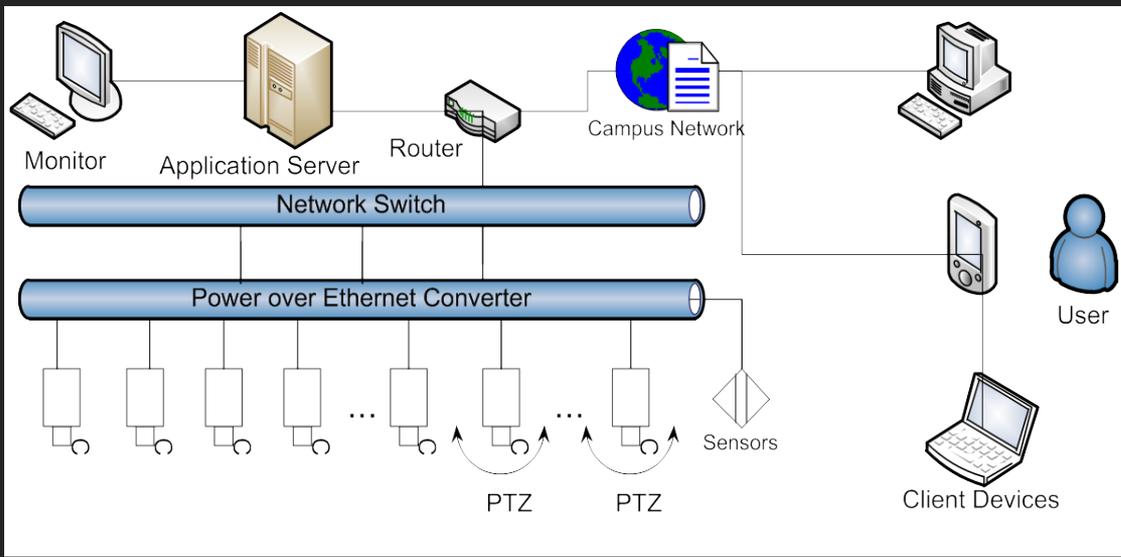


Simulation Environment

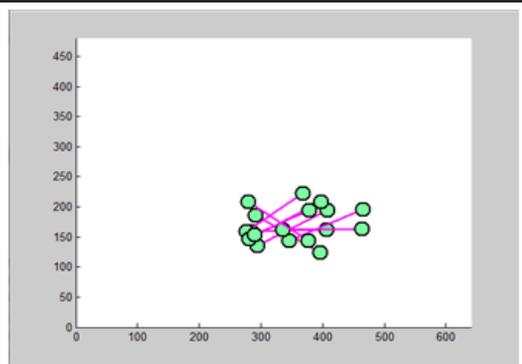
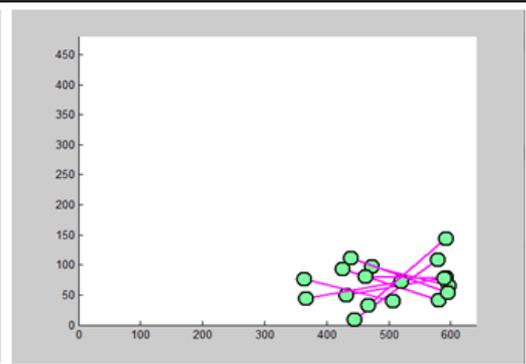
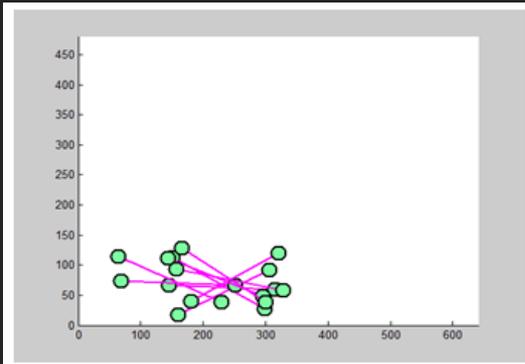
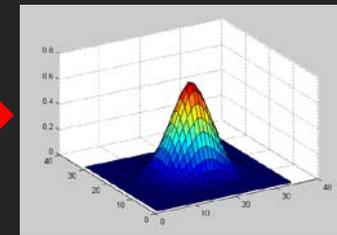
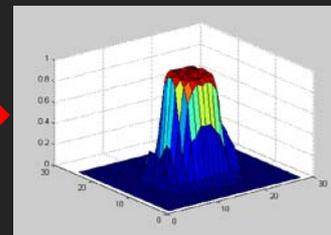
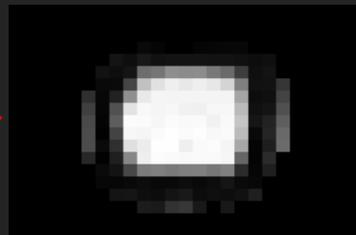
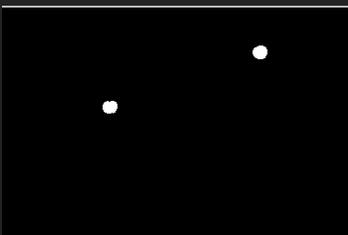




