Jialin Dong

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EDUCATION

Carnegie Mellon University (CMU) Pittsburgh, PA

Master of Science in Civil and Environmental Engineering, GPA **3.95**/4.00 12/2020

Jilin University (JLU) Changchun, China

Bachelor of Engineering in College of New Energy and Environment, GPA 85.03/100 (**Top 5**) 07/2018

RESEARCH INTERESTS

My research interests are Water Analysis and Modeling with Data Mining Methods, especially Machine Learning. Currently, I am focusing on oil sheen detection using multi-modality data analysis and machine learning model.

PUBLICATIONS

Dong, J., Fu, S., Zhou, H., Li T., Effect of Nano Calcium Peroxide on the Fenton-Like Degradation of Nitrobenzene in Groundwater[J]. *China Environmental Science.* 2019, 39(11): 4730-4736.

Dong, J., Review of Soil Heavy Metal Pollution and Technology. *Energy Conservation & Environmental Protection*. 2018. (292)

SKILLS

- **Technical:** Python, R, AutoCAD, ArcGIS, GMS, CASS, MySQL, Swift, Weka, Origin, Microsoft Office
- **Instrument:** Spectrophotometer, AAS, UV-Vis, DO Analyzer, PH Meter, HPLC, GC, GC-MS, GPMAS

RESEARCH EXPERIENCES

Imaged-based Oil Sheen Detection on Water Surface | CMU 09/2020-Currently

- Prepared a large oil sheen image dataset through simulating and filming a multi-level small-scale oil sheen generation process
- Designed a visible image-based oil sheen detection and pollution level prediction algorithm with convolutional neural networks (CNNs) to quantitatively and qualitatively achieve small-scale oil spills monitoring
- Applied Residual block architecture and transfer learning to boost the model's prediction accuracy to 99%

Project Leader of Air Pollution Control at Guilin, Guangxi | Shanghai Jiao Tong University 04/2019-08/2019

- Optimized air pollution control policy for the local government to improve AQI efficiently and minimize economic loss
- Established a list of key air pollutants and primary air pollution sources from industries, construction sites, and transportation mapping with air pollution geospatial distribution to identify the critical pollution source needed to be controlled
- Quantified air pollutants emission reduction to support corporate emissions and traffic control policymaking
- Increased the annual good air quality rate to 95% in Guilin City and reduced economic loss 3% annually for air pollution control

Nano-CaO_2 Degradation of Nitrobenzene in Groundwater (National Project) | JLU 03/2016-06/2018

- Purposed a new method to produce nano-CaO_2 powder with a high content of 88.35% compared with 70% from previous studies
- Verified the Fenton-Like degradation mechanism that •OH was the prominent degradation free radical degrading nitrobenzene, and degradation effect were affected by HCO^{3-} , SO_4^{2-}, Ca^{2+} and Mg^{2+} plasma
- Determined the first-order kinetic curve to be the degradation kinetics and the best reaction conditions in groundwater
- Proved that nano-CaO_2 could be used as a sustained-release agent of H_2O_2 to degrade nitrobenzene through dynamic simulation of a one-dimensional soil column

Environmental Investigation in Xingcheng and Changchun City | JLU 07/2016-09/2016

- Tested soil and water samples both on-site and in lab to explore the distribution characteristics of organic pollutants and heavy metal pollutants in Xingcheng City
- Modeled a dynamic air pollution distribution by continuously sampling and testing the air quality in Changchun to evaluate the air quality status and provided suggestions on air pollution control
- Associated the environmental pollutants distribution with local common diseases and frequently-occurring diseases distribution

Allegheny County Office Green Roof Monitoring System Analysis | CMU 01/2020- 05/2020

- Examined environmental and energy benefits for the Allegheny County Office green roof system utilizing a vast amount of sensing data from different environmental sensors through calculating energy saving and carbon emissions
- Explored the relationship between heat flux and evapotranspiration to verify the cooling benefit of the green roof system

