Appendix

Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies

This Appendix describes the variables and underlying data used in the empirical presentation (“Taking Inventory: A Survey of Federal Agency Use of AI”) of Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies, a report prepared for the Administrative Conference of the United States.

Part I sets forth the variable used to code AI use cases. Part II describes agency metadata and attributes. Part III lists all use cases reported in the report’s empirical presentation.

Part I. Use Case Coding Protocol

The following fields were used to document each use case captured by the search protocol.

**Governance Task**
Which of the following governance tasks best describes the objective of the AI/ML tool?

- **Enforcement**: tools that primarily identify or prioritize targets of agency enforcement action, including monitoring for violations that can lead to enforcement action
- **Regulatory research, analysis, and monitoring**: tools that collect or analyze information that shapes agency policymaking, or research intended to produce data or analysis for that purpose
- **Adjudication**: tools that support formal or informal agency adjudication of benefits or rights
- **Public services and engagement**: tools that support the direct provision of services to the public or facilitate communication with the public for regulatory or other purposes
- **Internal management**: tools that support agency management of resources, including employee management, procurement, and maintenance of technology systems

**Task Description**
A use-case specific description of the task in the context of the agency and its aim.

**Method**
Which of the following technical methods best describes the tool’s use of artificial intelligence?

- Classification
- Regression
- Structured Prediction
- Clustering
- Dimensionality Reduction
- Robotics
- N/A

**Method Description**
A use-case specific description further clarifying technical specifications of the tool.
**Data Type**
Which of the following data types are used by the tool?

- **Structured**
  - ‘Structured’ data includes numerical information and other factored variables.
- **Text**
- **Images**
- **Audio**

**Data Description**
A use-case description of the data in the context of the particular algorithm.

**Implementation Stage**
Of the following options, how far along is the development of the tool?

- **Planning**: The agency or one of its representatives has expressed interest in or has committed to utilizing AI/ML for the given use case but it has not yet been piloted or deployed
- **Piloting or Partially Deployed**: The AI/ML tool is currently being tested or is partially in use
- **Fully deployed**: The AI/ML tool is currently fully deployed by the agency for the particular use case

**Developer**
Of the following options which entity was responsible for the technical development of the AI/ML tool?

- **In-house**: Government-employed developers were responsible for creating the tool.
- **Commercial Contractor**: Developers employed by a private business entity were responsible for creating the tool through a contract with the government.
- **Non-Commercial Collaboration**: The agency used a non-traditional means of procurement such as crowdsourcing, public-facing prize competitions, or academic-agency partnerships in order to develop the tool.

**Sophistication**
How technologically sophisticated is the tool? Note that sophistication is particularly difficult to judge, as it is dependent on the state of the science within a subfield. Unless some detail was provided, we did not make judgments solely based on the task. We attempted to evaluate scientific papers referenced by use cases, but there was a limit to our capacity to go beyond the agency materials.

- **Higher**: The model relies on a highly sophisticated technological method and/or data pipeline. For example, a deep neural network to predict intrinsic factors (sex, population affiliation, etc.) and extrinsic factors (human development and Gini indices) as indicators of life quality and social inequality, respectively.
- **Medium**: The model relies on a moderately sophisticated technological method and/or data pipeline. For example, a chatbot that provides information and login support and performs searches for visitors at the Federal Help Desk.
- **Lower**: The model relies on an unsophisticated technological method and/or data pipeline. For example, simple regression-based approaches to generate and predict quality-adjusted prices and price indices.
- **Insufficient detail**: Sources are unclear on the sophistication of the model or the model has yet to be developed.

**Citation**
A citation to the document referring to the agency use case, including a one or more links to the webpage(s) on which the use case was found.
Number of Full Times Employees

Policy Area
Which of the following options best describes the policy domain most related to the agency's function and mandate?

- Technology
- Transportation
- Workplace
- Internal management
- Law Enforcement
- Social Welfare
- Environmental Energy
- Financial Consumer
- Other
Part III. Listing of Canvass Use Cases

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

Use Case #1
Agency: Board of Governors of the Federal Reserve System
Subagency: Consumer Financial Protection Bureau
Policy Area: Consumer Protection, Financial Regulation
Task: Regulatory research, analysis, and monitoring, Public services and engagement
Task Description: To categorize narratives, identify trends, and predict consumer harm in textual consumer complaints.
Method: Data Unavailable
Data Type: Text
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail

Use Case #2
Agency: Board of Governors of the Federal Reserve System
Subagency: N/A
Policy Area: Other
Task: Regulatory research, analysis, and monitoring
Task Description: To predict the vulnerability of banks of different sizes to losses in various asset classes.
Method: Regression
Data Type: Structured
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Lower
Citation: Board of Governors of the Federal Reserve System, Logit Model of Bank Failure (June 2011), https://www.gao.gov/new.items/d11612.pdf (noting at page 56, development of “a logistic (logit) regression model of bank failure prediction.”)

Use Case #3
Agency: Board of Governors of the Federal Reserve System
Subagency: N/A
Policy Area: Other
Task: Regulatory research, analysis, and monitoring
Task Description: To predict unemployment figures using neural networks.
Method: Regression
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Higher
Citation: Thomas R. Cook & Aaron Smalter Hall, Macroeconomic Indicator Forecasting with Deep Neural...
Use Case #5
Agency: Board of Governors of the Federal Reserve System
Subagency: N/A
Policy Area: Other
Task: Enforcement, Regulatory research, analysis, and monitoring
Task Description: To examine bank emails to identify signs of control failures or misbehavior.
Method: Data Unavailable
Data Type: Text
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail

DEPARTMENT OF AGRICULTURE

Use Case #7
Agency: Department of Agriculture
Subagency: Agricultural Research Service
Policy Area: Agriculture
Task: Regulatory research, analysis, and monitoring
Task Description: To research diseases and pests using genomics and proteomics as well as develop genetic stock resistant to these diseases using bioinformatics, machine learning and modeling.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail
Citation: U.S. Department of Agriculture, High Performance Computing Related to Agricultural Research in Regard to Big Data, Geospatial Statistics, and Bioinformatics (undated but listed as active), https://www.ars.usda.gov/research/project/?accnNo=435529 (noting use of machine learning)

COMMODITY FUTURES TRADING COMMISSION

Use Case #6
Agency: Commodity Futures Trading Commission
Subagency: N/A
Policy Area: Financial Regulation
Task: Enforcement, Regulatory research, analysis, and monitoring
Task Description: To facilitate surveillance and monitoring, customer identification, and anti-money laundering compliance, regulatory intelligence, reporting and risk management and investor risk assessment.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: J. Christopher Giancarlo, Chairperson, CFTC, Quantitative Regulation: Effective Market Regulation in a Digital Era, https://www.cftc.gov/PressRoom/SpeechesTestimony/opagiancarlo59 (noting series of CFTC initiatives to develop “automated data analysis,” “machine learning,” and “artificial intelligence” to work of the Division of Enforcement, the whistleblower program, and other forms of “enforcement analysis” as well as rulemaking).
Use Case #9
Agency: Department of Agriculture
Subagency: Food Safety and Inspection Service
Policy Area: Agriculture
Task: Regulatory research, analysis, and monitoring
Task Description: To process genomic information in order to better identify the precise source of food pathogens.
Method: Data Unavailable
Data Type: Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Food Safety and Inspection Service, Use of Whole Genome Sequence (WGS) Analysis to Improve Food Safety and Public Health (Oct 2017), https://www.fsis.usda.gov/wps/wcm/connect/88be6d2-a051-40a9-a787-5e4b180efa12/Transcript-Whole-Genome-Sequencing-102617.pdf?MOD=AJPERES (referencing use of machine learning methods)

Use Case #10
Agency: Department of Agriculture
Subagency: Food Safety and Inspection Service
Policy Area: Agriculture
Task: Regulatory research, analysis, and monitoring
Task Description: To analyze food safety related questions from consumers, the food production industry, and the agency's inspection staff to identify trends.
Method: Classification
Data Type: Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Medium

Use Case #11
Agency: Department of Agriculture
Subagency: Natural Resources Conservation Service
Policy Area: Agriculture
Task: Regulatory research, analysis, and monitoring
Task Description: To help landowners and natural resource managers track vegetation through time and plan actions to improve America's grazing lands. To inform strategies that improve productivity of grazing lands, manage weeds, mitigate impacts of wildfire and drought, and benefit wildlife habitats
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Medium
Citation: Department of Agriculture's Natural Resources Conservation Service, Rangeland Analysis Platform (Aug. 2017), https://rangelands.app/about/rapFactSheet.pdf (noting, at page 1, merger of "machine learning and cloud-based computing with remote sensing and field data")

Use Case #12
Agency: Department of Agriculture
Subagency: Natural Resources Conservation Service
Policy Area: Agriculture
Task: Regulatory research, analysis, and monitoring
Task Description: To forecast the volume of daily water supply in a city or zip code as well as the likelihood that the volume will exceed the average daily supply.
Method: Regression
DEPARTMENT OF COMMERCE

Use Case #13
Agency: Department of Commerce
Subagency: Bureau of Economic Analysis
Policy Area: Commerce
Task: Regulatory research, analysis, and monitoring
Task Description: To improve timing and accuracy of earlier information on economic indicators.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Medium

Use Case #14
Agency: Department of Commerce
Subagency: National Oceanic and Atmospheric Administration
Policy Area: Commerce
Task: Regulatory research, analysis, and monitoring
Task Description: To generate automated probabilistic forecasts for thunderstorm hazards.
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Higher

Use Case #15
Agency: Department of Commerce
Subagency: National Oceanic and Atmospheric Administration
Policy Area: Commerce
Task: Regulatory research, analysis, and monitoring
Task Description: To identify whale songs.
Method: Classification
Data Type: Audio
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Higher
Citation: NOAA/CIMSS ProbSevere, Training Module (Spring 2019), https://cimss.ssec.wisc.edu/severe_conv/training/training.html (detailing NOAA development of “Naive Bayesian Classifier” model to predict thunderstorm hazards).
Use Case #17
Agency: Department of Commerce
Subagency: National Oceanic and Atmospheric Administration
Policy Area: Commerce
Task: Regulatory research, analysis, and monitoring
Task Description: To predict habitat suitability for several taxa of deep-sea corals.
Method: Regression
Data Type: Structured
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Higher
Citation: VIAME leverages developments in machine learning from the human surveillance and biomedical fields, as well as deep learning research funded through DARPA, to create automated analysis pipelines for processing of marine video data.