Multi-Camera Network

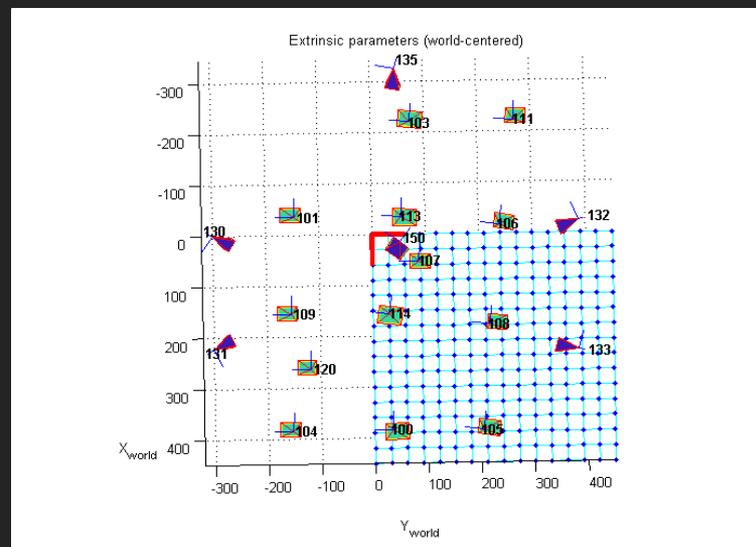
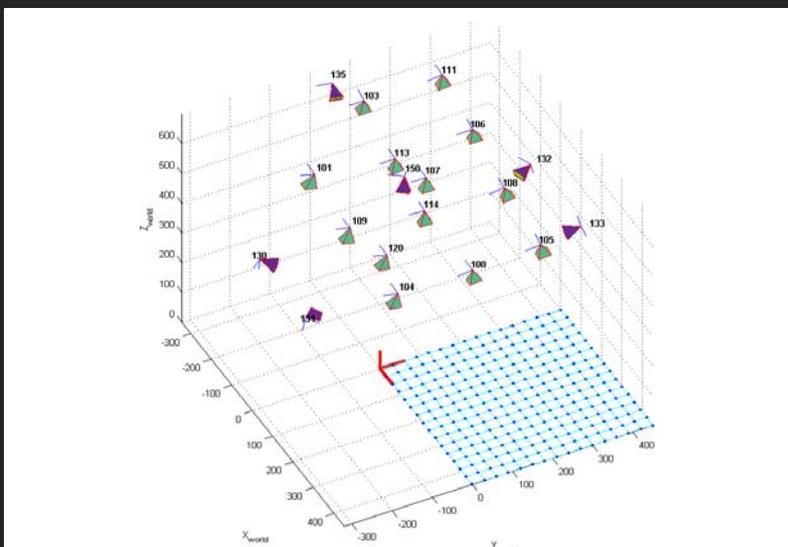
