NRC Operating Experience Artificial Intelligence Workshop
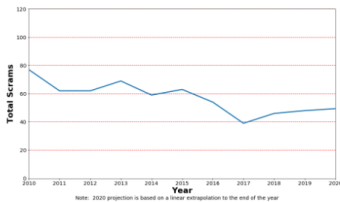
An Overview

ODAT
Operating Experience Data Analysis Tool

Get Started

Team

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Chris Speer
Julie Winslow
Rebecca Sigmon
Lisa Regner
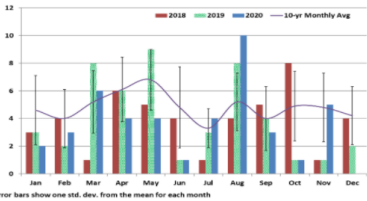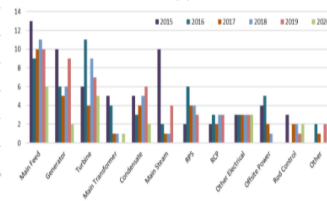
Focus

- Machine learning / natural language processing applications for operating experience
- Progress to date
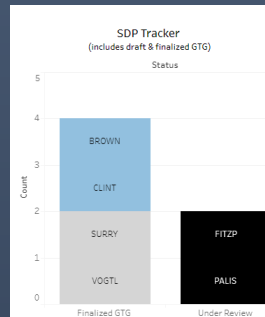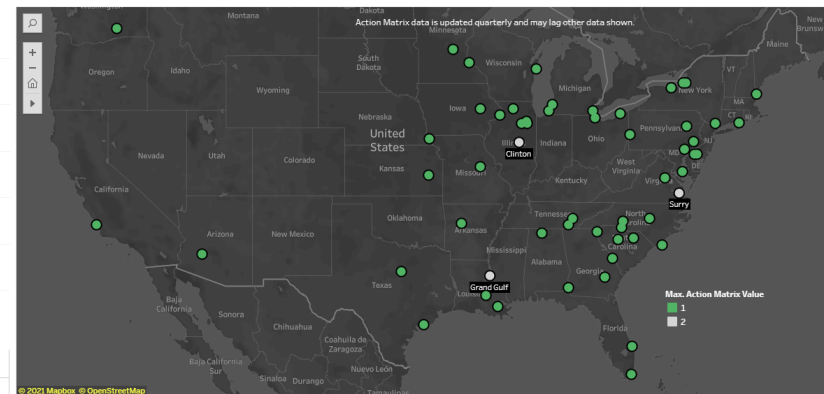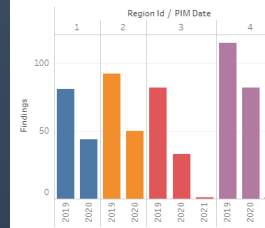- Impacts to the reactor oversight process
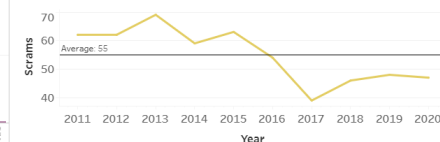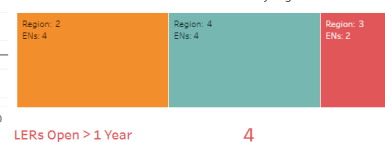
OpE Artificial Intelligence Projects

The operating experience branch is developing machine learning / natural language processing algorithms to make our processes more efficient.

Automation of operating experience processing

Extending existing search tools to allow association of reports to inspection procedure, system, and available risk information

OpE Hub – Deployed Products

Consolidation of Deployed Products

- Website portal for NRC users
- One stop shop for all OpE products
- Easy to navigate
- Facilitates user interaction and support
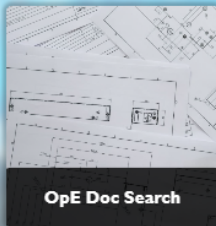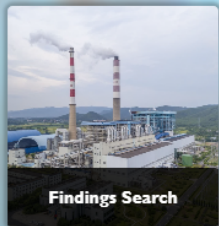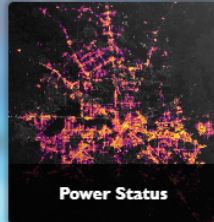
ROP Machine Learning Case 1
Classification of Operating Experience Documents by Technical Review Group

