Homeland Security

U.S. Department of Homeland Security

Archived Content

In an effort to keep DHS.gov current, the archive contains outdated information that may not reflect current policy or programs.

Artificial Intelligence Use Case Inventory

Pursuant to Executive Order 13960 Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government (https://www.federalregister.gov/documents/2020/12/08/2020-27065/promoting-the-use-of-trustworthy-artificial-intelligence-in-the-federal-government) , Federal agencies are required to create and make publicly available an inventory of non-classified and non-sensitive Artificial Intelligence (AI) use cases, to the extent practicable and in accordance with applicable law and policy.

To download a copy of the inventory, visit the AI Use Case Inventory publication library (/publication/ai-use-case-inventory) page.

Any questions regarding the DHS inventory can be directed to AI@hq.dhs.gov (mailto:AI@hq.dhs.gov) .

Close all Open all

DHS Enterprise

Commercial Generative AI for Text Generation (AI Chatbot)

DHS employees are permitted to use commercially available generative AI for text generation in day-to-day work. Commonly referred to as AI Chatbots, these tools are able to dynamically create written content through text prompts submitted by the user. They use Natural Language Processing (NLP) and Large Language Models (LLM) to produce natural sounding language in a wide variety of contexts and styles.

Approved applications of commercial Gen AI tools to DHS business include generating first drafts of documents that a human would subsequently review, conducting and synthesizing research on open-source information, and developing briefing materials or preparing for meetings and events.

AI techniques used: Generative AI, Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Commercial Generative AI for Image Generation

DHS employees are permitted to use commercially available generative AI for image generation in day-to-day work. These tools are able to dynamically create graphical content through text prompts submitted by the user. They use Natural Language Processing (NLP), in conjunction with other Machine Learning techniques such as Generative Adversarial Networks (GANs) and Diffusion Models, to produce images in a wide variety of contexts and styles.

AI techniques used: Generative AI, Machine Learning, Natural Language Processing (NLP), Synthetic Image Generation
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Commercial Generative AI for Code Generation

DHS employees are permitted to use commercially available generative AI for code generation in day-to-day work. These tools are able to dynamically create usable code through plain-language prompts submitted by the user. They use Natural Language Processing (NLP) and Large Language Models (LLM) to produce code in many different programming languages and for a variety of tasks.

AI techniques used: Generative AI, Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

RelativityOne

RelativityOne is a document review platform used to gain efficiencies in document review in litigation, FOIA, and other arenas where large-scale document review and production is necessary. It is currently in use across several different DHS Components and Offices.

AI techniques used: Machine Learning, Clustering, Continuous Active Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

DHS Headquarters

Text Analytics for Survey Responses (TASR)

Text Analytics for Survey Responses (TASR) is an application for performing Natural Language Processing (NLP) and text analytics on survey responses. It is currently being applied by DHS OCHCO to analyze and extract significant topics/themes from unstructured text responses to open-ended questions in the quarterly DHS Pulse Surveys. Results of extracted topics/themes are provided to DHS Leadership to better inform agency-wide efforts to meet employees' basic needs and improve job satisfaction.

AI techniques used: Natural Language processing (NLP), Latent Dirichlet Allocation
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Sentiment Analysis and Topic Modeling (SenTop)

This use case is no longer in use at DHS. The summary is provided as it was listed on previous inventories for informational purposes.

The initial purpose of the Sentiment Analysis and Topic Modeling (SenTop) project was to analyze survey responses for DHS's Office of the Chief Procurement Officer related to contracting. However, it has evolved to be a general-purpose text analytics solution that can be applied to any domain/area. It also has been tested/used for human resources topics. SenTop is a DHS-developed Python package for performing descriptive text analytics. Specifically, sentiment analysis and topic modeling on free-form, unstructured text. SenTop uses several methods for analyzing text including combining sentiment analyses and topic modeling into a single capability, permitting identification of sentiments per topic and topics per sentiment. Other innovations include the use of polarity and emotion detection, fully automated topic modeling, and multi-model/ multi-configuration analyses for automatic model/configuration selection. The code has been established, performs an analysis, and provides a report but it is only accessed and run by one person per customer request.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Cybersecurity and Infrastructure Security Agency (CISA)

AIS Scoring & Feedback (AS&F)

Automated Indicator Sharing (AIS), a CISA capability, enables the real-time exchange of machine-readable cyber threat indicators and defensive measures to help protect against and ultimately reduce the prevalence of cyber incidents. AIS is offered as part of CISA's broad authority to share information relating to cybersecurity risks, including authority to receive, analyze, and disseminate information, and fulfills CISA's obligation under the Cybersecurity Information Sharing Act of 2015 to establish and operate the federal government's capability and process for receiving cyber threat indicators and defensive measures, and to further share this information with certain other agencies, in some cases in a real-time manner. For more information, please visit: https://www.cisa.gov/ais (https://www.cisa.gov/ais) .

AIS Automated Scoring & Feedback (AS&F), built on the AIS Scoring Framework, defines an algorithm by which organizations can enrich Structured Threat Information Expression Indicator objects, shared via AIS, with (1) an opinion value that provides an assessment of whether or not the information can be corroborated with other sources available to the entity submitting the opinion and (2) a confidence score that states the submitter's confidence in the correctness of information they submit into AIS. When leveraged by CISA, AS&F uses artificial intelligence / machine learning to perform descriptive analytics from organizational-centric intelligence to support confidence and opinion classification of indicators of compromise. Together, these enrichments can help those receiving information from AIS prioritize actioning and investigating Indicator objects.

AI techniques used: Descriptive Analysis, Machine Learning, Natural Language processing (NLP)
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Automated Indicator Sharing (AIS) Automated PII Detection

CISA's Automated Personally Identifiable Information (PII) Detection and Human Review Process incorporates descriptive, predictive, and prescriptive analytics. Automated PII Detection leverages natural language processing tasks including named entity recognition coupled with Privacy guidance thresholds to automatically detect potential PII from within Automated Indicator Sharing submissions. If submissions are flagged for possible PII, the submission will be queued for human review where the analysts will be provided with the submission and artificial intelligence-assisted guidance to the specific PII concerns. Within human review, analysts can confirm/deny proper identification of PII and redact the information (if needed). Privacy experts are also able to review the actions of the system and analysts to ensure proper performance of the entire process along with providing feedback to the system and analysts for process improvements (if needed). The system learns from feedback from the analysts and Privacy experts.