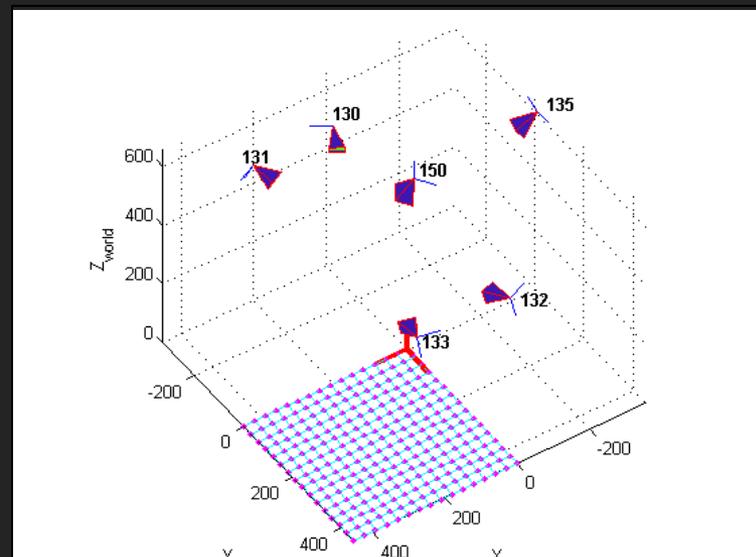
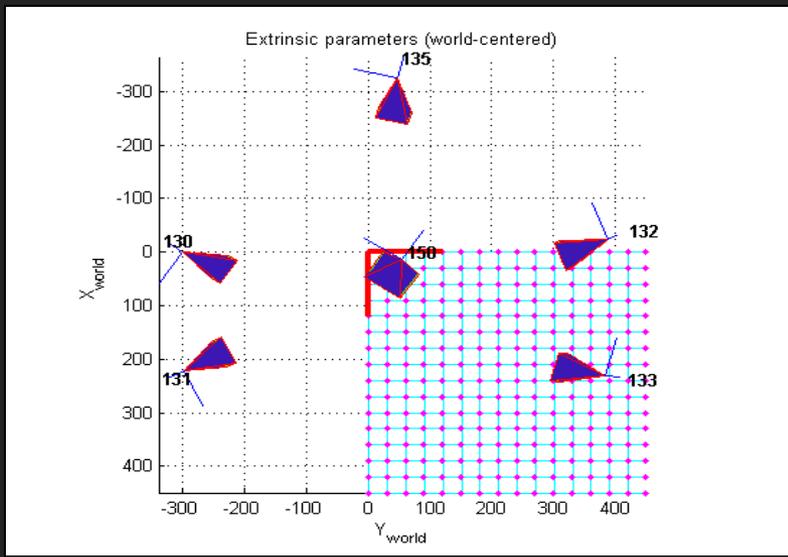