Use Case #19
Agency: Department of Commerce
Subagency: United States Patent and Trademark Office
Policy Area: Commerce
Task: Adjudication
Task Description: To generate patent term synonyms.
Method: Classification
Data Type: Text
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: United States Patent and Trademark Office, Emerging Technologies in USPTO Business Solutions (May 2018), noting use of “maximum entropy” machine learning algorithm.

Use Case #20
Agency: Department of Commerce
Subagency: United States Patent and Trademark Office
Policy Area: Commerce
Task: Adjudication
Task Description: To create a chatbot accompanying the
USPTO Manual Patent of Examination of Procedures (MPEP) for claim and classification analytics.

Method: Structured Prediction

Data Type: Text

Implementation Stage: Planning

Developer: In-House

Level of Sophistication: Higher


Use Case #21

Agency: Department of Commerce

Subagency: United States Patent and Trademark Office

Policy Area: Commerce

Task: Adjudication

Task Description: To classify patent applications for claim processing

Method: Classification

Data Type: Text

Implementation Stage: Fully deployed

Developer: Commercial Contractor

Level of Sophistication: Insufficient detail


Use Case #22

Agency: Department of Commerce

Subagency: United States Patent and Trademark Office

Policy Area: Commerce

Task: Adjudication

Task Description: To classify trademark applications and assign design codes for processing

Method: Classification

Data Type: Structured, Images

Implementation Stage: Fully deployed

Developer: In-House

Level of Sophistication: Higher


Use Case #23

Agency: Department of Commerce

Subagency: United States Patent and Trademark Office

Policy Area: Commerce

Task: Adjudication

Task Description: To assist search for existing trademark images

Method: Classification

Data Type: Images

Implementation Stage: Fully deployed

Developer: In-House

Level of Sophistication: Higher


DEPARTMENT OF EDUCATION

Use Case #24

Agency: Department of Education

Subagency: N/A

Policy Area: Education

Task: Regulatory research, analysis, and monitoring

Task Description: To score written portions of K-12 student assessments

Method: Data Unavailable

Data Type: Text

Implementation Stage: Planning

Developer: Commercial Contractor

Level of Sophistication: Insufficient detail
Citation: Department of Education, Race to the Top Assessment Public Meeting on Assessment Program and Technical Assistance Public Meeting (June 2011), https://www2.ed.gov/programs/racetothetop-assessment/june-10-2011-transcript.pdf (noting use of machine learning and natural language processing in agency effort to “expand the knowledge and expertise of the Department of Education” regarding AI-powered educational assessments)

DEPARTMENT OF ENERGY

Use Case #25
Agency: Department of Energy
Subagency: Federal Energy Regulatory Commission
Policy Area: Energy
Task: Regulatory research, analysis, and monitoring
Task Description: To monitor infrastructure projects and predict project schedules and costs.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Press Release, LawIQ Wins Contract to Provide Regulatory Analytics to FERC (Feb. 27, 2018), https://www.prnewswire.com/news-releases/lawiq-wins-contract-to-provide-regulatory-analytics-to-ferc-300605067.html (noting FERC contract for software that uses “a machine learning technology that continuously analyzes hundreds of variables impacting project schedules and costs”)

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Use Case #26
Agency: Department of Health and Human Services
Subagency: Centers for Disease Control and Prevention
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To classify whether a child has autism based on medical records
Method: Classification

Use Case #27
Agency: Department of Health and Human Services
Subagency: Centers for Disease Control and Prevention
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To de-duplicate patient immunization records
Method: Classification
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail

Use Case #28
Agency: Department of Health and Human Services
Subagency: Centers for Medicare and Medicaid Services
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To analyze Medicare program performance metrics (e.g., hospital readmissions).
Method: Regression
Data Type: Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House

Citation: HHS, Rapid Autism Classification for Public Health, https://www.hhs.gov/cto/projects/rapid-autism-classification-for-public-health/index.html (noting CDC project applying multiple machine learning techniques, including natural language processing and convolutional neural networks to predicting autism)
**Use Case #29**

**Agency:** Department of Health and Human Services

**Subagency:** Centers for Medicare and Medicaid Services

**Policy Area:** Health

**Task:** Regulatory research, analysis, and monitoring

**Task Description:** To predict unplanned hospital admissions and adverse events.

**Method:** Data Unavailable

**Data Type:** Structured, Text

**Implementation Stage:** Planning

**Developer:** Non-Commercial Collaboration

**Level of Sophistication:** Insufficient detail


**Use Case #30**

**Agency:** Department of Health and Human Services

**Subagency:** Centers for Medicare and Medicaid Services

**Policy Area:** Health

**Task:** Enforcement

**Task Description:** To identify, at the time of claim submission, when mistakes or intentional behavior may lead to improper payments or indicate fraud, in the Medicare Fee-for-Service Program.

**Method:** Data Unavailable

**Data Type:** Text

**Implementation Stage:** Piloting or Partially Deployed

**Developer:** Commercial Contractor

**Level of Sophistication:** Insufficient detail

**Citation:** Food & Drug Administration, Impact Story: Capturing Patient Experience Through Deep Learning (Mar. 5, 2019).

**Use Case #31**

**Agency:** Department of Health and Human Services

**Subagency:** Food and Drug Administration

**Policy Area:** Health

**Task:** Internal management

**Task Description:** To receive Tier 0 and 1 requests for the FDA's Office of Computational Sciences and notify the help desk assistant to send access and installation keys to callers.

**Method:** Structured Prediction

**Data Type:** Audio

**Implementation Stage:** Planning

**Developer:** Commercial Contractor

**Level of Sophistication:** Higher

**Citation:** Food & Drug Administration, FDA's Virtual Assistant: Utilizing Machine Learning for Automated Customer Service, https://www.fda.gov/media/130558/download (noting FDA's partnership with IBM to automate customer service).

**Use Case #32**

**Agency:** Department of Health and Human Services

**Subagency:** Food and Drug Administration

**Policy Area:** Health

**Task:** Regulatory research, analysis, and monitoring

**Task Description:** To make MedDRA coding decisions (e.g., adverse events of drugs and therapeutic biologic products) in submissions that include patient narratives.

**Method:** Structured Prediction

**Data Type:** Text

**Implementation Stage:** Planning

**Developer:** In-House

**Level of Sophistication:** Insufficient detail

**Citation:** Food & Drug Administration, Impact Story: Capturing Patient Experience Through Deep Learning (Mar. 5, 2019),
Government by Algorithm: Artificial Intelligence in Federal Administrative Agencies

Use Case #33
Agency: Department of Health and Human Services
Subagency: Food and Drug Administration
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To scan external information (e.g., product complaints) to detect food contamination events and evaluate inspection and sampling findings to inform future policies.
Method: Data Unavailable
Data Type: Text
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Food & Drug Administration, Food for Thought: Ideas on How to Begin a New Era of Smarter Food Safety (undated), https://www.fda.gov/media/131682/download (noting use of artificial intelligence and predictive analytics)

Use Case #34
Agency: Department of Health and Human Services
Subagency: Food and Drug Administration
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To estimate time-to-event for pharmaceuticals effects.
Method: Regression
Data Type: Structured, Text
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Medium
Citation: Xiajing Gong, Meng Hu, Liang Zhao, Big Data Toolsets to Pharmacometrics: Application of Machine Learning for Time-to-Event Analysis, 11 Clinical Translational Sci. 3 (2018), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5944589/#:po=5.00000 (noting use of machine learning methods)

Use Case #35
Agency: Department of Health and Human Services
Subagency: Food and Drug Administration
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To predict the time to first ANDA submissions referencing new chemical entities following their earliest lawful ANDA submission dates.
Method: Regression
Data Type: Structured
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Medium

Use Case #36
Agency: Department of Health and Human Services
Subagency: Food and Drug Administration
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To use sensory analysis to determine the decomposition status of seafood samples.
Method: Regression
Data Type: Structured
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Medium

Use Case #37
Use Case #38
Agency: Department of Health and Human Services
Subagency: Food and Drug Administration
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To detect filth elements in food contamination
Method: Classification
Data Type: Images
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Higher
Citation: Leihong Wu et al., A Deep Learning Model To Recognize Food Contaminating Beetle Species Based on Elytra Fragments, 166 Computers & Elec. in Agric. 105002 (2019), https://doi.org/10.1016/j.compag.2019.105002 (noting use of neural networks)

Use Case #39
Agency: Department of Health and Human Services
Subagency: Food and Drug Administration
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To identify adverse event reports that are likely to demonstrate medication-related causality.
Method: Regression
Data Type: Structured, Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Medium

Use Case #40
Agency: Department of Health and Human Services
Subagency: Office of the CTO
Policy Area: Health
Task: Regulatory research, analysis, and monitoring
Task Description: To auto-categorize public comments to proposed regulations.
Method: Clustering
Data Type: Text
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Lower

Use Case #41
Use Case #42

Agency: Department of Health and Human Services
Subagency: Substance Abuse and Mental Health Services Administration
Policy Area: Health
Task: Public services and engagement
Task Description: To deliver an intuitive interface that will improve health experiences and patient outcomes
Method: Data Unavailable
Data Type: Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail


Use Case #43

Agency: Department of Health and Human Services
Subagency: N/A
Policy Area: Health
Task: Internal management
Task Description: To clean data from legacy systems to maximize visibility of contract terms across agency procurement process
Method: Classification
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Insufficient detail


Use Case #44

Agency: Department of Health and Human Services
Subagency: N/A
Policy Area: Health
Task: Internal management
Task Description: To improve procurement efficiency -- e.g., identifying duplicate procurements to realize economies of scale
Method: Structured Prediction
Data Type: Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Insufficient detail

Citation: Department of Health and Human Services, The BuySmarter Journey: Our Successes Thus Far (Summer 2018), https://www.hhs.gov/sites/default/files/hhs-buysmarter-journey.pdf (noting, at page 9, use of natural language processing to put structure on agency procurement contracts for analysis).
Use Case #45
Agency: Department of Homeland Security
Subagency: Federal Emergency Management Agency
Policy Area: Law Enforcement
Task: Regulatory research, analysis, and monitoring
Task Description: To conduct flood modeling and analytics
Method: Classification, Structured Prediction
Data Type: Structured
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail

Use Case #46
Agency: Department of Homeland Security
Subagency: Federal Emergency Management Agency
Policy Area: Law Enforcement
Task: Public services and engagement
Task Description: To assist first responders in disaster areas by using drones that map disaster-stricken areas.
Method: Classification
Data Type: Images
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Insufficient detail

Use Case #47
Agency: Department of Homeland Security
Subagency: Transportation Security Administration
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To automatically classify the contents of passenger Stream-of-Commerce images/data in a manner that can support future algorithm development for explosives and/or prohibited item threats.
Method: Data Unavailable
Data Type: Images
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail

Use Case #48
Agency: Department of Homeland Security
Subagency: Transportation Security Administration
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To predict the probability that a given body zone (out of 17 total body zones) has a threat present.
Method: Regression
Data Type: Images
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Department of Homeland Security, Transportation Security Administration, Passenger Screening Algorithm Challenge (2017), https://www.kaggle.com/c/passenger-screening-algorithm-challenge (noting in the competition description that “TSA is stepping outside their established procurement process and is challenging the broader data science community to help improve the accuracy of their threat prediction algorithms”)
**Use Case #49**
Agency: Department of Homeland Security  
Subagency: Transportation Security Administration  
Policy Area: Law Enforcement  
Task: Enforcement  
Task Description: To replace manual photo identification with facial recognition  
Method: Classification  
Data Type: Images  
Implementation Stage: Piloting or Partially Deployed  
Developer: In-House  
Level of Sophistication: Insufficient detail  
Citation: Transportation Security Administration, Biometrics Roadmap For Aviation Security & the Passenger Experience (Sept. 2018), https://www.tsa.gov/sites/default/files/tsa_biometrics_roadmap.pdf (noting that “[f]acial recognition capabilities will be automated to improve the performance and security of TSA operations”)

**Use Case #50**
Agency: Department of Homeland Security  
Subagency: United States Citizenship and Immigration Services  
Policy Area: Law Enforcement  
Task: Public services and engagement  
Task Description: To provide assistance navigating the USCIS website and answering immigration questions.  
Method: Structured Prediction  
Data Type: Text  
Implementation Stage: Fully deployed  
Developer: In-House  
Level of Sophistication: Insufficient detail  
Citation: U.S. Citizenship and Immigrations Services, Emma: Friendly Presence and Innovative USCIS Resource--Available 24/7 (Sept. 1, 2016), https://www.uscis.gov/archive/blog/2016/09/emma-friendly-presence-and-innovative (noting that system called Emma “is not a live agent but an artificial intelligence conversational software”)

**Use Case #51**
Agency: Department of Homeland Security  
Subagency: United States Customs and Border Protection  
Policy Area: Law Enforcement  
Task: Enforcement  
Task Description: To analyze and compare facial images from electronic passports – or e-Passports – to live captured images in order to identify imposters attempting to enter the United States.  
Method: Classification  
Data Type: Images  
Implementation Stage: Piloting or Partially Deployed  
Developer: Commercial Contractor  
Level of Sophistication: Insufficient detail  

**Use Case #52**
Agency: Department of Homeland Security  
Subagency: United States Customs and Border Protection  
Policy Area: Law Enforcement  
Task: Enforcement  
Task Description: To develop border facial recognition.  
Method: Classification  
Data Type: Images  
Implementation Stage: Piloting or Partially Deployed  
Developer: In-House  
Level of Sophistication: Insufficient detail  
Citation: United States Customs and Border Protection, CBP to Implement a Facial Comparison Technical Demonstration at Anzalduas International Bridge for Vehicle Travelers (Aug 2018), https://www.cbp.gov/newsroom/local-media-release/cbp-implement-facial-comparison-technical-demonstration-anzalduas (noting CBP’s use of “a facial comparison system comprised of a camera to test and evaluate capturing facial
biometrics of vehicle travelers entering and departing the United States and compare those images to photos on file in government holdings”)

**Use Case #53**
**Agency:** Department of Homeland Security
**Subagency:** United States Customs and Border Protection
**Policy Area:** Law Enforcement
**Task:** Enforcement, Regulatory research, analysis, and monitoring
**Task Description:** To create an open source platform that can receive and store standard air traveler information (Advanced Passenger Information (API) and Passenger Name Record (PNR)) enabling real-time risk-modeling.
**Method:** Regression
**Data Type:** Text
**Implementation Stage:** Planning
**Developer:** Commercial Contractor
**Level of Sophistication:** Insufficient detail


**Use Case #54**
**Agency:** Department of Homeland Security
**Subagency:** United States Customs and Border Protection
**Policy Area:** Law Enforcement
**Task:** Enforcement
**Task Description:** To identify travelers and cargo that present security risks.
**Method:** Data Unavailable
**Data Type:** Structured
**Implementation Stage:** Piloting or Partially Deployed
**Developer:** In-House
**Level of Sophistication:** Insufficient detail

**Citation:** Chinmayi Sharma, The National Vetting Enteprise: Artificial Intelligence and Immigration Enforcement, Lawfare (Jan. 8, 2019), https://www.lawfareblog.com/national-vetting-enterprise-artificial-intelligence-and-immigration-enforcement (detailing ICE’s piloting, but eventual rejection, of unspecified machine learning methods to perform “vetting” of immigrants, particularly regarding social media data)

**Use Case #55**
**Agency:** Department of Homeland Security
**Subagency:** United States Immigration and Customs Enforcement
**Policy Area:** Law Enforcement
**Task:** Enforcement
**Task Description:** To create a predictive risk assessment platform using social media
**Method:** Classification
**Data Type:** Text
**Implementation Stage:** Planning
**Developer:** Commercial Contractor
**Level of Sophistication:** Insufficient detail


**Use Case #56**
**Agency:** Department of Homeland Security
**Subagency:** United States Secret Service
**Policy Area:** Law Enforcement
**Task:** Enforcement
**Task Description:** To develop facial recognition at the White House complex.
**Method:** Classification
**Data Type:** Images
**Implementation Stage:** Planning
**Developer:** In-House
**Level of Sophistication:** Insufficient detail

**Citation:** Department of Homeland Security, DHS/USSS/PIA-024, Facial Recognition Pilot (Nov. 26, 2018), https://www.dhs.gov/publication/dhsusssvia-024-facial-recognition-
pilot (describing, at page 2, Secret Service piloting of “facial recognition algorithms” to identify facial images among agency volunteers).

**Use Case #57**  
**Agency:** Department of Homeland Security  
**Subagency:** N/A  
**Policy Area:** Law Enforcement  
**Task:** Internal management  
**Task Description:** To deploy thousands of rules to instantly defend against complex DDoS attacks at very high speeds.  
**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Piloting or Partially Deployed  
**Developer:** In-House  
**Level of Sophistication:** Insufficient detail  
**Citation:** U.S. House of Representatives, Committee on Oversight and Government Reform, Game Changers: Artificial Intelligence Part II, Artificial Intelligence and the Federal Government (Mar. 7, 2018) (noting, at page 30, use of “machine learning” to counter distributive denial of service attacks)

**Use Case #58**  
**Agency:** Department of Homeland Security  
**Subagency:** N/A  
**Policy Area:** Law Enforcement  
**Task:** Public services and engagement  
**Task Description:** To gather and synthesize data for first responders  
**Method:** Classification  
**Data Type:** Audio  
**Implementation Stage:** Piloting or Partially Deployed  
**Developer:** In-House  
**Level of Sophistication:** Insufficient detail  
**Citation:** U.S. House of Representatives, Committee on Oversight and Government Reform, Game Changers: Artificial Intelligence Part II, Artificial Intelligence and the Federal Government (Mar. 7, 2018) (noting, at page 30, the use of a “machine learning-based policy engine” for TDoS protection)

**Use Case #59**  
**Agency:** Department of Homeland Security  
**Subagency:** N/A  
**Policy Area:** Law Enforcement  
**Task:** Internal management, Public services and engagement  
**Task Description:** To provide TDoS (Telephony Denial of Service) protection: defend 911 centers against life-threatening distributed denial-of-service attacks, identify, categorize, and score adversarial telephony denial-of-service techniques.  
**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Piloting or Partially Deployed  
**Developer:** In-House  
**Level of Sophistication:** Insufficient detail  
**Citation:** U.S. House of Representatives, Committee on Oversight and Government Reform, Game Changers: Artificial Intelligence Part II, Artificial Intelligence and the Federal Government (Mar. 2018) (noting, at page 30, the use of a “machine learning-based policy engine” for TDoS protection)

**DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT**

**Use Case #60**  
**Agency:** Department of Housing and Urban Development  
**Subagency:** Federal Housing Administration  
**Policy Area:** Housing  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To assist with credit risk determination  
**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Fully deployed  
**Developer:** In-House  
**Level of Sophistication:** Lower  
**Citation:** Federal Housing Administration, Fiscal Year 2015 Annual Management Report (2015) https://www.hud.gov/sites/documents/FHAFY2015ANNUALMGMNTRPT1.PDF (scoring algorithm to measure credit risk and the probability of a loan “claiming”)
**Use Case #61**

Agency: Department of Housing and Urban Development  
Subagency: N/A  
Policy Area: Housing  
Task: Public services and engagement  
**Task Description:** To assist citizens looking for information about rental assistance, information about HUD programs, and procedures for sending discrimination complaints.  
Method: Structured Prediction  
Data Type: Text  
**Implementation Stage:** Piloting or Partially Deployed  
Developer: Commercial Contractor  
**Level of Sophistication:** Medium  
**Citation:** HUD Customer Service Bot (undated), https://hud-rental-assistance-bot.herokuapp.com/ (offering "test bot")

---

**DEPARTMENT OF JUSTICE**

**Use Case #63**

Agency: Department of Justice  
Subagency: Federal Bureau of Investigation  
Policy Area: Law Enforcement  
Task: Enforcement  
**Task Description:** To aid with biometrics (Iris and fingerprint matching), as well as facial recognition  
Method: Classification  
Data Type: Images  
**Implementation Stage:** Fully deployed  
Developer: In-House  
**Level of Sophistication:** Insufficient detail  
**Citation:** Federal Bureau of Investigation, Next Generation Identification (NGI), https://www.fbi.gov/services/cjis/fingerprints-and-other-biometrics/ngi (noting FBI system featuring a “new fingerprint matching algorithm”)

