DEPARTMENT OF HEALTH AND HUMAN SERVICES

Artificial Intelligence Use Cases – FY2022

OFFICE OF THE CHIEF INFORMATION OFFICER
DEPARTMENT OF HEALTH AND HUMAN SERVICES

Introduction

Executive Order 13960, "Promoting the Use of Trustworthy Artificial Intelligence in the Federal Government," requires agencies to prepare an inventory of non-classified and non-sensitive current and planned AI use cases. Agencies must share their inventories with the public and other agencies, to the extent practicable.

The HHS Office of the Chief Artificial Intelligence Officer (OCAIO) has created an inventory of HHS AI Use Cases that not only satisfies the EO requirements, but also increases awareness of and cross-agency collaboration on AI initiatives.

On the following pages the Department highlights some of the AI use cases and provides context for how they enhance Departmental missions.

FDA Counterfeit Detection Device Version 5 (CD5)

Opportunity: The FDA developed CD5, the latest version of a counterfeit detection device, is a handheld device that uses LEDs at different wavelengths to help forensic workers to examine FDA-regulated products and detect counterfeit pharmaceuticals. While this device is valuable, its outputs are images requiring interpretation through visual comparison to assess whether a product is authentic or a counterfeit. With increasingly sophisticated counterfeits, this visual decision making can be subjective at times and become an important vulnerability in current counterfeit detection capabilities.

Purpose: The goal of the project is to eliminate the subjectivity in the analysis of sophisticated counterfeits and foreign-approved authentic products entering the U.S. Using AI for image examination and analysis, this project seeks to improve CD5 such that it provides a device-generated conclusion.

Methodologies: AI will use the colorimetric information and tablet images generated by the CD5 to detect differences between authentic and counterfeits products.

Outcomes: By automating the device's analysis and conclusion generation, this project will decrease the amount of time needed to examine and determine if a product is authentic or counterfeit from tens of minutes to seconds. It will also multiply the number of products able to be examined while decreasing the number of inconclusive results that require samples to be sent to a lab for further analysis. Ultimately, this device can be expanded to other products and product packages.

CMS Center for Program Integrity (CPI) Fraud Prevention System Models

Opportunity: Given the development of systems that capture more extensive data on the investigative process and outcomes, there is greater opportunity to apply machine learning techniques, such as reinforcement and deep learning. In addition, machine learning techniques are helping us develop more fraud, waste, and abuse models that don't rely as much on past/known fraud schemes allowing CPI to more quickly identify new emerging fraud, waste, and abuse cases.

Purpose: The goal of this project is to more effectively detect, prevent, and prioritize potential cases of Medicare and Medicaid fraud, waste, and abuse for future investigations.

Methodology: A system to complement CPI's existing Fraud Prevention System, the Unified Case Management (UCM) system, was developed and serves as a centralized business workflow, data repository and reporting system that creates a coordinated approach to capturing fraud investigative data. Using tree-based models and deep learning approaches, Medicare administrative and claims data were and are being analyzed to develop a system that assigns weights to conventional fraud identification models.

Outcomes: While this project is still in development, outputs of this system will be used to improve alerts to investigators of potential fraud schemes. The system also identifies underperforming or obsolescent fraud identification models for deactivation.

FDA Emerging Chemical Hazard Intelligence Platform (ECHIP) and Warp Intelligent Learning EnginE (WILEE)

Opportunity: FDA's capacity to respond to an emerging chemical hazard hinges on early identification of signals. Yet, delays in signal detection have led FDA to take a reactive posture when responding to potential chemical hazards.

Purpose: The goal of this project is to leverage AI to better forecast the emergence of a new chemical hazard, by screening and connecting a broader range of data sources for detection of potential chemical signals.

Methodologies: AI is used to develop a horizon-scanning application and intelligent knowledge discovery platform that identifies, aggregates, maps and links information from internal and external data sources related to consumed foods, ingredients, and food chemicals. A model is trained to identify patterns of events that can be used to anticipate chemical hazard signal detection over a period of time and across data sources. Risk posed by identified signals is determined by analyzing potential exposure and toxicity levels.

Outcomes: By enhancing signal detection and chemical hazard forecasting capabilities, this tool can help anticipate and prioritize hazards, accelerate decision making and proactively mitigate risk to consumers.

