Stadium Security
In a Changing Environment

Bishwa Silwal and Mustapha Olokun
Advisor: Dr. Christie Nelson
Background on Recent Stadium Terrorist Events

Manchester Stadium (May 22, 2017)

- Explosive device concealed in a black vest or a backpack detonated after the concert ended
- Only a bag check was in place according to news reports
  - Other screening methods were not used in this location at the time of the attack.

Photo credit: New York Times
Background on Recent Stadium Terrorist Events

Paris attacks (November 13, 2015)
- Multiple coordinated attacks throughout Paris: soccer stadium, smaller concert hall, others.
- All attackers wore explosive vests at the large soccer venue
  - Security was able to identify the first attacker, preventing him from entering.
  - This deterred the other 2 attackers at that location.

Istanbul (December 10, 2016)
- A car bomb was detonated outside Vodafone Area two hours after a soccer match ended.
- A Second explosive was detonated by the bomber wearing a suicide vest in an adjacent park.
- Both bombings targeted mainly police officials.
Our Project

1. Experiments on Walk Through Metal Detectors (WTMDs)

2. Data Collection and Analysis at a Live Stadium Event

3. Video Data Analysis from Stadium Event
Our Project: 1. Experiments on WTMDs

1. Make Test Object (safe/fake) “Explosive” Vest(s) (just metallic items)
   - Test to see how well WTMD catch metallic Vest(s)
     - Creating a test object representative of explosive vest(s) containing similar metallic objects (nuts, screws, nails) with different distribution/objects

2. Checking how human gait may impact WTMD detection of metallic objects
   - Create heatmaps of vulnerabilities
   - Test items to be used correspond to NILECJ 0601.00 standards for WTMDs (to meet a certain quality level)
Literature Search

Prior Work:

Walk-Through Metal Detectors and Stadium Contraband (Nelson et al, 2016)
○ Experiments on how multiple real stadium contraband used as test objects affected detection.

Performance of Walk-Through Metal Detectors against Curvilinear Motion (Nelson, 2017)
○ Experiments on how different walking pattern affected results of WTMDs

○ Experiments to discover potential vulnerabilities of WTMDs and observe their operation at large live events.

Experimental Design:

● “An Experimental Design is the laying out of a detailed experimental plan in advance of doing the experiment.” (NIST, 2012)
Our Project: 2. Data Collection and Analysis

- Work with CCICADA Stadium Security Project Research Team
- Observe and collect data on WTMDs at MetLife at upcoming U2 concert

Photo Credit: Metlife Stadium Website
Our Project: 3. Video Analysis

If time and video footage made available:

- Compare data collection from video data versus human collection and analyze their differences
- Look for implications of Parkinson’s law in Security Screening at Stadiums (following a 2007 study of airport security)
Acknowledgements

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We look forward to working with the CCICADA Stadium Security Research Team.

We also look forward to working with the US Air Force visiting researchers.

Our mentor Dr. Christie Nelson
References