**Use Case #64**

Agency: Department of Justice  
Subagency: Federal Bureau of Investigation  
Policy Area: Law Enforcement  
Task: Enforcement  
**Task Description:** To identify altered fingerprints  
Method: Classification  
Data Type: Images  
**Implementation Stage:** Planning  
Developer: Commercial Contractor  
**Level of Sophistication:** Insufficient detail  
**Citation:** Department of Justice, FBI Seeks AI Solutions for Altered Fingerprint Detection (Aug. 2018), https://intelligencecommunitynews.com/fbi-seeks-ai-solutions-for-altered-fingerprint-detection/ (noting the need to develop “AI to enable the NGI System to detect and match not only the alteration types the algorithm has been coded to detect and match, but also new alteration types the algorithm has not previously received”)
Use Case #65
Agency: Department of Justice
Subagency: Federal Bureau of Investigation
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To identify terrorist financing
Method: Data Unavailable
Data Type: Structured, Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Federal Bureau of Investigation, Before the House Committee on Government Reform Subcommittee on Government Efficiency and Financial Management and Subcommittee on Technology Policy and the Census (Dec 2003) https://archives.fbi.gov/archives/news/testimony/information-technology-enhancing-interagency-cooperation (discussing “targeted, predictive pattern recognition algorithms” and continues that the “PEG will shortly begin a pilot testing of this capability to include the utilization of artificial intelligence and robotic searching models”)

Use Case #66
Agency: Department of Justice
Subagency: Federal Bureau of Investigation
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To conduct facial recognition from a mugshot database
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Federal Bureau of Investigation, Next Generation Identification (NGI), https://www.fbi.gov/services/cjis/fingerprints-and-other-biometrics/ngi (noting FBI system featuring “facial recognition search”)

Use Case #67
Agency: Department of Justice
Subagency: Office of Justice Programs
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To conduct facial detection, recognition, and identification using low quality or obscured images
Method: Regression
Data Type: Images
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail
Citation: National Institute of Justice, Using Artificial Intelligence to Address Criminal Justice Needs (Oct. 8, 2018), https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justice-needs#note12 (noting use of “AI-based facial recognition algorithms”)

Use Case #68
Agency: Department of Justice
Subagency: Office of Justice Programs
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To identify cases of likely victims of human trafficking and those who victimize them using machine learning and social network analysis.
Method: Structured Prediction
Data Type: Text
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail
Citation: National Institute of Justice, Combating Human Trafficking Using Structural Information in Online Review Sites (2018), https://external.ojp.usdoj.gov/selector/awardDetail?awardNumber=2018-75-CX-0031&fiscalYear=2018&applicationNumber=2018-91005-GA-IJ&programOffice=NIJ&po=NIJ (noting contract award to develop “machine learning models. . .trained using a ground truth dataset” to classify online reviews for possible human trafficking)
Use Case #69
Agency: Department of Justice
Subagency: Office of Justice Programs
Policy Area: Law Enforcement
Task: Regulatory research, analysis, and monitoring
Task Description: To evaluate the impact of intrinsic factors (sex, population affiliation, and indicators of pathology/stress) and extrinsic factors of variation (Human Development Index [HDI] and Gini index, as indicators of life quality and social inequality, respectively) on juvenile age estimation at both local and global levels.
Method: Regression
Data Type: Structured
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Lower
Citation: Department of Justice Office of Justice Programs, Quantifying the Impact of Intrinsic and Extrinsic Factors to Improve Juvenile Age Estimation (2017), https://nij.ojp.gov/funding/awards/2017-dn-bx-0144 (noting the use of “transition analysis and neural network algorithms ... to construct population-specific and universal models for age estimation”)

Use Case #70
Agency: Department of Justice
Subagency: Office of Justice Programs
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To quantify and map gang activity in order to predict emerging areas of gang conflict.
Method: Structured Prediction
Data Type: Structured
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Medium
Citation: Department of Justice, Office of Justice Programs, Chicago Police Department’s Predictive Policing Demonstration and Evaluation Program (2019), https://home.chicagopolice.org/wp-content/uploads/2019/01/FACT-SHEET-Crime-and-Victimization-Risk-Model-1.pdf (noting, at page 4, that the model’s “form and its parameters were learned empirically as part of model training”)

Use Case #71
Agency: Department of Justice
Subagency: Office of Justice Programs
Policy Area: Law Enforcement
Task: Enforcement
Task Description: To facilitate gunshot detection
Method: Classification
Data Type: Audio
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail
Citation: Department of Justice Office of Justice Programs, Development of Computational Methods for the Audio Analysis of Gunshots (May 2019), https://www.ncjrs.gov/pdffiles1/nij/grants/252947.pdf (noting, at page 1, use of “a fine-grained mathematical representation of the frequency spectrum with a series of advanced machine learning techniques for clustering and pattern recognition”)

Use Case #72
Agency: Department of Justice
Subagency: Office of Justice Programs
Policy Area: Law Enforcement
Task: Enforcement, Regulatory research, analysis, and monitoring
Task Description: To produce an empirically-tested dynamic risk assessment protocol to anticipate the imminent risk of violence, and a computationally efficient tool based on this new protocol that enables law enforcement to mine, monitor, and screen for the occurrence of risk indicators in large law enforcement databases.
Method: Classification
Data Type: Structured
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail
Citation: Department of Justice Office of Justice Programs, Dynamic, Graph-Based Risk Assessments for the Detection of Violent Extremist Radicalization Trajectories Using Large Scale
Social and Behavioral Data (2017), https://nij.ojp.gov/funding/awards/2017-za-cx-0002 (noting in the award description that “machine learning will be applied to the enhanced database of behavioral indicators to develop algorithms for the dynamic risk assessment tool”)

**Use Case #73**

**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To enable the tracking of an individual across surveillance video from cameras with non-overlapping fields of view over a wide area.  
**Method:** Regression  
**Data Type:** Images  
**Implementation Stage:** Planning  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Insufficient detail  
**Citation:** Department of Justice, Office of Justice Programs, Learning Models for Predictive Behavioral Intent and Activity Analysis in Wide Area Video Surveillance (Oct. 2016), https://www.ncjrs.gov/pdffiles1/nij/grants/250273.pdf (noting, on page 3, that the objective of the program is “to develop an intelligent, non-obtrusive, real-time, continuous monitoring system for assessing activity and predicting emergent suspicious and criminal behavior across a network of distributed cameras”)

**Use Case #74**

**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To refine DNA analysis, especially in cases involvingDNA from multiple individuals  
**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Planning  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Insufficient detail  
**Citation:** Department of Justice Office of Justice Programs, Using Artificial Intelligence to Address Criminal Justice Needs (Oct. 8, 2018), https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justice-needs (noting that research project combines “the strengths of approaches involving human analysts with data mining and AI algorithms”)

**Use Case #75**

**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To refine DNA analysis, especially in cases involvingDNA from multiple individuals  
**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Planning  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Insufficient detail  
**Citation:** Department of Justice Office of Justice Programs, Research and Evaluation on the Abuse, Neglect and Exploitation of Elderly Individuals and Residents of Residential Care Facilities (May 2013) https://nij.ojp.gov/funding/opportunities/nij-2013-3459 (noting in the project description that “Bayesian model averaging, which provides the most accurate set of risk factors when using predictive models, will be used to determine the best set of risk factors”)

**Use Case #76**

**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To identify victim, perpetrator and community-level and sociocultural risk factors for elder financial exploitation in order to inform the development of targeted public service announcements as well as to enhance law enforcement prevention efforts.  
**Method:** Classification  
**Data Type:** Structured

**Implementation Stage:** Planning  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Insufficient detail  
**Citation:** Department of Justice Office of Justice Programs, Research and Evaluation on the Abuse, Neglect and Exploitation of Elderly Individuals and Residents of Residential Care Facilities (May 2013) https://nij.ojp.gov/funding/opportunities/nij-2013-3459 (noting in the project description that “Bayesian model averaging, which provides the most accurate set of risk factors when using predictive models, will be used to determine the best set of risk factors”)

**Use Case #76**

**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To discover knowledge and recognize patterns from online data across dark web and Internet that could provide valuable investigative leads, which might greatly facilitate law enforcement preventing, responding to, and disrupting the networks of opioid trafficking. This
project will design and develop an intelligent system (named AlphaDetective) leveraging the latest advances in artificial intelligence technologies to automate the analysis of these data and link participants on the dark web to the Internet to provide timely investigative leads to law enforcement in the U.S.

**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Planning  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Insufficient detail  
**Citation:** Department of Justice Office of Justice Programs, Using Artificial Intelligence Technologies to Expose Darknet Opioid Traffickers (2018), https://nij.ojp.gov/funding/awards/2018-75-cx-0032 (noting a grant to utilize “Artificial Intelligence (AI) technologies to discover knowledge and recognize patterns from online data across dark web”)

**Use Case #77**  
**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To identify a license plate from low quality images  
**Method:** Classification  
**Data Type:** Images  
**Implementation Stage:** Planning  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Higher  
**Citation:** National Institute of Justice, Using Artificial Intelligence to Address Criminal Justice Needs (Oct. 8, 2018), https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justice-needs#note13 (noting use of “algorithms” in NIJ overview of AI applications to criminal justice)

**Use Case #78**  
**Agency:** Department of Justice  
**Subagency:** Office of Justice Programs  
**Policy Area:** Law Enforcement  
**Task:** Enforcement  
**Task Description:** To provide text describing objects and relationships between them for crime detection.  
**Method:** Classification  
**Data Type:** Images  
**Implementation Stage:** Fully deployed  
**Developer:** Non-Commercial Collaboration  
**Level of Sophistication:** Higher  
**Citation:** National Institute of Justice, Using Artificial Intelligence to Address Criminal Justice Needs (Oct. 8, 2018), https://nij.ojp.gov/topics/articles/using-artificial-intelligence-address-criminal-justice-needs#note12 (noting use of “algorithms” in NIJ overview of AI applications to criminal justice)

**DEPARTMENT OF LABOR**

**Use Case #79**  
**Agency:** Department of Labor  
**Subagency:** Bureau of Labor Statistics  
**Policy Area:** Labor and Employment  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To establish an Automated Coding of Worker Injury Narratives  
**Method:** Classification  
**Data Type:** Text  
**Implementation Stage:** Fully deployed  
**Developer:** In-House  
**Level of Sophistication:** Higher  
**Citation:** U.S. Bureau of Labor Statistics, Deep Neural Networks for Worker Injury Autocoding (Sep. 2017), https://www.bls.gov/iif/deep-neural-networks.pdf (noting, at page 2, “the limitations of SOII’s existing autocoders and then [discussing] a new neural network autocoder that demonstrates substantial improvements”)