Camera Network Calibration

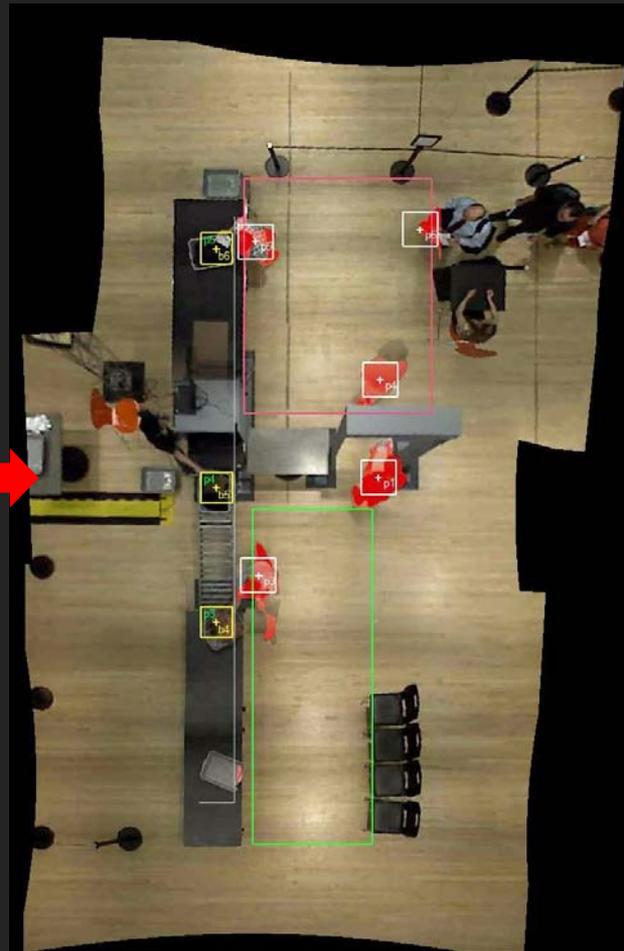
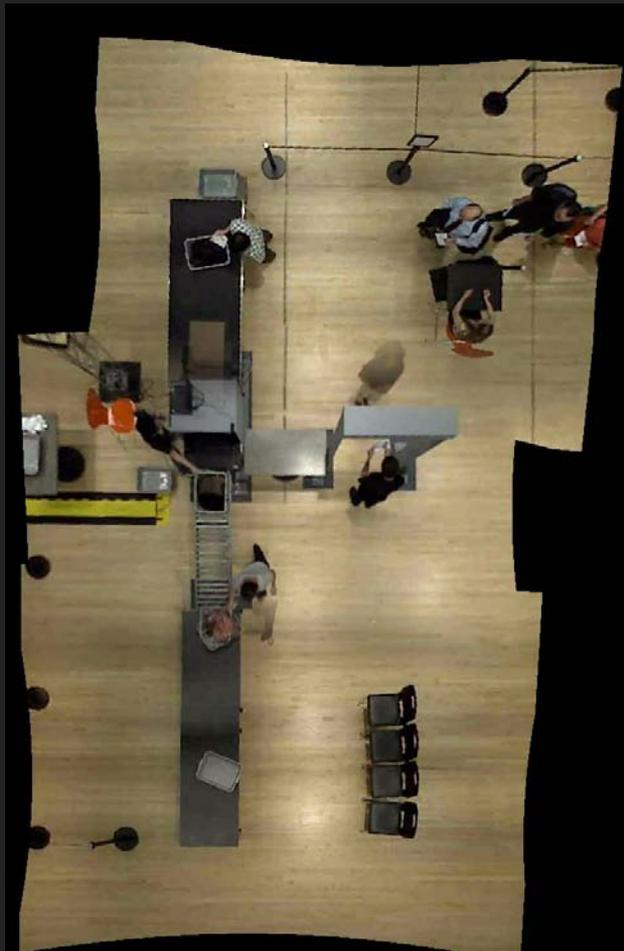