CMS Rapid Authority to Operate (ATO)

Opportunity: The Authority to Operate (ATO) security planning process is a burdensome and lengthy process that requires an average of 500 pages worth of documentation. In addition to requiring business owners 543+ hours to get an ATO, obtaining and maintaining and ATO can cost between $180-$700k.

Purpose: The goal of this project is to reduce the burden of security compliance planning and accelerate the time to ATO by providing reusable compliance documentation that matches specific technology requirements.

Methodology: An automated AI pipeline, consisting of natural language processing and supervised and unsupervised machine learning was used to analyze the security plans of technologies used at CMS. Combined with subject matter expertise, this pipeline was used to create a component library, a library of reusable templates of control narratives related to a specific technology or methodology. These components include sample security implementations in the form of compliance descriptions.

Outcomes: The component library provides business owners with sample security implementation standards that increases the potential for re-use, automation and collaboration while reducing burden. It can speed up the time to ATO by assisting in one of the most time-intensive tasks.

CMS OSFLO Help Desk Chatbot

Opportunity: OSFLO (Office of Security, Facility & Logistics Operations) help desk calls were not being responded to in a timely manner.

Purpose: The goal of this project is to assist the OSFLO help desk to more rapidly and effectively respond to employee and contractor questions by automating voice and text responses for general security and badging questions.

Methodologies: After analyzing the most common incoming OSFLO helpdesk calls, the team trained Google DialogFlo's natural language understanding model to respond to general physical security and badging questions. The chatbot has also been coupled with a "LocatorBot" that can automatically schedule an appointment at the nearest available CMS Regional Office or HHS Operational Division PIV (Personal Identity Verification) Card Issuance Facility to a PIV applicant using their provided zip code.

Outcomes: In the first iteration of the chatbot, 20% of incoming calls were resolved via chatbot. The fully developed version of the chatbot is projected to resolve 65% of incoming calls. Through this chatbot automation, help desk personnel are able to focus on assisting employees and contractors with more detailed/larger issues.

HRSA Electronic Handbooks (EHB) AI Chatbot

Opportunity: HRSA's grant applications and management portal, Electronic Handbooks (EHB), has a large user base (45,000+ users) which generates around 25,000 customer support calls a year and overwhelms current staffing capabilities.

Purpose: The goal of this project is to develop and deploy the EHB Chatbot, a self-service platform with 24/7 availability capable of communicating knowledge and action-based responses to grantees using regular natural conversational expressions.

Methodology: Using the Artificial Solutions Teneo platform, the EHB Chatbot was trained to identify the most common, low complexity grantee questions and develop responses to questions using regular natural conversational expressions. The chatbot has the ability to refine and increase the accuracy of its responses as more and more users invoke/use the chatbot. It is also integrated with existing electronic handbook applications for automated ticket creation.

Outcomes: 90% of incoming chatbot inquiries are resolved without any involvement of the customer support staff. EHB call center staff are now able to dedicate more time and attention to answering more complex grantee questions and issues.

OIG Grants Analytics Portal

Opportunity: Single audits can be helpful in identifying issues impacting all grant programs, but some single audit findings can only be found by reading PDF reports. With 35,000-45,000 single audits submitted each year, extracting this valuable information requires a significant investment in time and personnel.

Purpose: The goal of this project is to turn grants data into actionable intelligence to support oversight of HHS grants recipients and grant programs.

Methodologies: A deep neural network model was built to extract A-133 single audit finding text from PDFs. The results of this extraction were fused with other data sets and additional statistical models were developed to assess multiple dimensions of risk. Agile processes were used to build visualization that render results of the AI efforts accessible to staff.

Outcomes: The GAP has enabled HHS staff and leadership to leverage data to evaluate programs with the most risk.

NIH eRA Internal Referral Module (IRM)

Opportunity: The NIH grant referral process is prone to bottlenecks as it requires individuals to manually review applications and refer them to corresponding agencies. Staff shortages may exacerbate this risk and lead to delays in the referral process.

Purpose: The goal of this project is to eliminate referral bottlenecks by automatically referring grant applications to Program Officers once they are received.

Methodology: An AI system was trained to analyze grant applications inputs- including the title, abstract, specific aims and Public Health Relevance- and to automatically refer the grant application to the Program Officer who matches a similar background with the science contained in the applications. The system is flexible and provides the opportunity for grants management experts to make the final decision.

Outcomes: This process is operating at a high accuracy rate (92%) and has effectively eliminated the referral bottleneck.