**Use Case #80**  
**Agency:** Department of Labor  
**Subagency:** Bureau of Labor Statistics  
**Policy Area:** Labor and Employment  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To conduct research related to the consumer price index
Method: Regression
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Lower
Citation: U.S. Bureau of Labor Statistics, Price and Index Number Research, https://www.bls.gov/pir/overview.htm (noting research using "machine learning algorithms" to perform CPI quality adjustment analysis)

Use Case #81
Agency: Department of Labor
Subagency: Bureau of Labor Statistics
Policy Area: Labor and Employment
Task: Regulatory research, analysis, and monitoring
Task Description: To learn about Respondents’ Characteristics Using Standard Exploratory Data Analysis (EDA) Tools and interpret nonresponse rates.
Method: Classification, Regression, Clustering
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Lower

Use Case #82
Agency: Department of Labor
Subagency: Bureau of Labor Statistics
Policy Area: Labor and Employment
Task: Regulatory research, analysis, and monitoring
Task Description: To model topics in survey interviewer notes for the Consumer Expenditure Interview Survey
Method: Clustering
Data Type: Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Lower

Use Case #83
Agency: Department of Labor
Subagency: Bureau of Labor Statistics
Policy Area: Labor and Employment
Task: Regulatory research, analysis, and monitoring
Task Description: To code worker injury narratives.
Method: Regression
Data Type: Text
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Higher

Use Case #84
Agency: Department of Labor
Subagency: Mine Safety and Health Administration
Policy Area: Labor and Employment
Task: Enforcement, Regulatory research, analysis, and monitoring
Task Description: To predict whether or not a fatal or serious disabling injury is more likely to occur in the following 12-month period.
Method: Regression
Data Type: Structured, Text
Implementation Stage: Piloting or Partially Deployed
Developer: Commercial Contractor
Level of Sophistication: Lower
Citation: Mine Safety and Health Administration, Predictive Analytics with Administrative Data from the Mine Safety and Health Administration (March 2016), https://nces.ed.gov/
**DEPARTMENT OF THE INTERIOR**

**Use Case #85**
**Agency:** Department of the Interior  
**Subagency:** United States Fish and Wildlife Service  
**Policy Area:** Environment  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To create population genetics model for lake trout  
**Method:** Classification  
**Data Type:** Structured  
**Implementation Stage:** Fully deployed  
**Developer:** In-House  
**Level of Sophistication:** Lower  
**Citation:** United States Fish and Wildlife Service, Comparisons of Likelihood and Machine Learning Methods of Individual Classification (July 2002), https://www.fws.gov/lab/pdfs/Guinand_etal.2002.pdf (noting, at page 1, the use of “different nonparametric machine learning techniques with parametric likelihood estimations commonly employed in population genetics for purposes of assigning individuals to their population of origin”)

**Use Case #86**
**Agency:** Department of the Interior  
**Subagency:** United States Fish and Wildlife Service  
**Policy Area:** Environment  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To help the Kenai National Wildlife Refuge staff model bird, arthropod, and plant distributions using data collected as part of our Long-Term Ecological Monitoring program (LTEMP).  
**Method:** Regression  
**Data Type:** Structured, Images  
**Implementation Stage:** Fully deployed  
**Developer:** In-House  
**Level of Sophistication:** Medium  
**Citation:** United States Fish & Wildlife Service, Species Distribution and Climate Envelope Models (undated), https://www.fws.gov/refuge/Kenai/what_we_do/science/models.html (noting use of random forest machine-learning models)

**Use Case #87**
**Agency:** Department of the Interior  
**Subagency:** United States Geological Survey  
**Policy Area:** Environment  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To describe migration phenologies. For example, can we provide a probabilistic description of migration events that can be validated by our field studies?  
**Method:** Structured Prediction  
**Data Type:** Images  
**Implementation Stage:** Planning  
**Developer:** In-House  
**Level of Sophistication:** Insufficient detail  
**Citation:** United States Geological Survey, Evaluating Habitat Use by Pelagic Birds on the Western Great Lakes, and Airspace Use of Migrant Songbirds Near and Over the Western Great Lakes, https://www.usgs.gov/centers/umesc/science/evaluating-habitat-use-pelagic-birds-western-great-lakes-and-airspace-use?qt-science_center_objects=0#qt-science_center_objects (noting possible application of “machine learning algorithms to weather stations around the Great Lakes to describe migration phenologies”)

**Use Case #88**
**Agency:** Department of the Interior  
**Subagency:** United States Geological Survey  
**Policy Area:** Environment  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To track images of croplands across the globe. This is the baseline product of the GFSAD30 Project.  
**Method:** Classification  
**Data Type:** Images  
**Implementation Stage:** Fully deployed  
**Developer:** In-House  
**Level of Sophistication:** Medium  
**Citation:** United States Geological Survey, Global Food Security-Support Analysis Data at 30 m, https://www.usgs.gov/
centers/wgsc/science/global-food-security-support-analysis-data-30-m?qt-science_center_objects=0#qt-science_center_objects (noting GFSAD use of “machine learning algorithms on Google Earth Engine cloud computing platform”)

Use Case #89
Agency: Department of the Interior
Subagency: United States Geological Survey
Policy Area: Environment
Task: Regulatory research, analysis, and monitoring
Task Description: To predict landslides and natural hazards
Method: Classification
Data Type: Images
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail

Use Case #90
Agency: Department of the Interior
Subagency: United States Geological Survey
Policy Area: Environment
Task: Regulatory research, analysis, and monitoring
Task Description: To determine water quality and create water quality models using machine learning techniques
Method: Regression
Data Type: Structured, Text, Images
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Medium

Use Case #91
Agency: Department of the Interior
Subagency: United States Geological Survey
Policy Area: Environment
Task: Regulatory research, analysis, and monitoring
Task Description: To develop and demonstrate an automated Cropland Classification Algorithm (ACCA) that will rapidly, routinely, and accurately classify agricultural cropland extent, areas, and characteristics (e.g., irrigated vs. rainfed) over large areas such as a country or a region.
Method: Classification
Data Type: Structured, Images
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Lower
Citation: Prasad S. Themkabail & Shuoting Wu, An Automated Cropland Classification Algorithm (ACCA) for Tajikistan by Combining Landsat, MODIS, and Secondary Data, 4 Remote Sensing 2890 (2012), https://pubs.er.usgs.gov/publication/70098947 (noting use of “classification algorithm”)

Use Case #92
Agency: Department of the Interior
Subagency: United States Geological Survey
Policy Area: Environment
Task: Regulatory research, analysis, and monitoring
Task Description: To help predict soil types and properties between field observations of soils.
Method: Data Unavailable
Data Type: Structured, Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Medium
Citation: United States Geological Survey, Digital Soil Mapping: High Resolution Maps for Modern Land Management
Decisions (undated but listed as active), https://www.usgs.gov/centers/sbsc/science/digital-soil-mapping-high-resolution-maps-modern-land-management-decisions?qt-science_center_objects=0#qt-science_center_objects (noting use of random forest machine learning models)

Use Case #93
Agency: Department of the Interior
Subagency: United States Geological Survey
Policy Area: Environment
Task: Regulatory research, analysis, and monitoring
Task Description: To build a novel, first-of-its-kind, global hyperspectral imaging spectral-library of agricultural crops
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Medium
Citation: United States Geological Survey, Global Hyperspectral Imaging Spectroscopy of Agricultural-Crops & Vegetation (GHISA) (undated, but listed as active), https://www.usgs.gov/centers/wgsc/science/global-hyperspectral-imaging-spectroscopy-agricultural-crops-vegetation-ghisa?qt-science_center_objects=0#qt-science_center_objects (noting use of “machine learning algorithms (e.g., Support Vector Machines)”)

Use Case #94
Agency: Department of the Interior
Subagency: United States Geological Survey
Policy Area: Environment
Task: Regulatory research, analysis, and monitoring
Task Description: To initiate analysis of the natural and anthropogenic consequences of extensive ore and trace mineralization in the southern midcontinent of the U.S.
Method: Data Unavailable
Data Type: Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: United States Geological Survey, Geochemical Signatures and Environmental Impacts of Ore and Trace Mineralization in the Southern Midcontinent (undated, but listed as active), https://www.usgs.gov/energy-and-minerals/mineral-resources-program/science/geological-signatures-and-environmental?qt-science_center_objects=0#qt-science_center_objects (noting use of machine learning techniques)

DEPARTMENT OF THE TREASURY

Use Case #95
Agency: Department of the Treasury
Subagency: Internal Revenue Service
Policy Area: Financial Regulation
Task: Internal management
Task Description: To proactively detect and respond to cyber- and insider-related threats
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Internal Revenue Service, Advanced Analytics, Artificial Intelligence and Machine Learning Capabilities for the Cybersecurity Cloud Solution Program (Dec 2018), https://beta.sam.gov/opp/d5df279d2729d1c5b70d71b1b8c3dbf3/view (noting “need for an Artificial Intelligent (AI) machine-based analytical platform to proactively detect and respond to cyber- and insider-related threats”)

Use Case #96
Agency: Department of the Treasury
Subagency: Internal Revenue Service
Policy Area: Financial Regulation
Task: Enforcement
Task Description: To assess risk of fraudulent returns
Method: Classification
Data Type: Structured
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Treasury Inspector General for Tax Administration, The Return Review Program Increases Fraud Detection;

DEPARTMENT OF TRANSPORTATION

Use Case #97
Agency: Department of Transportation
Subagency: Federal Aviation Administration
Policy Area: Transportation
Task: Regulatory research, analysis, and monitoring, Public services and engagement
Task Description: To continually sample information about one’s own vehicle and nearby aircraft, then use that data as the basis for calculations to determine the best course. The idea is to avoid collisions while minimizing the number of recommended maneuvers that the human pilot or the drone’s autopilot must make.
Method: Regression
Data Type: Structured
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Higher

Use Case #98
Agency: Department of Transportation
Subagency: Federal Highway Administration
Policy Area: Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To enable transportation professionals to more accurately model lane-changing behavior on freeways
Method: Regression
Data Type: Images
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail

Use Case #100
Agency: Department of Transportation
Subagency: Federal Transit Administration
Policy Area: Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To train statistical models to predict crashes. To understand the relationship pedestrian fatalities may have with transportation system and built environment characteristics. This pilot has laid the foundation needed for a future nationwide scale-up of a crash count tool.
Method: Regression
Citation: James Colyar, FHWA Traffic Analysis Tools & NGSIM Program (Apr. 19, 2006), https://www.webpages.uidaho.edu/niatt/Internal/directors_notes/UIdaho%200406_NGSIM%20and%20Simulation_JColyar.pdf (noting agency development of “a core of driver behavior algorithms”)
Data Type: Structured, Images
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Medium

DEPARTMENT OF VETERANS AFFAIRS

Use Case #101
Agency: Department of Veterans Affairs
Subagency: N/A
Policy Area: Social Welfare
Task: Regulatory research, analysis, and monitoring, Public services and engagement
Task Description: To understand and strengthen veterans’ mental and emotional wellbeing particularly in the transition from active duty to civilian life using a digital assistant powered by IBM’s Watson.
Method: Data Unavailable
Data Type: Text
Implementation Stage: Piloting or Partially Deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: U.S. Department of Veterans Affairs, VA Partners with Tech Companies to Prevent Veteran Suicide, VA Blog (undated), https://www.blogs.va.gov/VAntage/56574/va-partners-tech-companies-prevent-veteran-suicide/ (noting incorporation of IBM Watson)

Use Case #102
Agency: Department of Veterans Affairs
Subagency: N/A
Policy Area: Social Welfare
Task: Regulatory research, analysis, and monitoring, Public services and engagement
Task Description: To build a medical knowledge graph with deep learning to inform medical decision-making and train artificial intelligence (AI) to personalize care plans.
Method: Classification
Data Type: Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: U.S. Department of Veterans Affairs Will Collaborate with Flow Health to Bring Artificial Intelligence and Precision Medicine to Veterans, BusinessWire (Nov. 29, 2016), https://www.businesswire.com/news/home/20161129005475/en/U.S.-Department-Veterans-Affairs-Collaborate-Flow-Health (noting five-year contract to develop a “deep learning” system for personalizing veteran care plans)

Use Case #103
Agency: Department of Veterans Affairs
Subagency: N/A
Policy Area: Social Welfare
Task: Public services and engagement
Task Description: To assist VA agents and Veterans / caregivers using either a chat or voice interface. AI can be trained to answer commonly asked questions, assist users in properly filling out forms, respond to routine issues, and assist VA agents to quickly locate key information relevant to a customer’s specific concern. Initially, AI must be taught using assisted learning, but once it is put into production it can learn over time to both expand and improve its own capabilities.
Method: Data Unavailable
Data Type: Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Department of Veterans Affairs, Request for Information, Improved Veteran Experience Through Use of Artificial Intelligence (AI) (July 2018), https://www.vendorportal.ecms.va.gov/ FBODocumentServer/DocumentServer.aspx?DocumentId=4453008&FileName=36C10B18Q2991-000.docx (requesting proposals for an AI-based “chat or voice interface”)
**Use Case #104**
Agency: Department of Veterans Affairs  
Subagency: N/A  
Policy Area: Social Welfare  
Task: Regulatory research, analysis, and monitoring, Public services and engagement  
Task Description: To identify risk factors for patient deterioration and predict its onset  
Method: Classification  
Data Type: Text  
Implementation Stage: Piloting or Partially Deployed  
Developer: Commercial Contractor  
Level of Sophistication: Insufficient detail  
Citation: U.S. Department of Veterans Affairs, VA Partners with DeepMind to Build Machine Learning Tools to Identify Health Risks for Veterans (Feb. 21, 2018), https://www.va.gov/opa/pressrel/pressrelease.cfm?id=4013 (noting use of “machine learning algorithms”)

**Use Case #105**
Agency: Department of Veterans Affairs  
Subagency: N/A  
Policy Area: Social Welfare  
Task: Regulatory research, analysis, and monitoring, Public services and engagement  
Task Description: To identify veterans who are at elevated risk for suicide.  
Method: Regression  
Data Type: Text  
Implementation Stage: Fully deployed  
Developer: In-House  
Level of Sophistication: Lower  
Citation: Ronald C. Kessler et al., Developing a Practical Suicide Risk Prediction Model for Targeting High-Risk Patients in the Veterans Health Administration, 26 Int’l J. Methods Psychiatric Res. (July 2014), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5614864/ (noting deployment of “commonly-used machine learning algorithms,” including “Bayesian additive regression trees”)

**ENVIRONMENTAL PROTECTION AGENCY**

**Use Case #106**
Agency: Environmental Protection Agency  
Subagency: N/A  
Policy Area: Environment, Science  
Task: Enforcement, Regulatory research, analysis, and monitoring  
Task Description: To predict toxicities in chemical compounds; flags for further in-depth analysis by agency  
Method: Clustering  
Data Type: Structured  
Implementation Stage: Fully deployed  
Developer: In-House  
Level of Sophistication: Lower  
Citation: George Helman et al., Generalised Read-Across GenRA, Research, Implementation and Practical Application, Oct. 30, 2018, https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NCCT&dirEntryId=342367 (describing nearest neighbor algorithm for generalized read-across or toxicity); Lisa Truong et al., Quantitative Predictive Models for Systemic Toxicity, https://figshare.com/articles/Quantitative_Predictive_Models_for_Systemic_Toxicity/5178820 (detailing ToxCast modeling effort applying machine learning techniques, including train-test split and validation)

**EQUAL EMPLOYMENT OPPORTUNITY COMMISSION**

**Use Case #107**
Agency: Equal Employment Opportunity Commission  
Subagency: N/A  
Policy Area: Labor and Employment  
Task: Enforcement, Regulatory research, analysis, and monitoring  
Task Description: To predict groups in specific industries that may be susceptible to facing workplace discrimination  
Method: Data Unavailable  
Data Type: Structured, Text  
Implementation Stage: Planning  
Developer: In-House  
Level of Sophistication: Insufficient detail
EXECUTIVE OFFICE FOR IMMIGRATION REVIEW

Use Case #108
Agency: Executive Office for Immigration Review
Subagency: N/A
Policy Area: Law Enforcement
Task: Internal management
Task Description: To automate technology business management and analyze technology costs
Method: Classification, Clustering
Data Type: Structured, Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail

Citation: Apptio, Apptio Introduces Machine Learning and Intelligence Analytics to Automate and Simplify TBM Across U.S. Federal Agencies, PRNewswire (July 11, 2018), https://www.apptio.com/company/news/press-releases/apptio-introduces-machine-learning-and-intelligent-analytics-to-automate-and-simplify-tbm-across-u.s.-federal-agencies/ (noting use of “[m]achine learning capabilities” within software platform and noting FedRAMP certification and work “with many federal agencies, including the General Services Administration, OMB, Department of Veterans Affair (VA), Department of Homeland Security (DHS), the Department of Justice’s Executive Office for Immigration Review (DOJ - EOIR), and more”)

FEDERAL COMMUNICATIONS COMMISSION

Use Case #109
Agency: Federal Communications Commission
Subagency: N/A
Policy Area: Communications
Task: Public services and engagement
Task Description: To facilitate auctioning of unneeded airwaves
Method: Structured Prediction
Data Type: Structured
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail


FEDERAL DEPOSIT INSURANCE CORPORATION

Use Case #110
Agency: Federal Deposit Insurance Corporation
Subagency: N/A
Policy Area: Financial Regulation
Task: Regulatory research, analysis, and monitoring
Task Description: To identify “systemically important financial institutions (SIFIs)” with risk of default so FDIC could undertake necessary preparatory actions for resolution
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail

Citation: Federal Deposit Insurance Corporation, Office of Inspector General, The FDIC’s Risk Monitoring of Systemically Important Financial Institutions Proximity and Speed to

**FEDERAL RAILROAD ADMINISTRATION**

*Use Case #111*

**Agency:** Federal Railroad Administration  
**Subagency:** N/A  
**Policy Area:** Transportation  
**Task:** Regulatory research, analysis, and monitoring  
**Task Description:** To conduct risk analysis of broken rails due to rail defects  
**Method:** Data Unavailable  
**Data Type:** Images  
**Implementation Stage:** Piloting or Partially Deployed  
**Developer:** In-House  
**Level of Sophistication:** Insufficient detail  
**Citation:** Federal Railroad Administration, Artificial Intelligence Research at FRA (June 2019), https://www.its.dot.gov/presentations/itsa_2019/Baillargeon_ITS19_20190523.pdf (noting, on slide 4 under strategic goals for AI, the development of “AI-based Risk Analyses & Processing”)

**GENERAL SERVICES ADMINISTRATION**

*Use Case #112*

**Agency:** General Services Administration  
**Subagency:** Office of Acquisition Policy  
**Policy Area:** Other  
**Task:** Internal management  
**Task Description:** To create a fully interoperable talent management capability  
**Method:** Data Unavailable  
**Data Type:** Text  
**Implementation Stage:** Planning  
**Developer:** Commercial Contractor  
**Level of Sophistication:** Insufficient detail  
**Citation:** General Services Administration Office of Acquisition Policy, U.S. General Services Administration and U.S. Office of Personnel Management FY 2020 Congressional Justification (March 2019), https://cdn.govexec.com/media/gbc/docs/pdfs_edit/031919ew1.pdf (noting, at pages 66-67, the “development of the End-to-End HR Service Delivery capability” that “will seek to provide a unified user experience with multifactor/single sign-on, adopt cloud characteristics and implement an initial set of advanced technologies such as talent analytics, robotics process automation, artificial intelligence/machine learning, or mobile capabilities”)

*Use Case #113*

**Agency:** General Services Administration  
**Subagency:** Office of Acquisition Policy  
**Policy Area:** Other  
**Task:** Public services and engagement, Internal management  
**Task Description:** To reduce the amount of human interaction required to review new proposal documents from solicitations, improve offeror experience during the new offer proposal process, and reduce the review time for new proposal reviews to award.  
**Method:** Data Unavailable  
**Data Type:** Text  
**Implementation Stage:** Planning  
**Developer:** Commercial Contractor  
**Level of Sophistication:** Insufficient detail  
**Citation:** GovTribe, FASTLane Automation RFQ (June 27, 2017), https://govtribe.com/opportunity/federal-contract-opportunity/fastlane-automation-rfq-qtf0017hm1000 (detailing GSA request for quotation for “automated machine learning technology” to analyze new procurement proposals)

**Use Case #114**

**Agency:** General Services Administration  
**Subagency:** Office of Assisted Acquisition Services  
**Policy Area:** Other  
**Task:** Public services and engagement  
**Task Description:** To help visitors to the Federal Help Desk get information, provide login support, and perform searches in a single communication channel  
**Method:** Structured Prediction  
**Data Type:** Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Medium
Citation: General Services Administration Office of Assisted Acquisition Services, Breaking into Artificial Intelligence: Meet Our USAGov ChatBot! (April 2019), https://blog.usa.gov/breaking-into-artificial-intelligence-meet-sam-the-chatbot ("In late 2018, we blended our exploration of AI and expertise in scams to launch our chatbot.")

