Artificial Intelligence (AI) and machine learning (ML) are gaining increased attention as ways to leverage the world’s data to solve problems. Although AI and ML offer much potential, there are often misconceptions about the application of such techniques.

Panel speakers will present machine learning approaches they have developed on a variety of aviation data, including digital flight data, safety reporting data, and voice communications data. They will discuss the purpose of the application, the data used, and the lessons learned in the development and deployment of their solutions. The panel will also discuss common pitfalls in developing an AI solution, the dangers of the current hype around AI, tips for gaining value from a ML solution, how to determine whether a ML approach is appropriate for a problem, and more.

Capt Scott Reeves, Manager Flight Safety, FedEx Express
Bryan Matthews, Data Science Research Engineer, KBR / NASA Ames Research Center
Shuo Chen, Software Systems Research Engineer, The MITRE Corporation

Moderator:
Dr. Elizabeth Leeds Hohman, Chief Data Scientist, Data Analytics Department, The MITRE Corporation
Artificial Intelligence and Machine Learning to the Rescue?

\[
tf(t, d) = 0.5 + 0.5 \cdot \frac{f_{td}}{\max \{f_{t}, t' \in d\}}
\]

\[
idf(t, D) = \log \frac{N}{|\{d \in D : t \in d\}|}
\]
Overcoming the Challenges of Data Integration and Automation

- **Leveraging and fusing heterogeneous data**
  - Flight Operational Quality Assurance Data (FOQA)
    - Aircraft centric view (usually de-identified)
  - Weather (current/forecast)
    - Identify levels of severity that impact traveled routes and planning.
  - Radar Surveillance
    - Captures interactions with other flights
  - Procedural Information
    - Standard Operating Procedures
    - RNAV Arrivals/Departures
  - NOTAMs
    - Changes that may disrupt normal planned operations.
  - Pilot/Controller Safety Reports
    - Captures context and trends of safety incidents.

"From a pilot's point of view this arrival could be better, safer, and more user friendly by simply extending the distance from BLUZZ and COPEN intersection. 9.7 miles is simply not enough to lose altitude and slow down. Could it be increased to possibly 20 or 25 miles? The chart states that from COPEN intersection to the airport is 40NM, surely there is enough room to make this possible."
MITRE’s voice data analysis capabilities

Source Audio → Ingest Audio → Segment & Identify Speaker Role → Convert Speech to Text → Semantic Parse 

Flight Data → Extract Aircraft Identifiers → Fuse with Surveillance 

Surveillance Data