Objectives
- Build a classifier that can sort incoming OpE documents by technical review group
- Automate certain aspects of operating experience workflow

Progress
- Working classifier for event notifications (ranges from 60%-90% accuracy depending on technical area)
- Exploring extension to licensee event reports

Training Set
Historical OpE Clearinghouse Data

ML / NLP Classification
(SVC / multinomial Naïve Bayes)

Incoming OpE Documents
(e.g., licensee event reports)

Automated Technical Review Group Classification
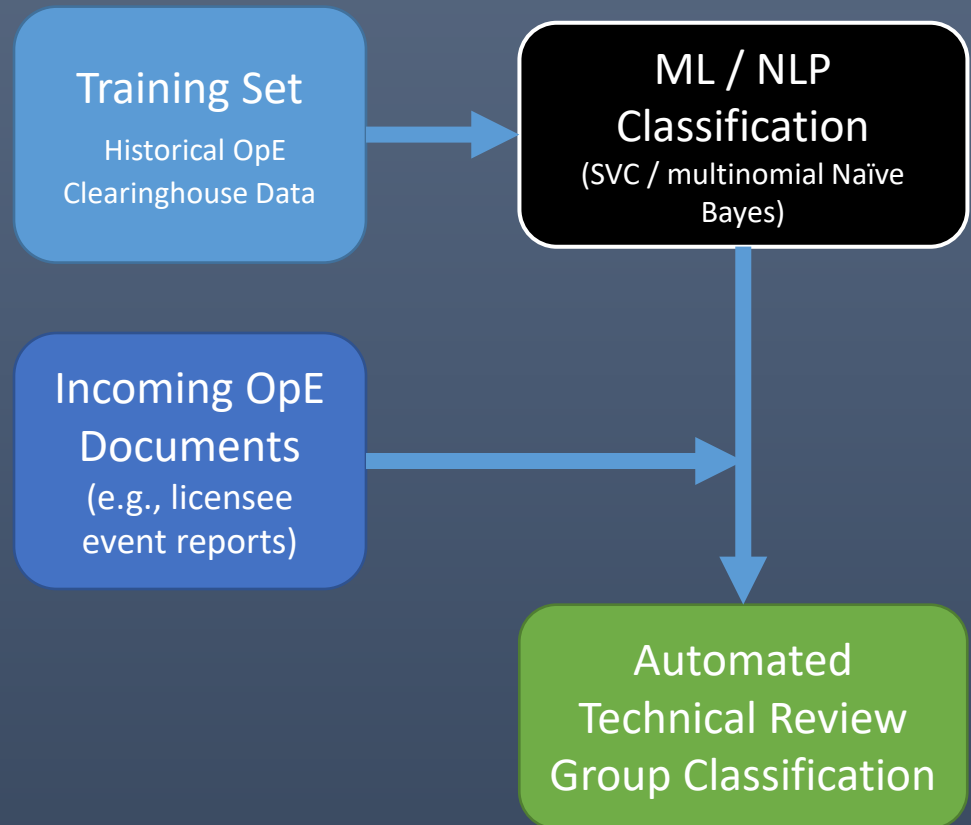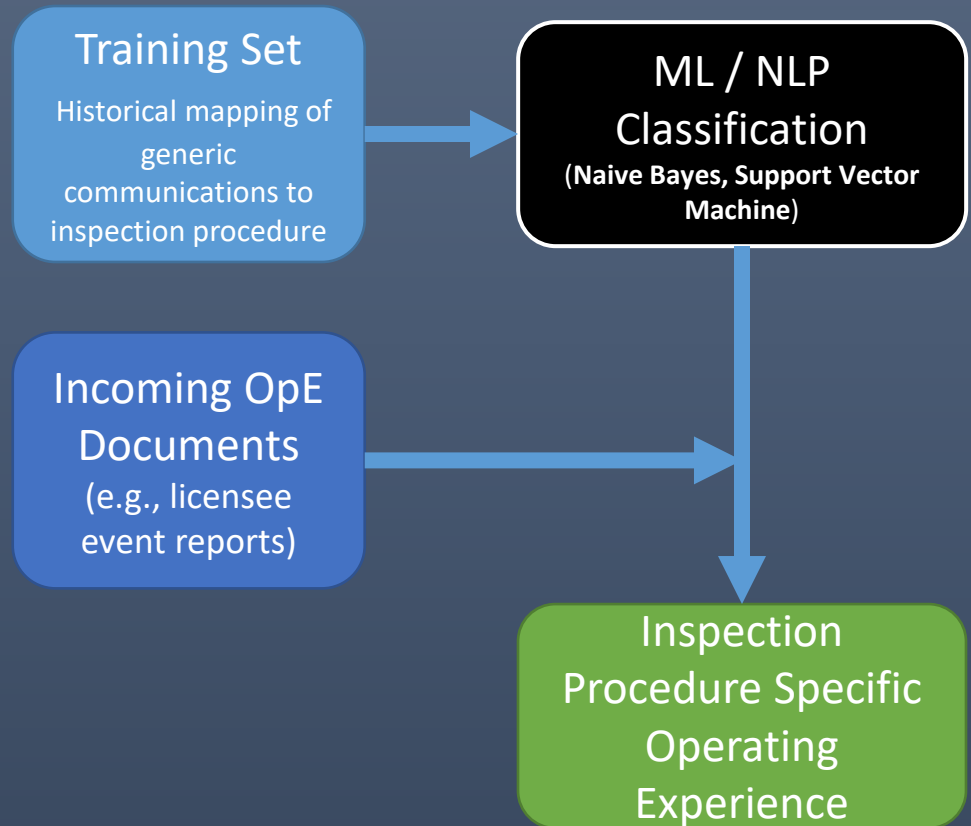
ROP Machine Learning Case 2
Classifying Operating Experience Documents by Inspection Procedure