Use Case #115
Agency: General Services Administration
Subagency: Office of Public Affairs
Policy Area: Other
Task: Internal management
Task Description: To automatically predict whether federal solicitations posted on fbo.gov are compliant with Section 508 of the Rehabilitation Act and alert responsible parties of non-compliance so that corrective actions could be taken.
Method: Classification
Data Type: Text
Implementation Stage: Piloting or Partially Deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: General Services Administration, Game Changers: Artificial Intelligence Part II (March 2018), https://www.gsa.gov/about-us/newsroom/congressional-testimony/game-changers-artificial-intelligence-part-ii-artificial-intelligence-and-the-federal-government (noting that "the SRT AI platform uses natural language processing, text mining, and machine learning algorithms to automatically predict whether federal solicitations posted on fbo.gov are compliant with Section 508 of the Rehabilitation Act and alert responsible parties of non-compliance so that corrective actions could be taken")

LEGAL SERVICES CORPORATION

Use Case #116
Agency: Legal Services Corporation
Subagency: N/A
Policy Area: Other
Task: Public services and engagement
Task Description: To identify legal problems and connect users to resources and services that fit their needs
Method: Data Unavailable
Data Type: Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Legal Services Corporation, Legal Navigator (2016), https://www.lsc.gov/simplifying-legal-help (noting use of “machine learning system,” including natural language processing, to power Legal Navigator, a “chatbot-like interface”)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Use Case #117
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To conduct more science, improve response to track science phenomena and natural hazards, and increase the efficiency of operations.
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: Non-Commercial Collaboration
Level of Sophistication: Higher
Citation: United States Senate, Hearing, The Dawn of Artificial Intelligence, Committee on Commerce, Science and Transportation, Subcommittee on Space, Science, and Competitiveness (Nov. 30, 2016) (noting, at p. 33, multiple uses of machine learning and other "AI-based software"); Jesse Emspak, With a Better Brain, Curiosity Mars Rover Picks Its Own Targets, Space.com (June 28, 2017), https://www.space.com/37326-curiosity-rover-picks-its-own-targets.html (noting computer vision applications and training protocols)
Use Case #118
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To enable collaboration between sensors in a network so that machine learning agents are able to autonomously improve performance
Method: Classification, Clustering
Data Type: Structured
Implementation Stage: Fully deployed
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail
Citation: National Aeronautics and Space Administration, CODEX Collaborative Learning for Sensor Networks, https://ml.jpl.nasa.gov/products/codex/codex.html (noting the creation of a “learning system that enables collaboration so that the agents can autonomously improve their performance”)

Use Case #119
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To automate the detection of clouds and distinguishing between different types of clouds and aerosols
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: National Aeronautics and Space Administration, Multi-angle Imaging Spectro Radiometer Automated Cloud Classification (Ongoing), https://ml.jpl.nasa.gov/projects/misr/misr.html (noting application of “machine learning technology to . . . complement the physics-based algorithms currently being used by scientists”)

Use Case #120
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring, Public services and engagement
Task Description: To provide situationally relevant info to flight crew
Method: Classification, Regression, Structured Prediction
Data Type: Structured, Text
Implementation Stage: Piloting or Partially Deployed
Developer: Commercial Contractor
Level of Sophistication: Higher
Citation: National Aeronautics and Space Administration, Pilot-Engaged Expert Response using IBM Watson Technology (Oct. 2018), https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20180007515.pdf (noting, at page 9, use of the Watson Discovery Advisor, a system “that orchestrates an ensemble of search technologies, natural language processing algorithms, and machine learning models, enabling users to find information in a large body of unstructured natural language text by posing simple, natural language questions to the system”)

Use Case #121
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To dynamically and autonomously detect changes in transient surface landmarks.
Method: Classification
Data Type: Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Higher
Citation: National Aeronautics and Space Administration, Detecting Transient Surface Features with Dynamic Landmarking (Oct. 2009), https://landmarks.jpl.nasa.gov/papers/wagstaff-PImeeting-09.pdf (noting, at page 11, the use of “k-nearest neighbors” to create a relative landmark graph)
Use Case #122
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To evaluate the geological data collected by the Mars rover to prioritize the data for transmission to Earth.
Method: Robotics
Data Type: Structured
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Higher

Use Case #123
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To improve the accuracy of predictions of future agricultural conditions
Method: Classification, Regression, Clustering
Data Type: Structured
Implementation Stage: Piloting or Partially Deployed
Developer: Non-Commercial Collaboration
Level of Sophistication: Medium
Citation: NASA Jet Propulsion Laboratory, Harvist Project Page (undated), https://harvist.jpl.nasa.gov/ (noting use of support vector machines and clustering)

Use Case #124
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To enable large-scale radio astronomy data analysis in real time
Method: Classification
Data Type: Images
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: NASA Jet Propulsion Lab, IMBUE: Machine Learning for Big Data Understanding and Explanation (undated), https://imbue.jpl.nasa.gov/ (noting multiple applications of machine learning in radio and optical astronomy)

Use Case #125
Agency: National Aeronautics and Space Administration
Subagency: N/A
Policy Area: Science, Transportation
Task: Regulatory research, analysis, and monitoring
Task Description: To elicit, model, and incorporate investigator preferences into fast, automated analysis in radio and optical astronomy
Method: Classification
Data Type: Images
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: NASA Jet Propulsion Lab, IMBUE: Machine Learning for Big Data Understanding and Explanation (undated), https://imbue.jpl.nasa.gov/ (noting multiple applications of machine learning in radio and optical astronomy)

Use Case #126
Agency: National Agricultural Statistics Service
Subagency: N/A
Policy Area: Agriculture
Task: Regulatory research, analysis, and monitoring
Task Description: To predict country yield of agricultural products based on weekly measurements of the Normalized Difference Vegetation Index (NDVI) during the growing season and temperature data from satellites over the past 6 years
Method: Regression
Data Type: Structured
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Lower

NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

Use Case #127
Agency: National Archives and Records Administration
Subagency: N/A
Policy Area: Other
Task: Internal management
Task Description: To organize and archive documents using natural language processing
Method: Data Unavailable
Data Type: Text
Implementation Stage: Fully deployed
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: National Archives and Records Administration, A Window on the Archives of the Future (Jan. 2011), https://www.tacc.utexas.edu/-/a-window-on-the-archives-of-the-future (describing a research “collaboration” between NARA and the University of Texas to use “alignment algorithms and Natural Language Processing methods” to organize archival records)

NATIONAL INSTITUTE OF FOOD AND AGRICULTURE

Use Case #128
Agency: National Institute of Food and Agriculture
Subagency: N/A
Policy Area: Agriculture, Science
Task: Regulatory research, analysis, and monitoring
Task Description: To conduct monitoring, analytics, and automation in precision crop agriculture and precision livestock farming. Provide solutions to AI challenges including testing, validation and effective implementation in agricultural applications.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: National Institute of Food and Agriculture, Agriculture and Food Research Initiative Competitive Grants Program (2018), https://nifa.usda.gov/sites/default/files/rfa/20190507-ly2019-afri-foundational-and-applied-science-ra.pdf (noting, at page 70, that the Foundational and Applied Science program is seeking “projects that apply artificial intelligence and machine learning for monitoring, analytics, and automation in precision crop agriculture and precision livestock farming”)

OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

Use Case #129
Agency: Office of the Director of National Intelligence
Subagency: Intelligence Advanced Research Projects Activity
Policy Area: Law Enforcement
Task: Enforcement, Internal management
Task Description: To combat Trojan attacks by inspecting other AIs for Trojans.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Medium
Citation: Office of the Director of National Intelligence, IARPA, Trojans in Artificial Intelligence (TrojAI) (2019), https://www.iarpa.gov/index.php/research-programs/trojai/trojai-baa (noting project, including calls for research proposals, to inspect AIs for trojans); trojai 0.2.10, https://pypi.org/project/trojai/#description (containing code that implements machine learning techniques)
**RAILROAD RETIREMENT BOARD**

**Use Case #130**  
Agency: Railroad Retirement Board  
Subagency: N/A  
Policy Area: Labor and Employment, Social Welfare  
Task: Internal management  
Task Description: To conduct automated code transformation  
Method: Data Unavailable  
Data Type: Text  
Implementation Stage: Planning  
Developer: Commercial Contractor  
Level of Sophistication: Insufficient detail  

**SECURITIES AND EXCHANGE COMMISSION**

**Use Case #131**  
Agency: Securities and Exchange Commission  
Subagency: Division of Economic and Risk Analysis  
Policy Area: Financial Regulation  
Task: Enforcement  
Task Description: To identify investment advisors who may be violating securities laws  
Method: Classification, Clustering  
Data Type: Structured, Text  
Implementation Stage: Fully deployed  
Developer: In-House  
Level of Sophistication: Insufficient detail  

**Use Case #132**  
Agency: Securities and Exchange Commission  
Subagency: Division of Economic and Risk Analysis  
Policy Area: Financial Regulation  
Task: Enforcement, Regulatory research, analysis, and monitoring  
Task Description: To analyze all transactions on the Consolidated Audit Trail System  
Method: Classification  
Data Type: Structured  
Implementation Stage: Planning  
Developer: In-House  
Level of Sophistication: Insufficient detail  
Citation: Scott Bauguess, U.S. Securities and Exchange Commission, Machine Learning, and AI in Assessing Risks: a Regulatory Perspective (June 21, 2017), https://www.sec.gov/news/speech/bauguess-big-data-ai (noting that substantial data infusion of Consolidated Audit Trail will require “the analytic methods we are currently developing to reduce the enormous datasets into usable patterns of results”)