Through the incorporation of the automated PII detection, CISA complies with Privacy, Civil Rights and Civil Liberties requirements of CISA 2015 and scaled analyst review of submissions by removing false positives and providing guidance to submission to be reviewed. Through continual audits CISA will maintain integrity and trust in system and human processes. For more information, please visit: https://www.cisa.gov/ais (https://www.cisa.gov/ais) .

AI techniques used: Natural Language processing (NLP)
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Advanced Analytic Enabled Forensic Investigation

CISA deploys forensic specialists to analyze cyber events at Federal Civilian Executive Branch (FCEB) departments and agencies, as well as other State, Local, Tribal, Territorial, and Critical Infrastructure partners. Forensic analysts can utilize advanced analytic tooling, in the form of Artificial Intelligence implementations to better understand anomalies and potential threats. This tooling allows forensic specialists the capabilities to comb through data in an automated fashion with mathematically and probabilistically based models to ensure high fidelity anomalies are detected in a timely manner.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Advanced Network Anomaly Alerting

Threat hunting and Security Operations Center (SOC) analysts are provided terabytes per day of data from the National Cybersecurity Protection System's (NCPS) Einstein sensors. Manually developed detection alerts and automatic correlation via off the shelf tooling are common, but not comprehensive. Many network attacks can be probabilistically determined given sufficient training data and time. Analysts use automated tooling to further refine the alerts they receive and produce additional automated alerts based on aggregated information and backed in subject matter expertise. This tooling allows CISA analysts the capabilities to comb through data in an automated fashion with mathematically and probabilistically based models to ensure high fidelity anomalies are detected in a timely manner.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

AI Security and Robustness

Frameworks, processes, and testing tools developed to govern the acquisition, development, deployment, and maintenance of AI technologies. Technology integrators within CISA as well as the rest of the federal enterprise use AI-enhanced tools to assure the trustworthy, robust, and secure operation of their AI systems. These tools use Machine Learning and Natural Language Processing to enhance the assessment of AI technology within the agency by speeding up data processing.

AI techniques used: Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Critical Infrastructure Anomaly Alerting

The Cyber Sentry program provides monitoring of critical infrastructure networks. Within the program, threat hunting analysts require advanced anomaly detection and machine learning capabilities to examine multimodal cyber-physical data on IT and OT networks, including ICS/SCADA. The Critical Infrastructure Anomaly Alerting model provides AI-assistance in processing this information.

AI techniques used: Machine Learning, Visualization
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Cyber Incident Reporting

Cyber incident handling specialists utilize advanced automation tools to process data received through various threat intelligence and cyber incident channels. These tools leverage Machine Learning and Natural Language Processing to increase the accuracy and relevance of data that is filtered and presented to human analysts and decision-makers. Machine Learning techniques also assist to aggregate the information in reports for presentation and further analysis. This includes data received through covered CIRCIA entities.

AI techniques used: Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Cyber Threat Intelligence Feed Correlation

Cyber Threat Intelligence Feed Correlation uses AI enabled capabilities to provide accelerated correlation across multiple incoming information feeds. This enables more timely enrichment to improve the externally shared information feeds. AI allows the algorithm to use the information items and results to learn most efficient ways to perform the task. Additionally, tailored algorithms could be created to provided sustained surveillance of threat actor TTPs.

AI techniques used: Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Cyber Vulnerability Reporting

Vulnerability analysts require advanced automation tools to process data received through various vulnerability reporting channels, as well as aggregate the information for automated sharing. These tools leverage Machine Learning and Natural Language Processing to increase the accuracy and relevance of data that is filtered and presented to human analysts and decision-makers. Machine Learning techniques also assist to aggregate the information in reports for presentation and further analysis. This includes data in the KEV and CVE databases.

AI techniques used: Natural Language Processing (NLP), Visualization
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Malware Reverse Engineering

Reverse engineering of malware, and software analysis more broadly, will continue to be a critical activity in support of CISA's cyber defense mission. Threat Focused Reverse Engineering (TFRE) leverages advanced engineering, formal methods, and deep learning techniques for better cyber threat intelligence. Without scalable, automated tools, it is difficult to disrupt sophisticated adversaries' malware development lifecycle. New, unique, automated techniques are needed to better target adversaries, augment analysts, and create sophisticated tools for end users.

Core tools disrupt the adversary's development lifecycle by exposing tactics, techniques, and procedures (TTPs). Analysts could spend more time and energy to hunt/takedown threats; adversaries can spend less time operating malware and must commit more resources to reorient. TFRE consists of a broader development pipeline providing tool hardening, enhanced computational abilities, understanding of deployment environments, and other important capabilities.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Operational Activities Explorer

Duty officers and analysts in CISA's Operations Center use a dashboard powered by artificial intelligence to enable sensemaking of ongoing operational activities. Artificial intelligence uses new near-real-time event data (from open source reporting, partner reporting, CISA regional staff, and cybersecurity sensors) coupled with historical cybersecurity and infrastructure security information and previous operational response activity to recommend courses-of-action and engagement strategies with other government entities and critical infrastructure owners and operators based on potential impacts to the National Critical Functions.

AI techniques used: Machine Learning, Natural Language Processing (NLP), Visualization
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Security Information and Event Management (SIEM) Alerting Models

Threat hunting and Security Operations Center (SOC) analysts are provided terabytes per day of log data. Manually developed detection alerts and automatic correlation in Security Information and Event Management tool are common, but not comprehensive. Many cyber attacks can be probabilistically determined given sufficient training data and time. Analysts use automated tooling to further refine the alerts they receive and produce additional automated alerts based on aggregated information and curated subject matter expertise. This tooling allows CISA analysts the capabilities to comb through data in an automated fashion with mathematically and probabilistically based models to ensure high fidelity anomalies are detected in a timely manner.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

U.S. Citizenship and Immigration Services (USCIS)

I-485 Family Matching

I-485 Family Matching is designed to create models to match family members to underlying I-485 petitions. The underlying immigrant petition defines if the I-485 is employment-based or family-based. It also has information about the visa classification and priority date which, when compared against the Department of State's monthly Visa Bulletin, helps predict visa usage. It is difficult to match an I-485 to its underlying immigrant petition, because the only available field on which to match is the A-number. This number is not always present on the immigrant petition, and name/date of birth matching is not as reliable. The goal of I-485 Family Matching is to leverage AI to more confidently create connections between petitioners and their families based on limited data.

Additionally, it will be able to help identify and group I485s filed by family members, as well as gather up the many ancillary forms they may have pending (such as I765, I131). Similar to immigrant petition matching, it can be difficult to match up I485s filed by family members. In these cases the only similar fields are a common address. Efforts have been made in the past to identify family members by address, but it is effective only to a point. The AI model will help make working with this data more reliable, as well as group individual petitioners, their families, and other helpful associated data together for faster and more accurate processing.

