Mitigating Threats with Artificial Intelligence for the Transportation Security Administration (TSA)

By Grace Fernandez

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INTRODUCTION

What is the Transportation Security Administration (TSA)?

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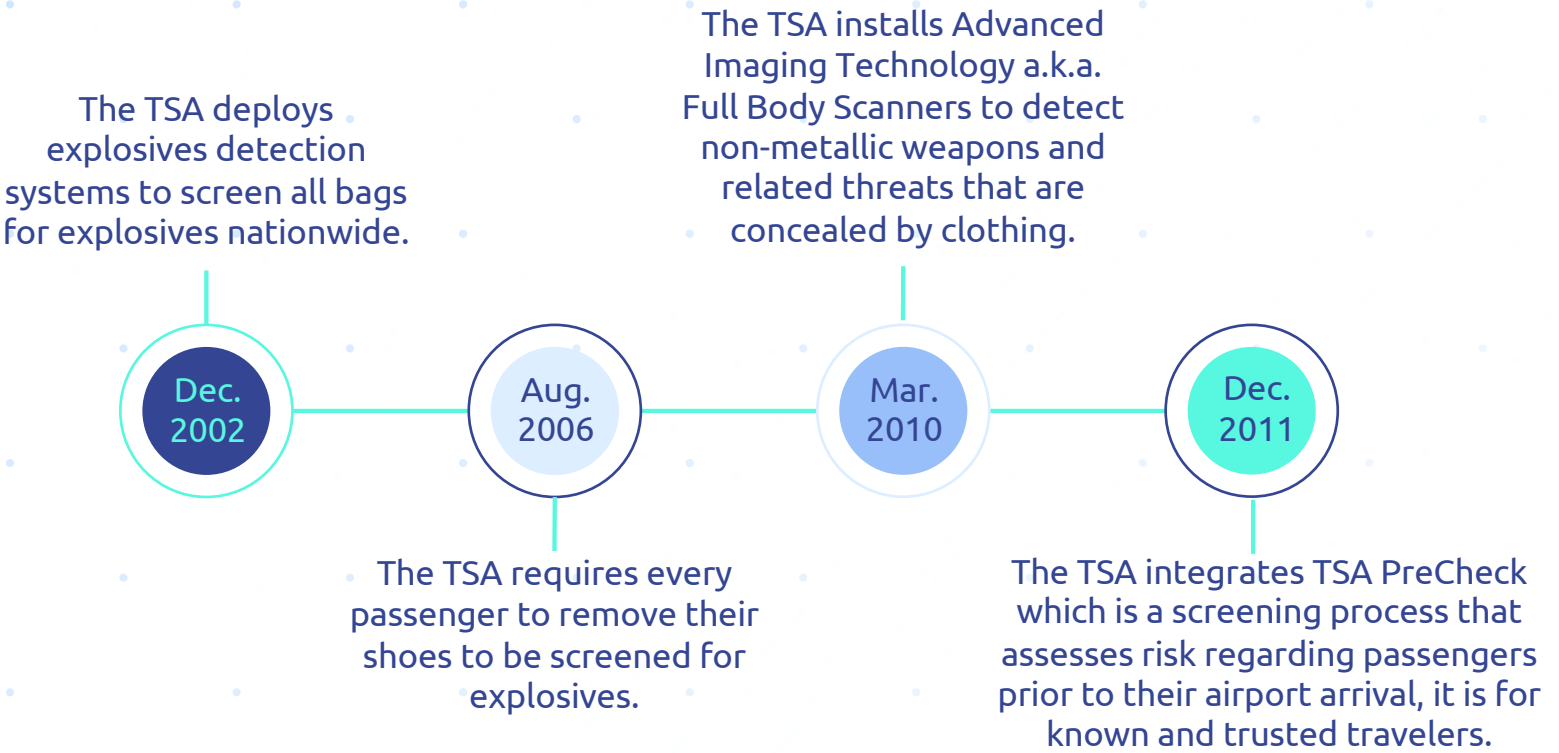
Transportation Security Administration (TSA)

- Agency under the Department of Homeland Security (DHS)
- Created in response to the 9/11 Attacks
- Their mission: “Protect the nation’s transportation systems to ensure freedom of movement for people and commerce.”
- They tend to focus more on air travel and airports

Notable Technology Advancements



Security Procedures

- The TSA begins their security detail before passengers arrive at the airport by collaborating with law enforcement and intelligence communities to share information.
- Physical Screening Procedures include: Carry-on & Checked Baggage Screening, Pat-Down Screening, Standard & PreCheck Screenings.
- Secure Flight – a prescreening process that compares passengers names to trusted traveler and watch lists.