**Use Case #133**  
Agency: Securities and Exchange Commission  
Subagency: Division of Economic and Risk Analysis  
Policy Area: Financial Regulation  
Task: Enforcement  
Task Description: To classify content in unstructured filings  
Method: Data Unavailable  
Data Type: Text  
Implementation Stage: Fully deployed  
Developer: Data Unavailable  
Level of Sophistication: Insufficient detail  
Use Case #134
Agency: Securities and Exchange Commission
Subagency: Division of Economic and Risk Analysis
Policy Area: Financial Regulation
Task: Enforcement
Task Description: To identify abnormal corporate issuer disclosures to predict misconduct.
Method: Classification
Data Type: Structured, Text
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Insufficient detail

Use Case #135
Agency: Securities and Exchange Commission
Subagency: Division of Enforcement
Policy Area: Financial Regulation
Task: Enforcement
Task Description: To evaluate hedge fund returns
Method: Regression
Data Type: Structured
Implementation Stage: Fully deployed
Developer: Data Unavailable
Level of Sophistication: Insufficient detail

Use Case #136
Agency: Securities and Exchange Commission
Subagency: Division of Enforcement
Policy Area: Financial Regulation
Task: Enforcement
Task Description: To identify suspicious trading activity and find connections among traders
Method: Classification, Clustering
Data Type: Structured, Text
Implementation Stage: Fully deployed
Developer: Data Unavailable
Level of Sophistication: Insufficient detail

Use Case #137
Agency: Securities and Exchange Commission
Subagency: Market Abuse Unit, Analytics and Detection Center
Policy Area: Financial Regulation
Task: Enforcement
Task Description: To detect instances of insider trading
Method: Classification
Data Type: Structured, Text
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Mary Jo White, Chair, U.S. Securities and Exchange Commission, Remarks at the International Institute for Securities Market Growth and Development (April 8, 2016), https://www.sec.gov/news/statement/statement-mjw-040816.html (noting use of “advanced data analytics” within ARTEMIS program)

Use Case #138
Agency: Securities and Exchange Commission
Subagency: Office of Compliance Inspections and Examinations
Policy Area: Financial Regulation
Task: Enforcement

Task Description: To analyze transaction data to identify front running, cherry picking, and window dressing.

Method: Classification

Data Type: Structured, Text

Implementation Stage: Fully deployed

Developer: In-House

Level of Sophistication: Insufficient detail


Use Case #139

Agency: Securities and Exchange Commission

Subagency: N/A

Policy Area: Financial Regulation

Task: Enforcement

Task Description: To assess risks of use of credit default swaps.

Method: Classification

Data Type: Text

Implementation Stage: Piloting or Partially Deployed

Developer: In-House

Level of Sophistication: Lower


Use Case #140

Agency: Securities and Exchange Commission

Subagency: N/A

Policy Area: Financial Regulation

Task: Enforcement

Task Description: To classify themes in tips, complaints, referrals (TCRs)

Method: Classification

Data Type: Text

Implementation Stage: Piloting or Partially Deployed

Developer: In-House

Level of Sophistication: Medium


SMALL BUSINESS ADMINISTRATION

Use Case #141

Agency: Small Business Administration

Subagency: N/A

Policy Area: Commerce

Task: Regulatory research, analysis, and monitoring

Task Description: To assess risk in loan operations and loan portfolios for SBA loans

Method: Regression

Data Type: Structured

Implementation Stage: Fully deployed

Developer: In-House

Level of Sophistication: Lower

Citation: Small Business Administration, SBA Lender Risk Rating System, 75 Federal Register 9257 (Mar. 1, 2010), https://www.sba.gov/sites/default/files/files/lender_risk_rating_system.pdf (noting purely predictive risk rating models)

SOCIAL SECURITY ADMINISTRATION

Use Case #142

Agency: Social Security Administration

Subagency: Office of the Inspector General

Policy Area: Social Welfare

Task: Adjudication

Task Description: To implement a program to automate the
initial disability claim decision, requiring human review only for denied claims

**Method:** Classification

**Data Type:** Structured, Text

**Implementation Stage:** Planning

**Developer:** In-House

**Level of Sophistication:** Insufficient detail

**Citation:** Social Security Administration, Implementation Of The Future Systems Technology Advisory Panel’s Recommendations (Aug 2012), https://oig.ssa.gov/sites/default/files/audit/full/pdf/A-14-12-11222_0.pdf (describing agency effort to “implement a program to automate the initial disability claim decision”)

**Use Case #143**

**Agency:** Social Security Administration

**Subagency:** N/A

**Policy Area:** Social Welfare

**Task:** Enforcement

**Task Description:** To identify disability insurance fraud. To implement a dynamic and flexible enterprise-wide anti-fraud solution that employs advanced data analytics to identify patterns indicative of fraud, improve the functionality for data-driven fraud activations, conduct real-time risk analysis, and integrate developing technology into our anti-fraud business processes.

**Method:** Classification

**Data Type:** Structured, Text

**Implementation Stage:** Piloting or Partially Deployed

**Developer:** Commercial Contractor

**Level of Sophistication:** Insufficient detail

**Citation:** Social Security Administration, Annual Performance Report, Fiscal Years 2017-2019 (Feb. 12, 2018), https://www.ssa.gov/budget/FY19Files/2019APR.pdf (noting, at pages 25-26, agency use of “data analytics and predictive modeling,” including “industry-proven predictive analytics software,” to identify fraud)

**Use Case #144**

**Agency:** Social Security Administration

**Subagency:** N/A

**Policy Area:** Social Welfare

**Task:** Adjudication

**Task Description:** To convert unstructured medical information from SSDI applications to readable text and apply NLP.

**Method:** Classification

**Data Type:** Structured, Text

**Implementation Stage:** Piloting or Partially Deployed

**Developer:** Data Unavailable

**Level of Sophistication:** Insufficient detail

**Citation:** Administrative Review Process for Adjudicating Initial Disability Claims, 71 Fed. Reg. 16,424, 16,430 (Mar. 31, 2006) (to be codified at 20 C.F.R. pts. 404, 405, 416 & 422) (describing predictive model for quick disability determinations)
Agency: Social Security Administration
Subagency: N/A
Policy Area: Social Welfare
Task: Adjudication
Task Description: To identify patterns in adjudication that are given as feedback to judges
Method: Classification
Data Type: Structured, Text
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Office of the Inspector General, Social Security Administration, A-12-18-50353, Audit Report: The Social Security Administration’s Use of Insight Software to Identify Potential Anomalies in Hearing Decisions 1 (2019) (describing “program that uses natural language processing and artificial intelligence technologies, to flag potential policy compliance or internal consistency errors”)

Use Case #147
Agency: Social Security Administration
Subagency: N/A
Policy Area: Social Welfare
Task: Adjudication
Task Description: To identify SSDI overpayments, redetermination cases with a high likelihood of error, potential overpayment in order to delay processing, and disability insurance determinations
Method: Regression
Data Type: Structured, Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Susan Miller, SSA Seeks Virtual Assistants To Help with Boomer Retirements, Sep. 4, 2018, https://gcn.com/articles/2018/09/04/ssa-virtual-assistant.aspx (noting that SSA is “looking for virtual assistant customer service support software that incorporates artificial intelligence and machine learning to allow for conversational interactions with clients and deliver a better self-service experience”)

Use Case #148
Agency: Social Security Administration
Subagency: N/A
Policy Area: Social Welfare
Task: Public services and engagement, Internal management
Task Description: To create a virtual assistant for customer support
Method: Structured Prediction
Data Type: Text
Implementation Stage: Planning
Developer: Commercial Contractor
Level of Sophistication: Insufficient detail
Citation: Issac Wohl & Jim Kennedy, Neural Network Analysis of International Trade (working paper 2018), https://www.usitc.gov/publications/332/working_papers/neural_networks_and_international_trade_-_compiled_draft_06.pdf (noting use of neural networks)

UNITED STATES INTERNATIONAL TRADE COMMISSION

Use Case #149
Agency: United States International Trade Commission
Subagency: N/A
Policy Area: Commerce, Foreign Affairs
Task: Regulatory research, analysis, and monitoring
Task Description: To analyze trade data and predict US trade flows with major trade partners
Method: Regression
Data Type: Structured, Text
Implementation Stage: Piloting or Partially Deployed
Developer: In-House
Level of Sophistication: Lower
Citation: Issac Wohl & Jim Kennedy, Neural Network Analysis of International Trade (working paper 2018), https://www.usitc.gov/publications/332/working_papers/neural_networks_and_international_trade_-_compiled_draft_06.pdf (noting use of neural networks)
UNITED STATES POSTAL SERVICE

Use Case #150
Agency: United States Postal Service
Subagency: N/A
Policy Area: Communications
Task: Public services and engagement
Task Description: To perform handwriting recognition
Method: Classification
Data Type: Structured, Text, Images
Implementation Stage: Fully deployed
Developer: In-House
Level of Sophistication: Insufficient detail
Citation: Venu Govindaraju, Reading the Handwriting on the Letter (May 2016), https://www.buffalo.edu/content/dam/www/research/pdf/Postal-Automation-Highlights_20160516.pdf (noting, at slide 3, the USPS’s development of a “learning-based system” for recognizing handwriting).

Use Case #151
Agency: United States Postal Service
Subagency: N/A
Policy Area: Communications
Task: Public services and engagement
Task Description: To provide customers with two-hour time windows for upcoming parcel deliveries.
Method: Data Unavailable
Data Type: Structured
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Medium

Use Case #152
Agency: United States Postal Service
Subagency: N/A
Policy Area: Communications
Task: Enforcement
Task Description: To identify workers’ compensation claims, health care fraud, financial fraud, contract fraud, and mail theft.
Method: Regression
Use Case #155
Agency: United States Postal Service
Subagency: N/A
Policy Area: Communications
Task: Public services and engagement
Task Description: To explore the possibility of launching a fleet of autonomous vehicles that will deliver mail, sort it, etc.
Method: Data Unavailable
Data Type: Structured, Text, Images
Implementation Stage: Planning
Developer: Non-Commercial Collaboration
Level of Sophistication: Insufficient detail

Use Case #156
Agency: United States Postal Service
Subagency: N/A
Policy Area: Communications
Task: Public services and engagement, Internal management
Task Description: To determine risk of fraud and comparative market value in lease contracts of facilities
Method: Regression
Data Type: Structured, Text
Implementation Stage: Fully deployed

Use Case #157
Agency: United States Postal Service
Subagency: N/A
Policy Area: Communications
Task: Public services and engagement
Task Description: To forecast demand and delivery costs and communicate pricing and delivery options to customers
Method: Data Unavailable
Data Type: Structured, Text
Implementation Stage: Planning
Developer: In-House
Level of Sophistication: Insufficient detail