AI techniques used: Machine Learning, Clustering, Regression
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

I-539 Approval Prediction

This project attempts to train and build a machine learning throughput analysis model to predict when an I-539 "Application to Extend or Change Nonimmigrant Status" case will be approved through eProcessing. Allows for some potential improvement for the approval process via eProcessing channel.

AI techniques used: Machine Learning, Clustering
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Identity Match Option (IMO) Process with DBIS Data Marts

The Identity Match Option (IMO) is used to derive a single identity across multiple systems for each applicant or beneficiary who interacts with USCIS. The IMO aims to aid in person-centric research and analytics.

USCIS maintains a variety of systems to track specific interactions with individuals – benefits case management, appointment scheduling, background check validation, and customer service inquiries. Each system captures its own person-centric data attributes (e.g. SSN, A-number, Name, DOB, address, etc.) related to individuals interacting with the agency. The identity derivation process uses standard entity matching algorithms included as part of the IMO product to leverage these individual instances of person-centric data attributes to derive identities. The system is able to account for a variety of data formats and potential data quality issues in the source data. The resulting identities are linked back to the original source records, allowing analysts to see an individual's comprehensive immigration history with the agency, perform fraud detection, and identify data quality issues requiring resolution.

AI techniques used: Criteria Based Identification
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Person-Centric Identity Services A-Number Management Model

The vision of Person-Centric Identity Services (PCIS) is to be the authoritative source of trusted biographical and biometric information that provides real-time, two-way visibility between services into an individual's comprehensive immigration history and status. The A-Number Management model ingests person-centric datasets from various source systems for model training and evaluation purposes. The dataset includes biographic information (name, date of birth, Alien #, Social Security #, passport #, etc.) as well as biographic information (fingerprint IDs, eye color, hair color, height, weight, etc.) for model training and matching purposes.

The A-Number Management identifies which records from within our identity database best match search criteria. The model uses machine learning to ensure that search results presented to authorized external partners for external integrations and servicing have a high degree of confidence with the search criteria so that trust in the PCIS entity resolution remains high.

The A-Number Management model plays a critical role in the entity resolution and surfacing of a person and all their associated records. The machine learning models are more capable of resolving "fuzzy" matches, and deal with the reality of different data quality.

AI techniques used: Ensemble Learning, Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Person-Centric Identity Services Deduplication Model

The vision of Person-Centric Identity Services (PCIS) is to be the authoritative source of trusted biographical and biometric information that provides real-time, two-way visibility between services into an individual's comprehensive immigration history and status. The de-duplication model, ingests person-centric datasets from various source systems for model training and evaluation purposes. Our dataset includes biographic information (name, date of birth, Alien #, Social Security #, passport #, etc.) as well as biographic information (fingerprint IDs, eye color, hair color, height, weight, etc.) for model training and matching purposes.

Critical to the success of PCIS is the entity resolution/deduplication of individual records from various systems of records to create a complete picture of a person. Using machine learning, it is able to identify which case management records belong to the same unique individual with a high degree of confidence. This allows PCIS to pull together a full immigration history for an individual without time-consuming research across multiple disparate systems.

The Deduplication model plays a critical role in the entity resolution and surfacing of a person and all their associated records. The ML models are more resilient to fuzzy matches, and deals with the reality of different data fill rates more reliably.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Sentiment Analysis - Surveys

The Sentiment Analysis - Surveys system provides a statistical analysis of quantitative results USCIS provides services for persons seeking immigration benefits while ensuring the integrity and security of our immigration system. As part of that mission, we issued a two-part employee satisfaction survey asking users both quantitative and qualitative questions. USCIS performed a statistical analysis of the quantitative results and then used Natural Language Processing modeling software to assign "sentiments" to categories ranging from strongly positive to strongly negative. This model was eventually enhanced using a machine learning model to have better reusability and performance. This capability has been deployed to production (on demand) for more than one year from survey results and then uses Natural Language Processing (NLP) modeling software to assign "sentiments" to categories ranging from strongly positive to strongly negative. This allows survey administrators to glean valuable information from employee satisfaction surveys from both quantitative and qualitative data. This capability is currently available on demand.

AI techniques used: R SQL and Databricks
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Topic Modeling on Request For Evidence Data Sets

Builds models that identify lists of topics and documents that are related to each topic. Topic Modeling provides methods for automatically organizing, understanding, searching, and summarizing text data. It can help with the following: discovering the hidden themes in the collection. classifying the documents into the discovered themes.

AI techniques used: Natural Language Processing (NLP), Machine Learning, Clustering
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Asylum Text Analytics (ATA)

USCIS oversees lawful immigration to the United States. As set forth in Section 451(b) of the Homeland Security Act of 2002, Public Law 107-296, Congress charged USCIS with administering the asylum program. USCIS, through its Asylum Division within the Refugee, Asylum & International Operations Directorate (RAIO), administers the affirmative asylum program to provide protection to qualified individuals in the United States who have suffered past persecution or have a well-founded fear of future persecution in their country of origin, as outlined under Section 208 of the Immigration and Nationality Act (INA), 8 U.S.C. § 1158 and Title 8 of the Code of Federal Regulations (C.F.R.), Part 208. Generally, an individual not in removal proceedings may apply for asylum through the affirmative asylum process regardless of how the individual arrived in the United States or his or her current immigration status by filing Form I-589, Application for Asylum and for Withholding of Removal. The ATA capability employs machine learning and data graphing techniques to identify plagiarism-based fraud in applications for asylum status and for the withholding of removal by scanning the digitized narrative sections of the associated forms and looking for common language patterns.

AI techniques used: Natural Language Processing (NLP), Machine Learning, Clustering
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Biometrics Enrollment Tool (BET) Fingerprint Maximization

USCIS's Customer Profile Management Service (CPMS) serves as a person-centric repository of biometric and biographic information provided by applicants and petitioners (hereafter collectively referred to as “benefit requestors”) that have been issued a USCIS card evidencing the granting of an immigration related benefit (i.e., permanent residency, work authorization, or travel documents). The Biometrics Encounter Tool (BET) / Federal Bureau of Investigation (FBI) Fingerprint Success Maximization Service center technicians can receive immediate feedback when a set of prints is likely to be rejected by the FBI by incorporating machine learning models into the BET application. The FBI will not disclose

their quality grading criteria for fingerprints, leaving CPMS with the responsibility of determining quality to prevent unnecessary secondary encounters with applicants. Using even the simplest of models would catch 98% of rejected submissions, which could have potentially saved USCIS from scheduling 42,763 additional appointments in 2020. This would come at the cost of forcing recapture during 11% of encounters. This effort aims to maximize the number of successful FBI submissions while minimizing the number of fingerprint recaptures necessary. The BET team is currently working to integrate this model to provide better feedback to the user when a whole set of fingerprints is likely to result in an FBI rejection.