Emerging Technology

Computed Tomography

Checkpoint X-Ray scanning equipment to enhance threat detection on carry-on baggage. This is only implemented in 18 airports in the U.S.

Biometrics Technology

Facial identification and facial matching technologies that can enhance security effectiveness, operational efficiency, and improve the current manual ID verification process.

Automated Screening Lanes (ASLs)

Checkpoint technology that decreases the security screening process time while enhancing security.

Biometrics Technology

In August, 2020, Ronald Reagan Washington National Airport (DCA) implemented a piloted self-service Credential Authentication Technology (CAT) machine with a camera. Passengers will be able to scan their own identification for biometric identity/facial matching and authentication.

- **Facial Matching** – The one-to-one identity test.

- **Facial Identification** – The one-to-n identity test.

All information in this section was found at tsa.gov

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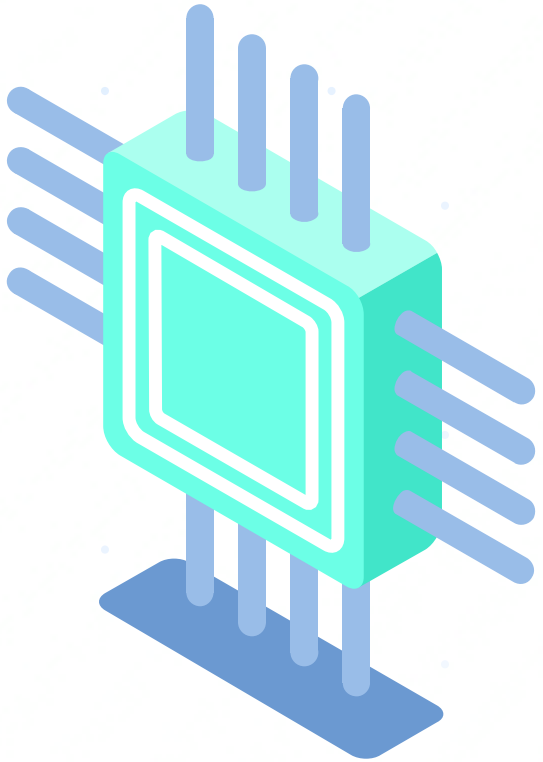


CHOSEN TECHNOLOGY

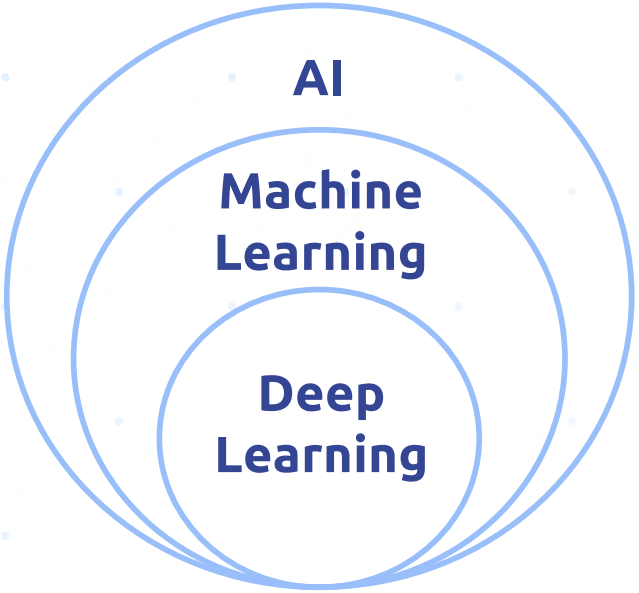
An introduction to Artificial Intelligence

Artificial Intelligence (AI)

Artificial Intelligence is an umbrella term defined as the **collection of technologies** that are comprised of the two **core concepts**:

Machine Learning – A type of artificial intelligence that enables systems to learn patterns from data and subsequently improve from experience.

Deep Learning – A machine learning methodology where a system discovers the patterns in data by automatically learning a hierarchical layer of features.



Definitions provided by Accenture.com

Computer Vision

Computer vision is about enabling machines to “see” images as humans do, to process and identify objects and even activities within a still frame or a video sequence.