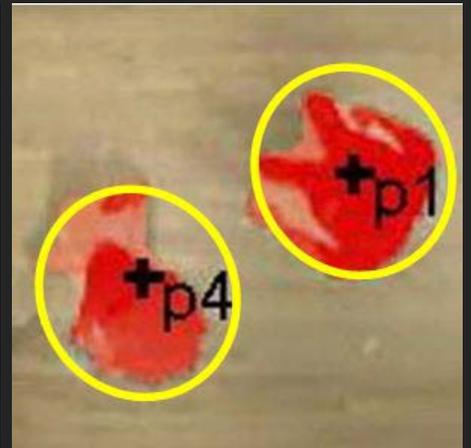
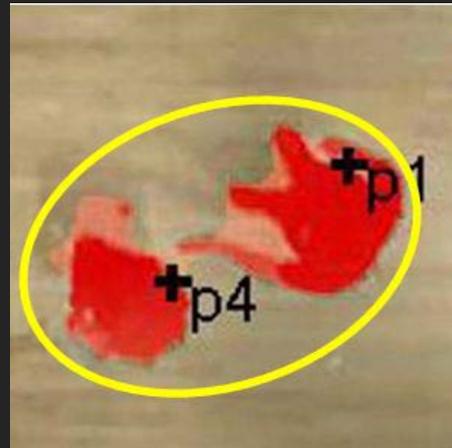
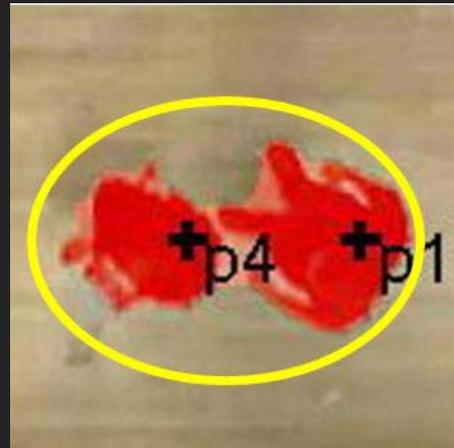
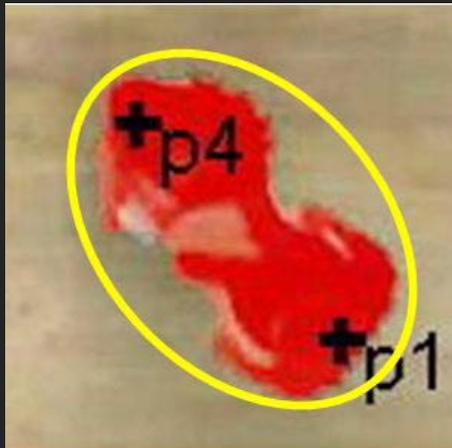
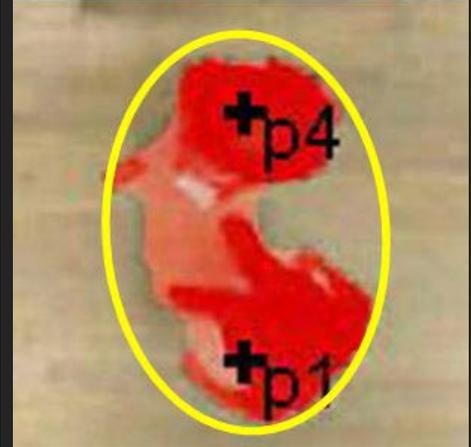
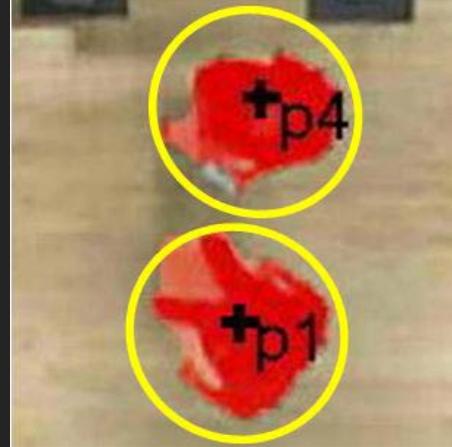
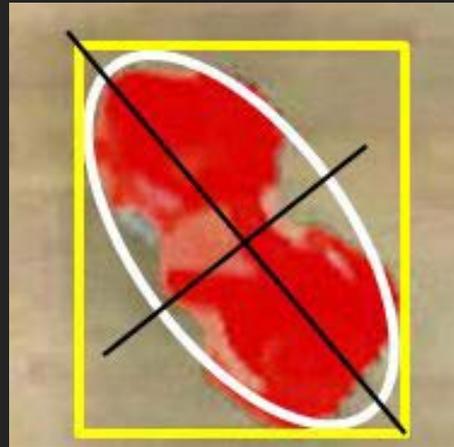
Camera Network Calibration