For more information, please visit: https://www.dhs.gov/publication/dhsuscispia-060-customer-profile-management-service-cpms

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Evidence Classifier

USCIS is the component within DHS that oversees lawful immigration to the United States. USCIS receives immigration requests from individuals seeking immigration and non-immigration benefits. Once a benefit request form is submitted to USCIS, a series of processing and adjudication actions occur. One of the case management systems used to track and adjudicate certain immigration request forms is the Electronic Information System (ELIS). USCIS ELIS is an internal case management system composed of microservices to assist with performing complex adjudicative and processing tasks; one of those microservices is the Evidence Classifier. Until the introduction of the Evidence Classifier machine learning (ML) solution, those who are working cases and who are responsible for reviewing evidence documents would often have to sift through dozens, if not hundreds, of unlabeled pages to find one specific artifact — be that a green card, a birth certificate, or so on. To reduce the amount of adjudicative time spent on these repetitive tasks, a ML solution was built to systematically tag individual pages with some of the highest-volume, highest-impact evidence types. Calculated from September 28, 2021 , to May 20, 2022, the ML enhancements have saved around 24 million page scrolls, which amounts to approximately 13,348 hours saved, assuming it takes 2 seconds to review 1 page of evidence. This has nearly doubled cases with a 30-day adjudication rate from about 30% to 58%. For more information, please visit: https://www.dhs.gov/publication/dhsuscispia-056-uscis-electronic-immigration-system-uscis-elis

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Timeseries Analysis and Forecasting

USCIS is the component within DHS that oversees lawful immigration to the United States. That means USCIS receives, processes, and maintains all applications for admission for Lawful permanent residents (LPRs), or adjustments to LPR status. Also known as “green card” holders, LPRs are non-citizens who are lawfully authorized to live permanently within the United States and are required to fill out Form I-90, Application to Replace Permanent Resident Card (Green Card). Since there has been a considerable influx of green card applications, USCIS used a combination of exploratory data analysis to determine the most used categories for applicants submitting I-90's and machine learning to create predictions of workloads. As a follow-on, USCIS used Autoregressive Integrated Moving Average (ARIMA) models on the I-90 form, which allowed the prediction of the total number of forms for a 2-year period. ARIMA is one of the easiest and effective machine learning algorithms to perform time series forecasting. This capability has been deployed in production for more than a year. This model was eventually enhanced using ML model to have better reusability and performance.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

FDNS-DS NexGen

USCIS created the Fraud Detection and National Security (FDNS) Directorate to strengthen the integrity of the nation’s immigration system and to ensure that immigration benefits are not granted to individuals who may pose a threat to national security and/or public safety. In addition, the FDNS Directorate is responsible for detecting, deterring, and combating immigration benefit fraud. In 2005, USCIS developed a case management system, the Fraud Detection and National Security – Data System (FDNS-DS), to record, track, and manage the screening processes related to immigration applications, petitions, or requests with suspected or confirmed fraud, public safety, or national security concerns, and identify vulnerabilities that may compromise the integrity of the legal immigration system. In June 2023, FDNS-DS was replaced with a modernized case management system, FDNS-DS NexGen. In the future, FDNS-DS NexGen may use artificial intelligence (AI) / machine learning (ML) data from other applications to aid in investigative work, enhance investigative case prioritization, and detect duplicate case

work. USCIS may also integrate AI/ML into the predictive modeling for future system enhancements, working side-by-side with the business stakeholders to develop best practices. Fraud occurs in numerous ways; being able to discover and detect persons with multiple identities allows for more comprehensive investigations, reduces investigative cycle time, and improves performance. Future implementation of AI/ML techniques will speed up case and investigative processing by several magnitudes. For more information, please visit: https://www.dhs.gov/publication/dhsuscispia-013-01-fraud-detection-and-national-security-directorate (/publication/dhsuscispia-013-01-fraud-detection-and-national-security-directorate)

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Large Language Models for an Officer Training Tool

The LLM for an Officer Training tool, will use GenAI to improve the way the agency trains immigration officer personnel. The tool will generate dynamic, personalized training materials that adapt to officers' specific needs and ensure the best possible knowledge and training on a wide range of current policies and laws relevant to their jobs. The goal is to help enhance trainees' understanding and retention of crucial information, increase the accuracy of their decision making process, and limit the need for retraining over time.

AI techniques used: Natural Language Processing (NLP), Generative AI
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Predicted to Naturalize

This use case is no longer in use at DHS. The use case was terminated prior to being used in an operational status. The summary is provided as it was listed on previous inventories for informational purposes.

The Predicted to Naturalize model predicts when Legal Permanent Residents would be eligible to naturalize, and attempts to provide a current address. This model could potentially be used to send correspondence to USCIS customers of their resident status, and notify others of potential USCIS benefits.

AI techniques used: Machine Learning, Clustering, Regression
Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Biometrics Enrollment Tool (BET) Fingerprint Quality Score

This use case is no longer in use at DHS and has been superseded by Biometrics Enrollment Tool (BET) Fingerprint Maximization, listed above. The summary is provided as it was listed on previous inventories for informational purposes.

USCIS's Customer Profile Management Service (CPMS) serves as a person-centric repository of biometric and biographic information provided by applicants and petitioners (hereafter collectively referred to as "benefit requestors") that have been issued a USCIS card evidencing the granting of an immigration related benefit (i.e., permanent residency, work authorization, or travel documents). The Biometrics Enrollment Tool (BET) team has been working on enhancing their quality checks, with one of the new improvements being incorporation of the National Institute of Standards and Technology (NIST) Fingerprint Image Quality 2 (NIFQ2) algorithm (a trained machine learning algorithm) for scoring of fingerprints (https://www.nist.gov/services-resources/software/nfiq-2) into the BET application. This algorithm takes a fingerprint image and assigns a score between 0 - 100, with 100 indicating that this is the best quality fingerprint image that could be obtained. The higher the score, the more likely that the fingerprint will match when captured again. This algorithm has been in place for several Program Increments. BET had been providing Biometric Capture Technicians with a poor-quality indicator and encountered objections from technicians for the larger than expected number of recaptures required, based on contractual complications. The BET team continues to capture this data in the background, but this does not require recapture currently. For more information, please visit: https://www.dhs.gov/publication/dhsuscispia-060-customer-profile-management-service-cpms

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Testing Performance of ML Model using H2O

This use case is no longer in use at DHS. The summary is provided as it was listed on previous inventories for informational purposes.