Objectives
- Build a classifier that maps OpE documents to applicable inspection procedures
- Expand to include different forms of classification (equipment types, failure modes, etc.)
- Deploy advanced search capability

Progress
- Generic Communication classifier built (ranges from 65-70% accuracy)
- Exploring extension to licensee event reports and other operating experience documents

Training Set
Historical mapping of generic communications to inspection procedure

ML / NLP Classification
(Naive Bayes, Support Vector Machine)

Incoming OpE Documents
(e.g., licensee event reports)

Inspection Procedure Specific Operating Experience

Offsetting redundant tasks

- Eliminating repetitive manual reports on popular topics
- Tools for inspectors / NRC staff / management to review data of interest
- Lowering bar of access to data for both internal and external users

Improving data-driven decision-making

- Consolidating and democratizing access to sparse and difficult to access data
- Deploying tools that allow users to explore data on their own
- Sharing insights previously difficult to ascertain
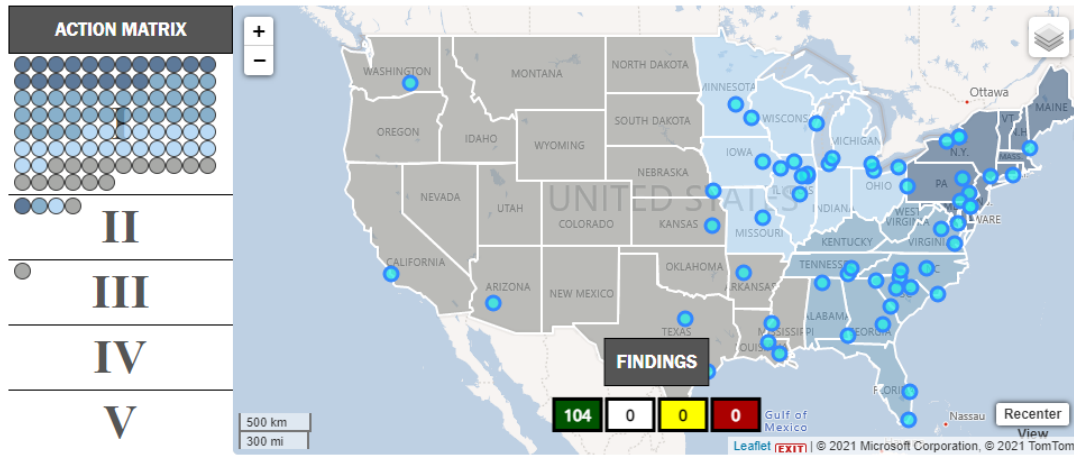
Operating Reactor Analytics Public Site

Public Site for Reactor Oversight Process Information

- Action Matrix
- Performance Indicators
- Findings

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https://www.nrc.gov/reactors/operating/oversight/analytics.html