Geographic Information System (GIS) & Location Intelligence (LI)

Geographic Information System (GIS)

- Analyzes spatial location
- Organizes layers of information
- Patterns, relationships, and situations

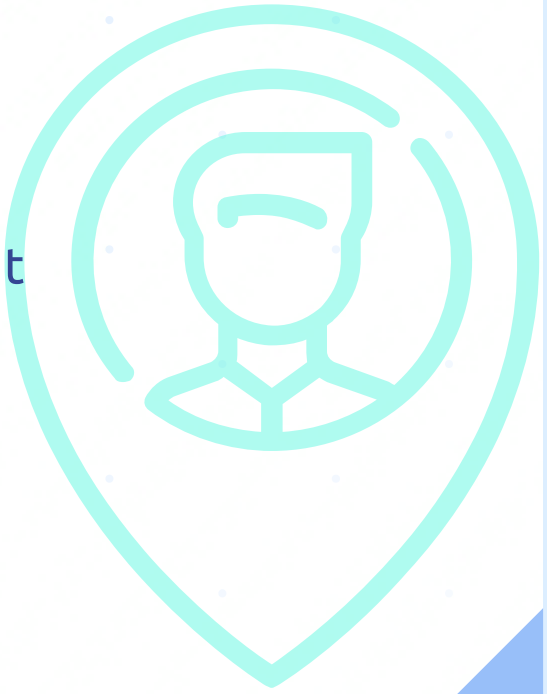
Location Intelligence (LI)

- Visualization and analysis of geospatial data
- Empowers understanding, insight, decision-making, and prediction.
- Why things happen where they do.

Definitions provided by esri.com

AI + GIS + LI = Business Analytics

- Business planners can utilize LI and AI to analyze their customers demographics
- Object classification and detection
- Separate sedans from SUV's from pickup trucks and brands
- Infer customer demographics and habits without using personal identifiable factors
- GIS incorporates time and location to monitor parking lot traffic flow



Case study provided by esri.com

APPLICATION

How consulting firms can use AI to help the TSA

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Consulting and GIS

In the Accenture Article, **“3 benefits of using GIS and artificial intelligence in the utility world,”** the authors discuss how the utility world can benefit from using AI and GIS. Object detection, or image recognition is mentioned to be one of the three examples of how the utility world can use GIS and AI. On top of identifying an image or asset, the discussed image recognition software is able to inspect attributes and read photos.