Foreground Detection

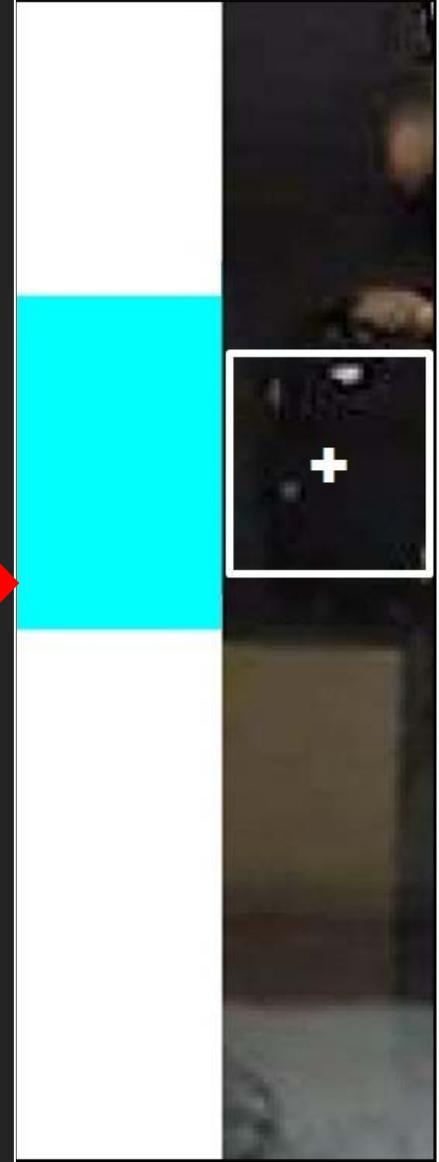
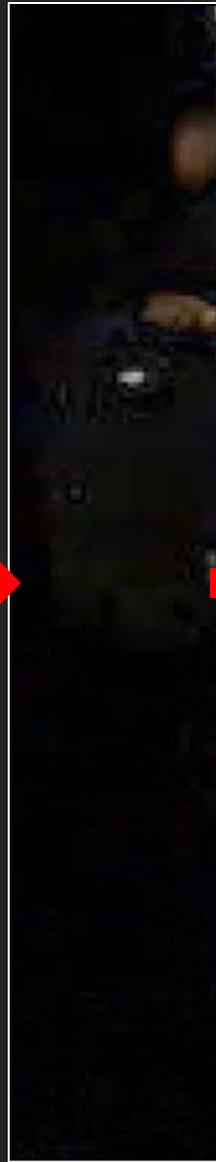
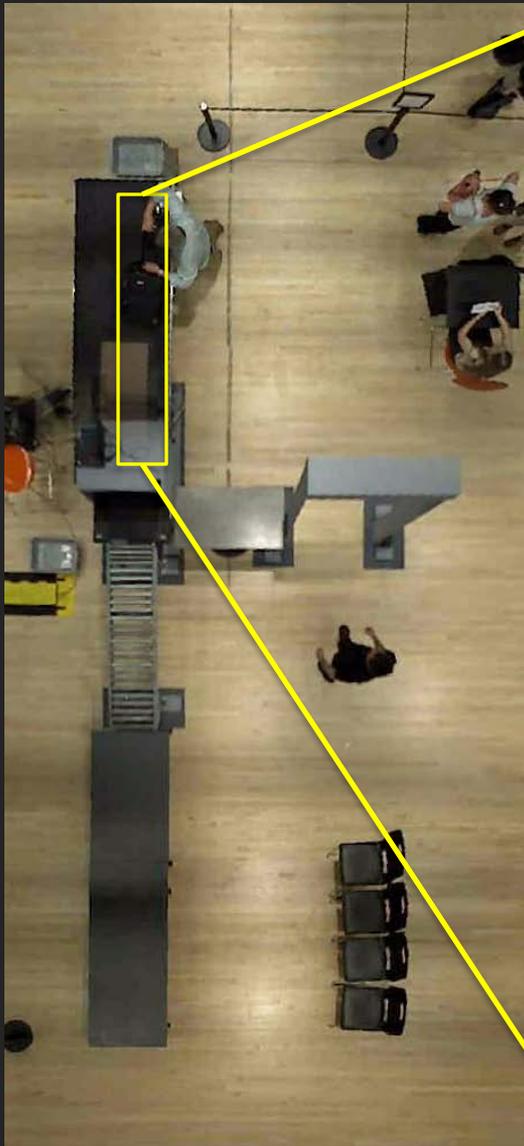