USCIS is the component within DHS that oversees lawful immigration to the United States. That means USCIS receives, processes, and maintains all applications for admission for Lawful permanent residents (LPRs), or adjustments to LPR status. Also known as “green card” holders, LPRs are non-citizens who are lawfully authorized to live permanently within the United States and are required to fill out Form I-90, Application to Replace Permanent Resident Card (Green Card). Since there has been a considerable influx of green card applications, USCIS used a combination of exploratory data analysis to determine the most used categories for applicants submitting I-90's, and machine learning to create predictions of workloads. USCIS used the H20 machine learning model to allow USCIS analysts to build and run several machine learning models on big data in an enterprise environment and identify the model that performs the best. It has already been successful in identifying the most accurate model for the I-90 Form Timeseries Analysis and Forecasting use case. This capability has been in production for more than one year.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

U.S. Customs and Border Protection (CBP)

AI for Autonomous Situational Awareness

The AI for autonomous situational awareness system is intended to use IoT sensor kits to covertly detect and track illicit cross-border traffic in remote locations.

The system will leverage a motion image/video system enhanced with Artificial Intelligence that is capable of vehicle detection and direction determination. It will also incorporate a motion sensor that, when triggered, wakes up a high-resolution camera to capture a series of pictures, with additional sensors providing confirmation prior to camera capture.

Images captured will be processed by Artificial Intelligence models to classify objects, determine vehicle direction at intersections, and provide imagery sufficient for re-identification. Ultimately, the systems is intended to create a low footprint, low cost, low power system to provide situational awareness and covert detection.

AI techniques used: Machine Vision
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

AI Curated Synthetic Data

AI Curated Synthetic Data creates synthetic data for computer vision to enable more capable and ethical AI when detecting anomalies in complex environments.

Specifically, it creates an emulated X-ray sensor that can produce visually realistic synthetic X-ray scan images similar to real X-ray scan images, and virtual 3D Assets of vehicles and narcotics containers. These images will be used to enhance the development of Anomaly Detection Algorithms for Non-Intrusive Inspection, incorporating AI/ML for the detection of narcotics and other contraband in conveyances and cargo.

AI techniques used: Synthetic Image Generation
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Automated Item of Interest Detection - ICAD

The software analyzes photographs that are taken by field imaging equipment, which are then fed into the ICAD system for review by USBP agents and personnel. The Matroid software currently processes and annotates images using proprietary software to determine if any of the images contain human subjects.

Matroid is the name of the Video Computer Aided Detection system used by CBP. It uses trained computer vision models that recognize objects,

people, and events in any image or video stream. Once a detector is trained, it can monitor streaming video in real time, or efficiently search through pre-recorded video data or images to identify objects, people, and events of interest.

The intent for the ICAD system is to expand the models used to vehicles, and subjects with long-arm rifles, while excluding items of little or no interest such as animals.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Autonomous Aerostat

Aerostat capability that uses three tethers instead of the traditional single tether, coupled with advanced weather sensors, analytic capabilities, and powerful winches. The AI/ML model is used to detect the need to launch and land based on weather. It also leverages AI and robotics to autonomously launch and recover the aerostat during inclement weather events without the need for on-site staffing, allowing the aerostat to operate autonomously, saving time and manpower.

AI techniques used: Automation & Robotics
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Autonomous Maritime Awareness

The Autonomous Maritime Awareness system combines surveillance towers, ocean data solutions, unmanned autonomous surface vehicles (ASV), and AI to autonomously detect, identify, and track items of interest in a maritime environment.

The towers are low-cost, customizable, and relocatable surveillance systems. They are equipped with a suite of radars and day/night camera sensors. The ASVs have been ruggedized for the open ocean and are powered by wind, solar, and/or onboard engine as required, allowing them to operate in an area of responsibility (AOR) for up to 12 months. Their sensor suite includes cameras and radar.

Both systems use AI/ML to detect and identify objects, determine items of interest (IoI) and autonomously track those items using their sensor suites. Once identified, these systems can send alerts to monitoring agencies for at-sea interdictions of potential targets and/or intel collections.

AI techniques used: Automation & Robotics, Machine Learning
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Autonomous Surveillance Towers (Anduril)

Autonomously Detects, Identifies, and Tracks items of interest using Artificial Intelligence integrated with the tower. It does not require a dedicated operator, is rapidly deployable, and is relocatable in less than a day by 2-3 people.

The system features a hybrid command and control capability, hosted in the government cloud, and is accessible via URL by desktop, laptop, tablet, or Smartphone. It is solar powered with battery backup and requires no accompanying physical infrastructure while providing visibility for 1.5 miles (2.4 km) for people, 3 miles (4.8km) for vehicles.

The Lattice system permits autonomous detection, identification, and tracking of Items of Interest (IoIs). The tower scans constantly and autonomously. The radar detects and recognizes movement. The camera slews autonomously to the IoI and the system software identifies the object. The system alerts the user and autonomously tracks the IoI. End users can monitor the system and see near real time photos by logging into the User Interface on any CBP device.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Data and Entity Resolution

Automates data unification and entity resolution with a high level of trust at enterprise scale and speed.

Data and Entity Resolution uses Machine Learning modeling to ingest multiple data sources and develop models that associate disparate records to identify probable connections, unique entities, and/or identify commonalities between multiple independently submitted records.

The automation of entity resolution within the models is supported by a tool that enables non-technical end users to continuously train models through a user-friendly interface.

AI techniques used: Natural Language Processing (NLP)
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Entity Resolution

The third-party global trade data is used to augment and enrich agency's investigations into entities of interest. It combines data from companies and goods across multiple languages, then provides network analysis to assess trade flows and risks associated with cross-border trade.

This can validate agency-held information or provide better understanding of networks of interest to the agency to better inform investigations that cross borders. AI/ML models help manage the information provided through the software, including behind-the-curtain collection of information, structuring of data, entity resolution, network analysis, risk analysis, and other functions that contribute to the software knowledge graph and front end that end users interact with.

AI techniques used: Natural Language Processing (NLP)
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Geospatial Imagery Utilizing Annotation

Leverages a commercial constellation of Synthetic Aperture Radar (SAR) satellites with readily available data, capable of imaging any location on Earth, day, and night, regardless of cloud cover.