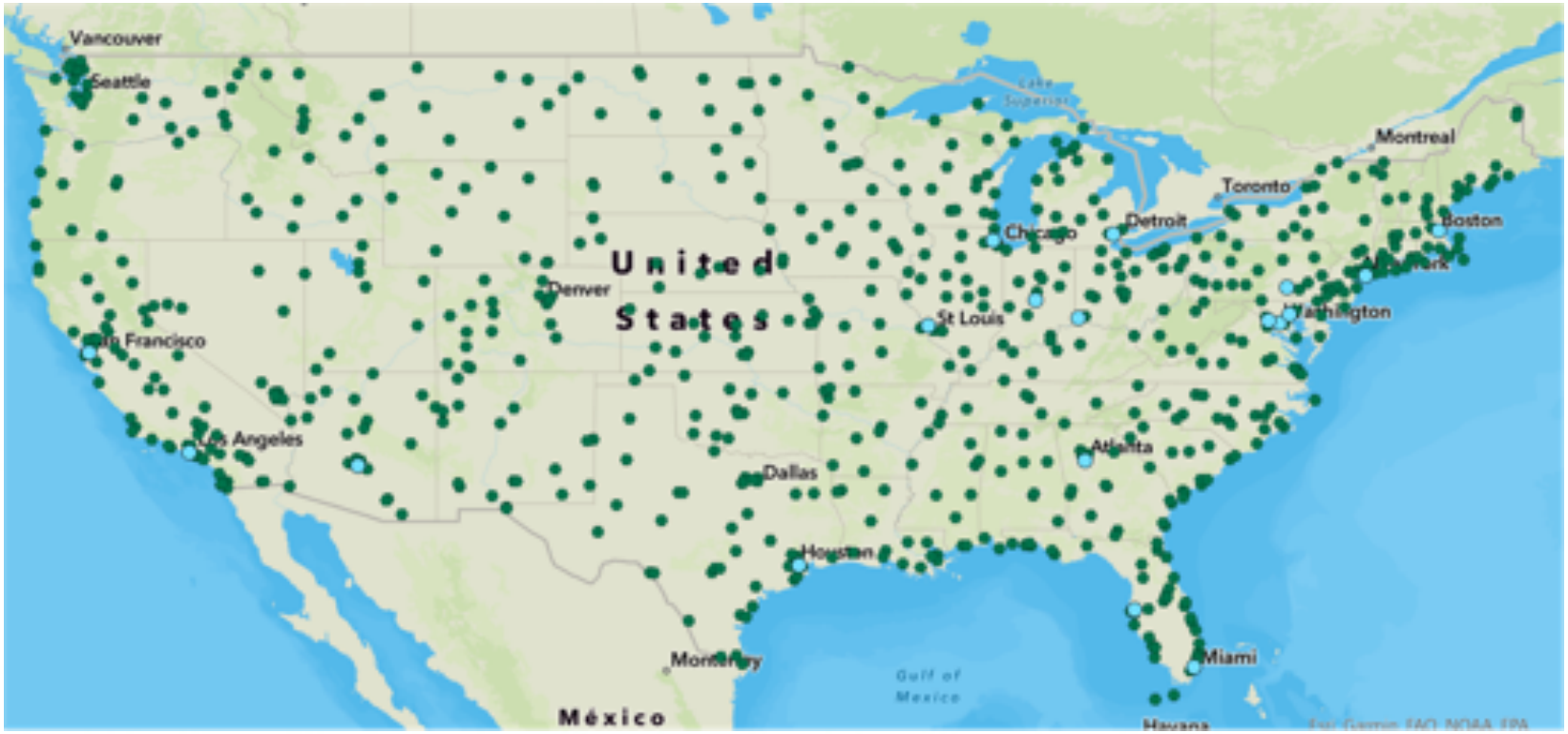
Any consulting firms who are currently or interested in becoming an Esri Gold Partner have the knowledge and access to the technology to utilize ArcGIS AI capabilities such as Image Analyst and deep learning techniques.

Information provided by Accenture.com

Consulting & TSA

Firms can utilize Artificial Intelligence, Geospatial Information Systems, and Location Intelligence to help analyze airport parking lot demographics to mitigate threats.

- Only 18 airports in the U.S. have TSA regulated X-ray screening machines for carry-on baggage
- Smaller airports lack the proper security procedures to mitigate threats and may be targeted



- Light Blue = 18 Airports with CT
- Dark Green = All Airports

Information sourced on github.com and map created by Grace Fernandez in ArcPro

Consulting & TSA Cont.

- Combined with TSA biometric technology, computer vision, object classification and detection, and possible drone investment
- Firms can assess the demographics of airport parking lots
- Determine potential threats before airport check in
- Mitigate threats for airports of all sizes around the nation

Business Benefits

Computer vision can recognize and classify with a **3% error rate**

Markets:

Location Intelligence **$32.8 billion by 2027**

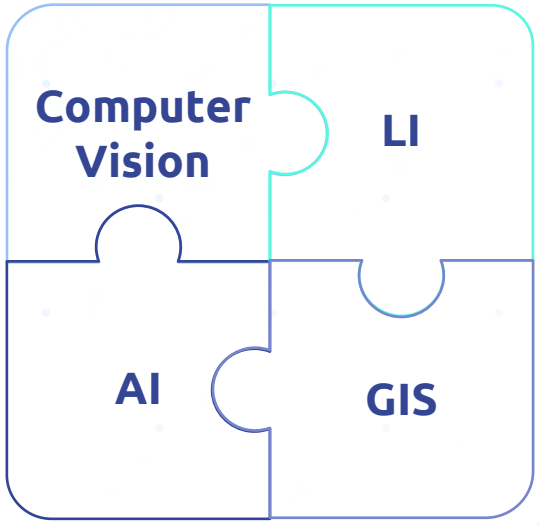
Computer Vision **$18.2 billion by 2025**

Artificial Intelligence **$733.6 billion by 2027**

Geographic Information Systems **$14.5 billion by 2025**

Information provided by Accenture.com, Grandviewresearch.com & Marketsandmarkets.com

Based on the numbers we just discussed, AI, GIS, LI, and Computer Vision prove to be a smart investment for Consulting Firms, the Intelligence Community, and to the TSA to deliver high-quality intelligence for better security implementation.



THANKS!

Do you have any questions?

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