Company Performance Big Data Analysis under COVID-19 | CMU 06/2020-08/2020

- Proposed a data mining algorithm to analyze COVID-19 related synonyms text data from millions of company disclosures to predict stock price return and evaluate company performance
- Interpreted the relationship between text features, belonging industries, categories, and stock price return values and developed a suggestion plan for companies to avoid further COVID-19 influence

In-situ Remediation Modeling and Design of a Petrochemical Contaminated Plant | JLU 02/2018-06/2018

- Established a 3D model for a pollution site to determine the contamination condition and remediation effect by simulating the conditions of the contaminated site, pollutants, and remediation parameters with GMS
- Designed a pollution remediation scheme with permeable reaction wall technology (PRB) and monitored natural attenuation technology (MNA) to decrease the groundwater pollutants concentration from 300MG/L to <10MG/L for over 30 years

WORK EXPERIENCES

Energy Programs Intern, Pittsburgh | CMU Wilton E. Scott Institute for Energy Innovation 05/2020-11/2020

- Designed an informative partnership searching system for the Institute to identify potential collaborations in the following years
- Established metrics for visitors and registers by mining poll data to identify special attendees for long-term engagement

Software Engineering Machine Learning Team [Computer Vision], Pittsburgh | SimpL Labs Inc. 07/2020- 09/2020

- Developed a real-time human body movement detection and tracking algorithm for exercise posture guidance based on OpenPose

Software Engineering 99 Ranch Queue Management Program Intern, Los Angeles | Butlr. 06/2020- 07/2020

- Applied Random Forest and CNN to predict customer waiting queue length to assist 99 Ranch supermarket advisors monitor the number of people during the pandemic
- Proposed an image processing method to translate thermal sensors' image into readable numbers with statistics features

Project Assistant of Air Pollution Control at Jiujiang, Jiangxi | Shanghai Jiao Tong University 02/2019-04/2019

- Predicted air pollutant trends for the following three days to guide the local government to prevent air pollution and formulated the air pollution control policy by analyzing the daily sensors data over the past five years

Environmental Investigator at Fengxian District, Shanghai | Shanghai Jiao Tong University 09/2018-02/2019

- Investigated production processes of hundreds of enterprises in Fengxian by collecting and reviewing pollution census data

ACADEMIC PROJECTS

Guilin City Air Quality Forecast for Outdoor Activities | CMU 01/2020- 05/2020

- Employed Support Vector Machine (SVM) to predict whether the weather was suitable for outdoor activities
- Solved the unbalanced dataset problem and improved the accuracy by over-sampling the minority class and boosting
- Improved algorithm performance after error analysis and achieved 0.9878 final test accuracy

Global Financial Environment Analysis under COVID-19 | CMU 01/2020-05/2020

- Analyzed seven financial indicator changes (exchange rate, interest rate, etc.) with fiscal policies and monetary policies to assess the financial environment for 12 countries with the highest number of total cases in 2020
- Explored the relationship between financial indicators and COVID-19 impact through utilizing linear panel regression
- Demonstrated that COVID-19 cases would lead to a change in the exchange rate, expansionary monetary and fiscal policy

NYC Drinking Water Lead Contamination Analysis | CMU 08/2019-12/2019

- Analyzed the distribution of NYC drinking water lead contamination related to social-economic distribution through investigating the trend of lead content in tap water in different boroughs from the 2014 to 2017 period
- Proved that the amount of lead found in tap water in the New York City boroughs is not related to income level but could be related to age or size of buildings, or other factors
- Proposed 5 measures for NYC's residents to protect themselves from lead exposure in tap water

HONORS & AWARDS

Excellent Student Leader, College of New Energy and Environment, JLU (top 5 %) 2016-2017

Second Class Scholarship, JLU 2016-2017

First Class Scholarship, JLU (top 3%) 2015-2016

Dean's List, JLU (top 3 %) 2015-2016