Utilizes AI, including machine vision, object, detection, object recognition, and annotation to detect airframes, military vehicles, and marine vessels, as well as built-in change detection capabilities for disaster response missions.

AI techniques used: Machine Vision
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Integrated Digital Environment

The Integrated Digital Environment provides managers with a better understanding of end user workflows, most and least used applications, and opportunities for improvement.

The AI/ML model applies to end user activity data (e.g., use of applications, flow between applications) to help CBP identify opportunities for more efficient or effective configuration of interfaces, use of resources, or development and deployment of CBP's applications. It tailors analytics and insight generation to allow metrics gathering, usage recording/observation, dashboarding, and workflow experimentations/ suggestions to support analysts utilizing the entire suite of agency and open-source data systems. It also customizes existing capabilities to allow the exact automations needed for agency applications and systems, creating an integrated digital environment for greater connectivity and security between applications, and better ability for CBP administrators to manage and optimize use of applications by end users.

AI techniques used: Natural Language Processing (NLP)
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

RVSS Legacy Overhauled System Project (INVNT)

Video Computer Aided Detection (VCAD) (also known as Matroid AI) is software that enables CBP end users to create and share vision detectors.

VCAD detectors are trained computer vision models that recognize objects, people, and events in any image or video stream. Once a detector is trained, it can monitor streaming video in real time, or efficiently search through pre-recorded video data or images to identify objects, people,

and events of interest.

Users can view detection information via a variety of reports and alert notifications to process and identify important events and trends. Detection data is also available through VCAD's powerful developer Application Programming Interface (API) and language specific clients, so CBP applications can be integrated with the power of computer vision.

AI techniques used: Machine Vision
Stage of System Development Life Cycle: Deployment
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Use of Technology to Identify Proof of Life

The Use of technology to identify proof of life, or "Liveness Detection," uses Artificial Intelligence to reduce fraudulent activity, primarily for use within the CBP One app.

The CBP One app is designed to provide the public with a single portal to a variety of CBP services. It includes different functionality for travelers, importers, brokers, carriers, International Organizations, and other entities under a single consolidated log-in, and uses guided questions to help users determine the correct services, forms, or applications needed.

The Liveness Detection component used by the authentication system for the CBP One app uses the user's mobile device camera in addition to Artificial Intelligence algorithms to determine if the face presented to the app is the person in front of the camera at the time of capture and not a photo, mask, or other spoofing mechanism. Being able to accept submitted data with confidence that the submitting individual is who and where they claim to be is critical to the functionality of the app within the agency environment.

AI techniques used: Machine Vision
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Vessel Detection

Integrated technologies and analytics enhance maritime detection and the sensor network. Machine-assisted and AI-enhanced detection and tracking allows for improved illicit vessel detection in areas with high volumes of legitimate trade and recreational water vessel traffic by increasing situational awareness and responsiveness to threats.

Vessel Detection allows an agent to set a search area with criteria (e.g., people, drones, vehicles) and transmit that criteria to the sensors. Images detected by the sensors are auto-recognized using Artificial Intelligence. The AI algorithms filter, detect, and recognize objects and divides them into Items of Interest (IoI) and "other" objects.

Detections of IoI are shared with other detection systems while detections of other objects (e.g., animals) are not shared. IoIs can be tracked and maintained across multiple sensors seamlessly.

AI techniques used: Machine Vision
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Port of Entry Risk Assessments

CBP utilizes AI to develop, inform, and augment risk assessment processes that evaluate trade and travel data in real-time. AI methods are applied to CBP data holdings, and the results are used to inform decision making. These tools are continuously evaluated to ensure accuracy and precision, and support CBP's core mission as part of the layered risk assessment strategy.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Traveler Verification Service (TVS)

The Traveler Verification Service (TVS) provides CBP a biometric entry/exit system to record arrivals and departures to and from the United States. CBP uses TVS as its backend matching service for all biometric entry and exit operations that use Facial Comparison.

CBP creates localized photo "galleries" from images captured during previous entry inspections, photographs from U.S. passports and U.S. visas, and photographs from other DHS encounters. The images are converted into templates and the actual photograph is discarded. The templates are securely stored, and are what make up the TVS gallery. The templates are then used by the Facial Comparison system to verify a traveler's identity when they arrive or depart the U.S.

Once a match is made, U.S. citizens' photos and templates are retained for no more than 12 hours for disaster recovery purposes, then deleted. For non-immigrant aliens and lawful permanent residents, facial images are temporarily retained for no more than 14 days for confirmation of travelers' identities, evaluation of the technology, assurance of accuracy of the algorithms, and system audits.

When the traveler presents him or herself for entry, or for exit, the traveler will encounter a camera connected to TVS. This camera matches live images with the existing photo templates from passenger travel documents. Once the camera captures a quality image and the system successfully matches it with historical photo templates of all travelers from the gallery associated with that particular manifest, the traveler proceeds to inspection for admissibility by a CBP Officer, or exits the United States. For more information, please read the DHS/CBP/PIA-056 - Privacy Impact Assessment for the Traveler Verification Service.

AI techniques used: Facial Comparison
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] I4 Viewer Matroid Image Analysis

I4 Viewer Matroid Image Analysis is no longer an AI use case at DHS. Use cases using Matroid, RVSS Legacy Overhauled System Project (INVNT) and Automated Item of Interest Detection - ICAD are listed above. The summary is provided as it was listed on previous inventories for informational purposes.

Matroid is a software that enables CBP end users to create and share vision detectors. Matroid detectors are trained computer vision models that recognize objects, people, and events in any image and in video streams. Once a detector is trained, it can monitor streaming video in real time, or efficiently search through pre-recorded video data or images to identify objects, people, and events of interest. Users can view detection information via a variety of reports and alert notifications to process and identify important events and trends. Detection data is also available through Matroid's powerful developer Application Programming Interface and language-specific clients, so CBP applications can be integrated with the power of computer vision.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Agent Portable Surveillance

This use case is no longer in use at DHS. The summary is provided as it was listed on previous inventories for informational purposes.

The agent portable surveillance system is a backpack mobile unit meant for single agent deployments. The system identifies border activities of interest by using artificial intelligence / machine learning to analyze data from Electro-Optical/Infra-Red cameras and radar. When an activity is detected, the system sends the information to agents through the Team Awareness Kit (TAK). Detections are shared with CBP TAK users to enhance efficiency and agent/officer safety.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Open-source News Aggregation

This use case is no longer in use at DHS. The summary is provided as it was listed on previous inventories for informational purposes.

