DHS SCIENCE AND TECHNOLOGY

Passenger Screening Algorithm Challenge

Homeland Security
Science and Technology

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Apex Screening at Speed Program Overview

Passenger Analysis

- Video Analysis and Passenger Tracking
- Passenger and Bag Correlation

Passenger Screening

- High-Definition Advanced Imaging Technology (HD-AIT)
- AIT Automatic Threat Recognition
- Millimeter Wave (MMW) Shoe Scanner
- Walk-by MMW

Carry-on Screening

- Computed Tomography (CT) Automatic Threat Recognition
- Gratings-based Phase Contrast Imaging
- X-ray Diffraction

Future Capabilities

- Optical Trace Detection
- Adaptive Threat Detection, Deep Learning
- Augmented Reality Human Systems Integration

Overarching Architecture

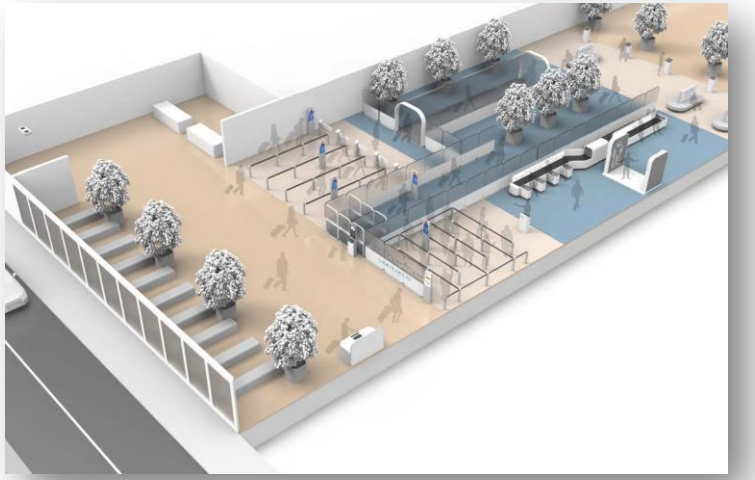
- Open Threat Assessment Platform (OTAP)
- Airport Risk Assessment Model

Test & Evaluation

- T&E: Baggage, Passenger, Secondary Screening
- Testbed development

Future State

- Passenger analysis from “curb-to-gate”
- Passengers do not divest outerwear, shoes, liquids, gels, aerosols and electronics
- Flexible CONOPS, algorithms to adapt to passenger risks and threat environments
- Low rate of false alarms enable efficient TSO assignments



So What, Who Cares

The DHS S&T/TSA Passenger Screening Algorithm Challenge was a successful R&D effort under Apex Screening at Speed

- Prize competitions engage “outsiders” to solve problems
- Prize competitions complement industrial R&D
- Prize competitions can be agile and cost-effective
- Care must be taken when setting up the competition to:
  - Attract maximum diversity of talent
  - Give entrants everything they need for success
  - Align competition outputs to operational requirements
  - Understand next steps

PASSENGER SCREENING ALGORITHM CHALLENGE

Passenger Screening Algorithm Challenge Competition Feedback

- Large and diverse number of participants
  - 11,510 entrants
  - 508 submissions for Round 1
  - 149 submissions for Round 2
- Competition algorithm performance exceeded team's optimistic expectations
  - Six months from announcement to scoring
- Problem scope was larger than anticipated
  - Segmentation was as challenging as detection
  - Algorithm performance may inform future hardware design

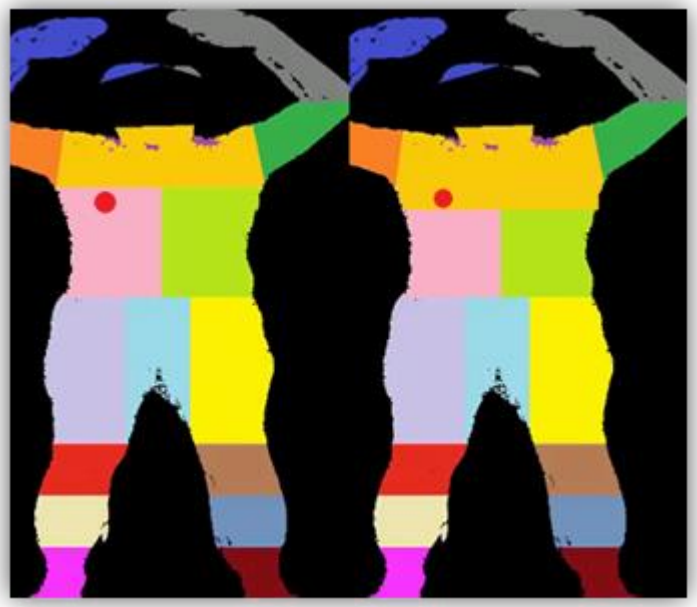


Illustration showing successful detection with improper segmentation

Questions?

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