

ARTIFICIAL INTELLIGENCE/INFORMATION TECHNOLOGY

PROJECT: Artificial Intelligence and Information Technology Support to DOE-EM

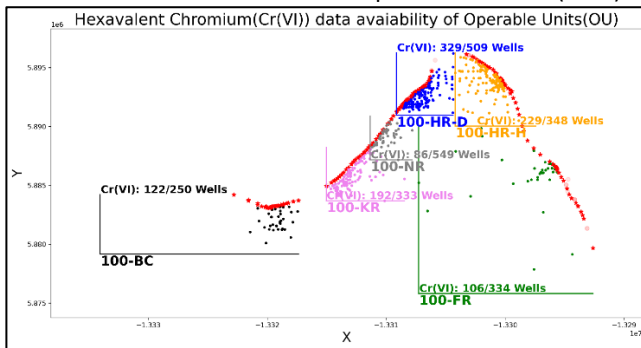
CLIENT: U.S. Department of Energy
PRINCIPAL INVESTIGATOR: Dr. Leonel Lagos

Description:

FIU-ARC is supporting DOE-EM on various Artificial Intelligence and Information Technology areas.

Exploratory Data Analysis and Machine Learning Model for Hexavalent Chromium [Cr (VI)] Concentration in the 100-H Area (Soil and Groundwater, PNNL)

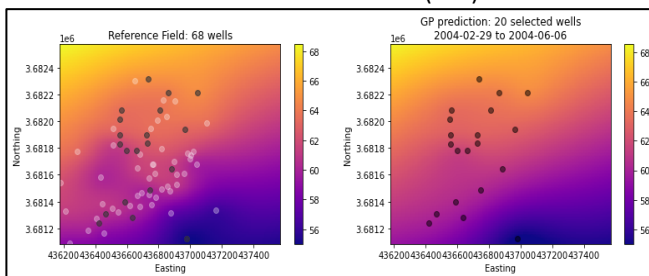
AI/ML models are being developed to identify temporal and spatial relationships of subsurface chromium transport that reduces uncertainties in the conceptual site model (CSM).



Hexavalent Chromium [Cr (VI)] data availability of wells in 100 Areas

Data Analysis and Visualization of Sensor Data from Wells at the SRS F-Area Using Machine Learning (Soil and Groundwater, LBNL and SRNL)

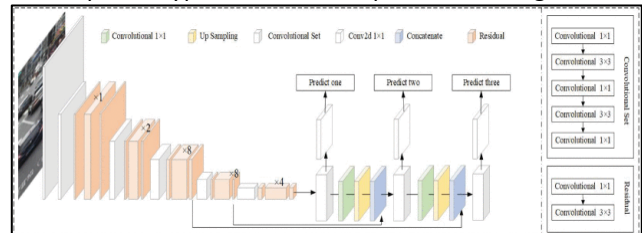
AI model development and prediction is being implemented to identify the optimal well locations to place Aqua TROLL 500 sensors in the Savannah River Site (SRS) F-Area.



Selection algorithm applied to water table data

Nuclear Waste Identification and Classification using Deep learning (Waste Processing, SRNL)

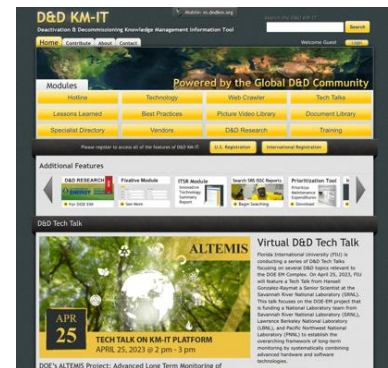
AI algorithms, like Convolutional Neural Networks (CNN), are being implemented to classify images based on the types of waste and perform object detection to identify and locate specific types of waste components in images.



Structure detail of YOLOv3 – CNN architecture

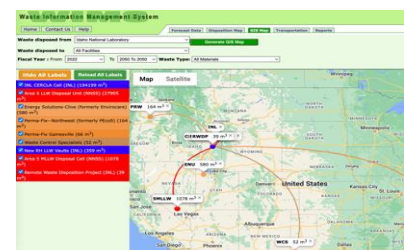
D&D Knowledge Management Information Tool (KM-IT)

The D&D KM-IT is a web-based system developed to maintain and preserve the EM knowledge base. The system was developed by FIU-ARC with the support of the D&D community, including DOE-EM, the former DOE ALARA centers, and with the active collaboration and support of the DOE's Energy Facility Contractors Group (EFCOG). The KM-IT can be accessed from web address: <https://www.dndkm.org/>



Waste Information Management System (WIMS)

The WIMS was developed to receive and organize the DOE waste forecast data from across the DOE complex and to automatically generate waste forecast data tables, disposition maps, GIS maps, transportation details, and other custom reports. WIMS is successfully deployed and can be accessed from the web address: <https://www.emwims.org/>



ABOUT

Since 1995, the Applied Research Center at Florida International University has provided critical support to the Department of Energy's Office of Environmental Management mission of accelerated risk reduction and cleanup of the environmental legacy of the nation's nuclear weapons program. ARC's research performed under the DOE-FIU Cooperative Agreement (Contract#DE-EM0005213) can be classified as fundamental/basic, proof of principle, prototyping and laboratory experimentation.

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