The platform enables users to make better decisions faster by identifying and forecasting emerging events on a global scale to mitigate risk, recognize threats, greatly enhance indications and warnings, and provide predictive intelligence capabilities. The artificial intelligence / machine learning models enable rapid access to automated intelligence assessments by fusing, processing, exploiting and analyzing open sources of data (including news, social media, economic indicators, governance indicators, travel warnings, weather and other sources). This system is an immediate and substantial force multiplier that shifts the traditional approach of monitoring and assessing the operational environment to focus on the forecast of the future geopolitical, socio, and economic environment.

Stage of System Development Life Cycle: Disposal

For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

U.S. Immigration and Customs Enforcement (ICE)

Normalization Services

HSI uses Artificial Intelligence to verify, validate, correct, and normalize addresses, phone numbers, names, and ID numbers to streamline the process of correcting data entry errors, point out purposeful misidentification, connect information about a person across HSI datasets, and cut down the number of resource hours needed for investigations.

Examples of the normalization services provided include: normalizing less well-defined addresses into usable addresses for analysis- (such as those using mile markers instead of a street number); inferring ID type based on user-provided ID value (such as distinguishing a SSN from a DL number without additional context); categorizing name parts while taking into account additional factors (including generational suffixes and multi-part family names); and validating and normalizing phone numbers to the E164 standard, including their identified county of origin.

These services are provided as part of the Repository for Analytics in a Virtualized Environment (RAVEn). RAVEn is a DHS HSI Innovation Lab project that facilitates large, complex analytical projects to support ICE's mission to enforce and investigate violations of U.S. criminal, civil, and administrative laws. RAVEn also enables tools used to analyze trends and isolate criminal patterns as HSI mission needs arise. For more information, please read the DHS/ICE/PIA-055 - Privacy Impact Assessment 055 for RAVEn.

AI techniques used: Machine Learning
Stage of System Development Life Cycle: Operations and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Machine Translation (Previously Language Translator)

Systran provides machine translation for over 100 different language combinations. Currently the Innovation Lab has licenses for translating Chinese, Spanish, Arabic, Farsi, Russian, German, Ukrainian and Filipino to English. Systran can translate plain text, word documents, and PDFS. A web-based UI and API endpoint are available.

AI techniques used: Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Operations and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Email Analytics

The Email Analytics application enables a user to review and analyze email data acquired through legal process. AI is incorporated to accomplish spam message classification, and named entity recognition (NER) for entity extraction of names, organizations, locations, etc. It also integrates machine translation capabilities using a commercial product. Previously included within the Data Tagging and Classification use case, which is no longer in use.

AI techniques used: Machine Learning, Natural Language Processing (NLP)
Stage of System Development Life Cycle: Operations and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Mobile Device Analytics

Mobile Device Analytics (MDA) has been developed to meet the demand on investigators to view and analyze massive amounts of data resulting from court ordered mobile device extractions. The overarching goal of MDA is to improve the efficacy of agents and analysts in identifying pertinent evidence, relationships, and criminal networks from data extracted from cellular phones. Machine Learning is being developed for object detection (such as firearms, drugs, money, etc.) in photos and videos contained in the data. Previously included within the Data Tagging and Classification use case, which is no longer in use.

This is a DHS HSI Innovation Lab / RAVEn project. The Repository for Analytics in a Virtualized Environment (RAVEn) facilitates large, complex analytical projects to support ICE's mission to enforce and investigate violations of U.S. criminal, civil, and administrative laws. RAVEn also enables tools used to analyze trends and isolate criminal patterns as HSI mission needs arise. For more information, please read the DHS/ICE/

PIA-055 - Privacy Impact Assessment 055 for RAVEn.

AI techniques used: Machine Learning, Natural Language Processing (NLP), Object Detection
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Barcode Scanner

The Barcode Scanner has been developed to scan and populate detected information into corresponding text fields within the RAVEn GO's Encounter Card. The barcode scanner currently supports MRZ and PDF417 barcode types, frequently found on travel documents (Passport and Passport cards) and US Driver's Licenses.

This is a DHS HSI Innovation Lab / RAVEn project. The Repository for Analytics in a Virtualized Environment (RAVEn) facilitates large, complex analytical projects to support ICE's mission to enforce and investigate violations of U.S. criminal, civil, and administrative laws. RAVEn also enables tools used to analyze trends and isolate criminal patterns as HSI mission needs arise. For more information, please read the DHS/ICE/ PIA-055 - Privacy Impact Assessment 055 for RAVEn.

AI techniques used: Machine Learning, Machine Vision
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Facial Recognition Service

The Facial Recognition Service is used during investigations conducted by HSI agents and analysts for identification of known individuals, as well as extracting faces for further investigations from perpetrators including child exploitation offenses, human rights atrocities, and war criminals.

This is a DHS HSI Innovation Lab / RAVEn project. The Repository for Analytics in a Virtualized Environment (RAVEn) facilitates large, complex analytical projects to support ICE's mission to enforce and investigate violations of U.S. criminal, civil, and administrative laws. RAVEn also enables tools used to analyze trends and isolate criminal patterns as HSI mission needs arise. For more information, please read the DHS/ICE/ PIA-055 - Privacy Impact Assessment 055 for RAVEn.

AI techniques used: Machine Learning, Facial Recognition
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Semantic Search and Summarization

The HSI Semantic Search and Summarization project will strengthen investigative processes by introducing an LLM-based system designed to enhance the efficiency and accuracy of summaries investigators rely upon. The LLM-based system will leverage open-source technologies to allow investigators to more quickly summarize and search for contextually relevant information within investigative reports. The project could lead to increases in detection of fentanyl-related networks, aid in identification of perpetrators and victims of child exploitation crimes, and surface key patterns and trends that could further HSI's vital work.

AI techniques used: Machine Natural Language Processing (NLP), Generative AI
Stage of System Development Life Cycle: Initiation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] Data Tagging and Classification

Data Tagging and Classification is no longer an AI use case at DHS. Email Analytics and Mobile Device Analytics are now individually listed above, and the RAVEn Leader Tracker is no longer in use. The summary is provided as it was listed on previous inventories for informational purposes.

RAVEn leverages data tagging and classification to do the following:

The Email Analytics Tool streamlines how special agents and criminal analysts search, filter, translate, and report on electronic communications evidence and will help investigators more effectively determine the structure and organization of criminal enterprises.

The RAVEn - Lead Tracker is a centralized system where agents can send and receive leads and enter outcomes such as arrests and seizures. The

goal is for all leads in the agency to be found in one place, rather than in various email inboxes.