Passenger Tracking



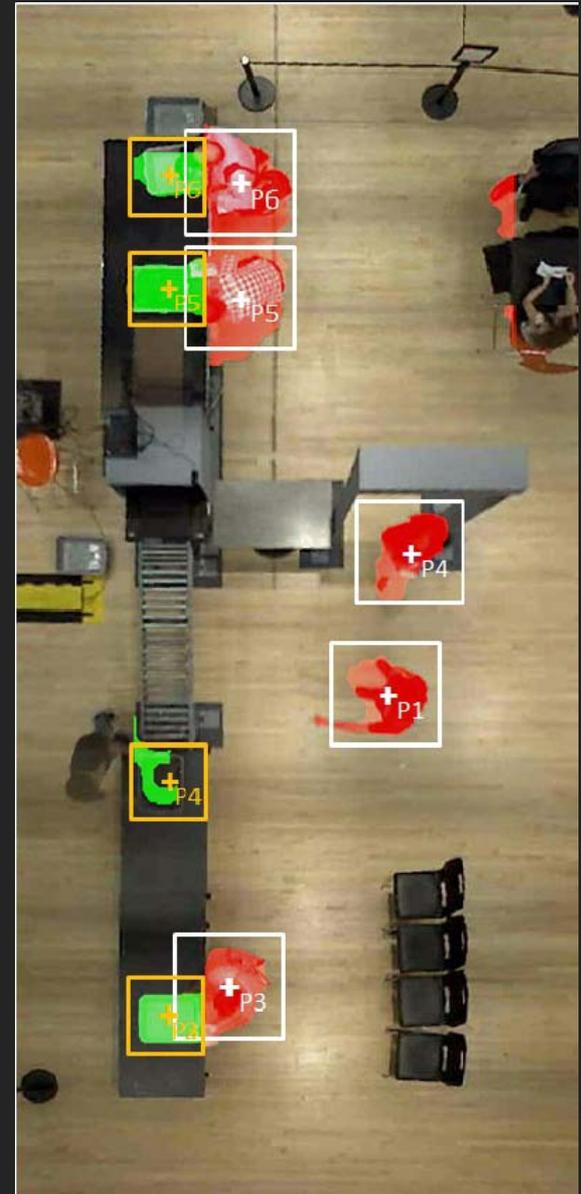
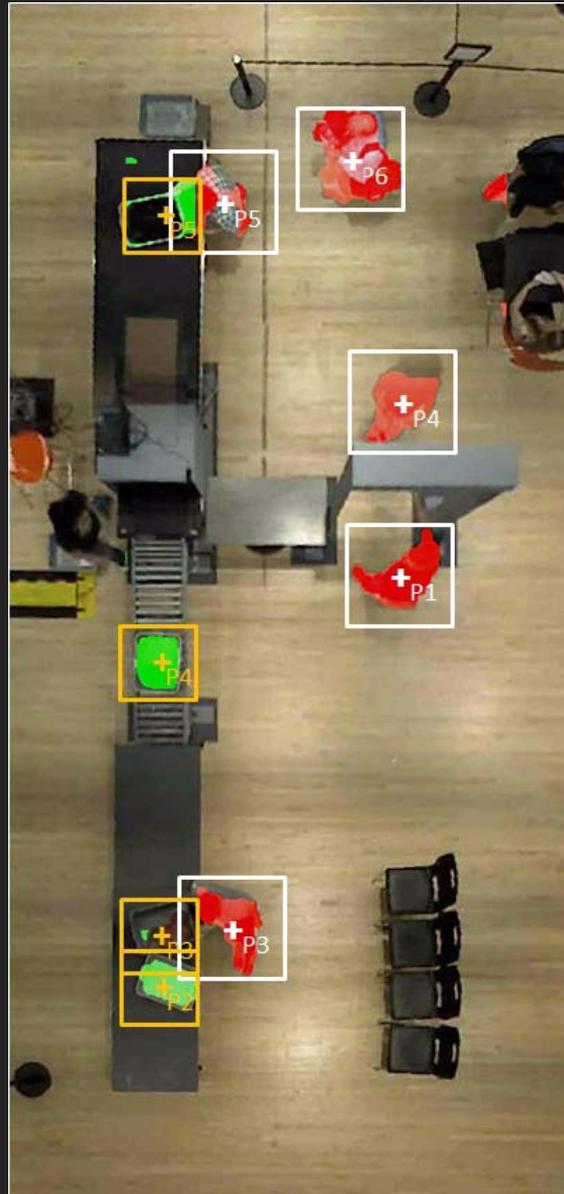
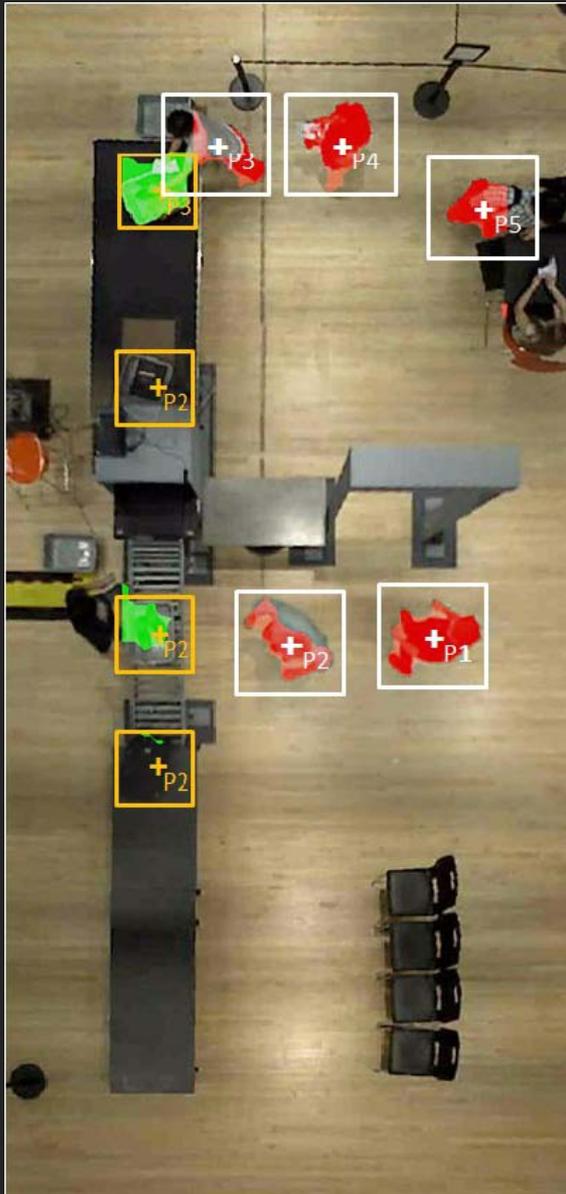


Baggage Tracking





Baggage Association





Conclusions



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- We designed a full-scale airport security checkpoint surveillance system.
- We investigated the setup and calibration of a large camera network.
- We developed algorithms for real-time tracking and association of passengers and bags.
- The system is robust to crowded scenes and complex interactions.

Questions?