The overarching goal of Mobile Device Analytics is to improve the efficiency of agents and analysts in identifying pertinent evidence, relationships, and criminal networks from data extracted from mobile devices.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] RAVEn Compliance Automation Tool (CAT)

This use case is no longer in use at DHS. The summary is provided as it was listed on previous inventories for informational purposes.

RAVEn CAT is being developed as part of an effort to modernize HSI's Form I-9 Inspection Process. The goal is to use machine learning and automation to increase the speed and efficiency of ingesting and processing Forms I-9 data. Easy to use front-end interface workflow that increases work productivity and reduces manual entry. RAVEn CAT currently employs an Optical Recognition Service (OCR) model and software (Tesseract OCR) to identify pixel coordinates of handwritten and read/extract computer typed characters from ingested forms for processing. Additional research into opensource Machine Learning Object Detection models is being made to help further augment accuracy of text identification and extraction of ingested forms into the pipeline.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

U.S. Coast Guard (USCG)

Silicon Valley Innovation Program (SVIP) Language Translator

USCG operators must be able to communicate with vessel occupants - many who may be non-English speakers - while performing a variety of rescue and investigative missions. The accurate and swift translation of information is critical to the safety and security of Coast Guard boarding teams and vessel occupants. The DHS's Science and Technology Silicon Valley Innovation Program (SVIP) Language Translator solicitation sought new capabilities to support the Coast Guard in facilitating real-time communications with non-English speakers and those who are unable to communicate verbally. The solicitation also included requirements for language translation technology to be capable of operating both online and offline because many Coast Guard interactions take place in extreme environmental conditions, and in locations without cell service or an internet connection.

AI techniques used: Machine Learning, Natural Language processing (NLP)
Stage of System Development Life Cycle: Development and Acquisition
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Transportation Security Administration (TSA)

Touchless PreCheck Identity Solution

TSA is using Facial Comparison to verify a passenger's identity at its security checkpoints using the CBP Traveler Verification Service (TVS). The TVS creates a secure biometric template of a passenger's live facial image taken at the checkpoint and matches it against a gallery of templates of photos that the passenger previously provided to the government.

TVS is standard procedure for travelers entering or leaving the United States, however, TSA is leveraging this technology as an optional process for passengers traveling via certain airports who wish to further expedite their PreCheck screening process. This additional PreCheck feature is voluntary, and passengers may opt-out of the process at any time and instead choose the standard identity verification by a Transportation Security Officer (TSO).

To further enhance speed and security, TSA and CBP are also allowing airport and airline partners to request the use of TVS for identity verification. These partners purchase camera equipment in order to take voluntary photos of passengers at airport baggage drop and boarding locations for transmission to TVS. TVS then creates biometric templates of these photos and compares them against templates of existing DHS

holdings as described above. This process streamlines passenger identity verification, increasing the speed of security checks while maintaining a high degree of safety for all passengers.

AI techniques used: Facial Comparison
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

[No Longer in Use] CDC Airport Hotspot Throughput (PageRank)

This use case is no longer in use at DHS. The summary is provided as it was listed on previous inventories for informational purposes.

TSA launched the “Stay Healthy. Stay Secure.” campaign, which details proactive and protective measures have been implemented at security checkpoints to make the screening process safer for passengers and our workforce by reducing the potential of exposure to the coronavirus. The campaign includes guidance and resources to help passengers prepare for the security screening process in the COVID environment. A big part of that campaign was the development of the Centers for Disease Control and Prevention's Airport Hotspot Throughput. This capability determines the domestic airports that have the highest rank of connecting flights during the holiday travel season to help mitigate the spread of COVID-19. This capability is a DHS-developed artificial intelligence model written in Spark/Scala that takes historical non-PII travel data and computes the highest-ranking airports based on the PageRank algorithm.

TSA does not make decisions about flight cancellations or airport closures. These decisions are made locally, on a case-by-case basis, by individual airlines, airports, and public health officials. TSA will continuously evaluate and adapt procedures and policies to keep the public and our workforce safe as we learn more about this devastating disease and how it spreads.

Stage of System Development Life Cycle: Disposal
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Federal Emergency Management Agency (FEMA)

Geospatial Damage Assessments

In the aftermath of Hurricane Ian, FEMA employed the Geospatial Damage Assessments machine learning (ML) model to quickly assess the severity of structural damage caused by the disaster. The model, trained on historical photos of damage caused by natural disasters, uses computer vision and ML techniques to identify both damaged and non-impacted structures in aerial imagery. Human analysts conducting Geospatial Damage Assessments reviewed the model outputs to verify those structures identified by the model as having damage classified as minor, major, or destroyed. A feedback loop was incorporated into the ML system to allow analysts input to improve performance over time.

In this use case, the tool narrowed the number of structures needing human review from over a million to just 77,000, shortening the time of completion from weeks to days. This helped improve efficiency and situational awareness for decision makers so they could expedite resources to those most in need.

AI techniques used: Machine Learning, Machine Vision
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

FEMA OCFO GPT

FEMA OCFO GPT is a generative AI solution developed to assist with answering questions related to the FEMA budget. On average, FEMA receives fifteen questions per day on the budget. These questions take thousands of hours per year to answer, pulling resources away from other mission critical activities. The goal of FEMA OCFO GPT is to generate draft responses to questions which are reviewed and validated by FEMA employees. This solution will help improve the quality of responses and decrease the resources required to respond.

AI techniques used: Natural Language Processing (NLP), Generative AI
Stage of System Development Life Cycle: Operation and Maintenance
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Planning Assistant for Resilient Communities (PARC)

The proposed Generative AI solution, "PARC" will create efficiencies for the hazard mitigation planning process for local governments, including underserved communities. Hazard mitigation plans are not only a foundational step that communities can take to build their resilience but can be lengthy to produce and challenging for communities that lack resources to do so. PARC will specifically support State, Local, Tribal, and Territorial (SLTT) governments' understanding of how to craft a plan that identifies risks and mitigation strategies as well as generate draft plan elements—from publicly-available, well-researched sources — that governments could customize to meet their needs. This capability could lead to more communities having the ability to submit grant applications for funding to become more resilient and reduce disaster risks.

For more information about the PARC pilot please read the PARC One-Pager (https://www.fema.gov/sites/default/files/documents/fema_parc_one-pager.pdf) .

AI techniques used: Natural Language Processing (NLP), Generative AI
Stage of System Development Life Cycle: Implementation
For more information, please contact: DHS Artificial Intelligence Team (mailto:AI@hq.dhs.gov)

Keywords

ARCHIVE (/KEYWORDS/ARCHIVE)

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