Reza V. Mehrizi, PhD

Data Scientist, Machine Learning Developer

PROFILE

With 8+ years of experience at data science and machine learning development, I specialize in implementing end-to-end ML workflows. Having a Ph.D. in Statistics, I possess a strong foundation in data science principles. My dedication lies in exploring advanced statistical and ML approaches, leveraging AI techniques, and optimizing ML workflows to architect robust and efficient solutions. I enjoy tackling complex problems as opportunities to refine my skills, exercise innovative thinking, and deliver exceptional results.

Highlights of Qualifications:

- Proficient in the development of machine learning models using frameworks like ***TensorFlow, PyTorch, Transformers***.
- Skilled in implementing MLOps practices using ***Docker, Kubernetes***.
- Adept at data preprocessing with ***Pandas, SQL, Snowflake***, and creating interactive visual dashboards using ***Tableau, Power BI***.
- Proficient in computer vision deployment with *HuggingFace transformers* ***(ResNet, YOLOv6/v7)*** and *cloud-based solutions* (***AWS Rekognition, Azure Computer Vision***).
- Proficient in ***NLP*** and ***LLM*** using advanced transformers such as ***GPT-3.5, BERT***, and the latest models like ***RoBERTa, Mistral-7B***, with expertise in cloud-based NLP services like ***AWS Comprehend*** *and* ***Azure AutoML***.
- Familiar with big data technologies such as ***Hadoop*** and ***Spark***.
- Collaborated with a diverse range of industries, including ***General Motors***, the ***Ontario Ministry of Transportation***, ***Eleaps***, ***Rogers***, and the ***Ontario Ministry of Healthcare***.

PROFESSIONAL EXPERIENCE

Data Scientist at MVS Lab, University of Waterloo

October 2021 – Present

- **Autonomous Shuttle Computer Vision:** Designed and developed forefront deep learning strategies and computer vision models, including Transfer Learning and YOLO, to enhance the autonomous shuttle's visual perception.
- **Cable Robot Operation:** Designed and implemented a cutting-edge cable robot system, integrating ML and graphical model approaches for automation in supply chain operations.
- **Warehouse Control System:** Developed a streamlined logistics optimization solution using deep learning algorithms and cloud computing, resulting in a remarkable 17% surge in warehouse throughput efficiency.
- **Fault Detection/Root Cause Analysis:** Developed a Deep Learning and Dynamic Bayesian Networks-based fault detection and root cause diagnosis algorithm for the automotive industry, resulting in substantial cost savings and enhanced vehicle reliability.

Statistical Consultant and Teaching Assistant at University of Waterloo

September 2016 – August 2021

- **Covid-19 Anomaly Detection:** Developed a highly accurate anomaly detection algorithm using deep learning approaches for Covid-19 disease enabling precise disease diagnosis prediction in the healthcare system.
- **Pattern Recognition:** Collaborated with Expedia Group, an international shipping company, and a sensor fouling system company to develop ML predictive models, resulting in remarkable enhancements in productivity, service quality, and cost-effectiveness.

Faculty Member at Semnan University

September 2010 – August 2016

- **National Census Consultant:** Collaborated on statistical analyses of national census data for educational and environmental inquiries.
- **Bank Ranking System:** Devised a customer ranking system utilizing unsupervised deep learning to discern and categorize customer preferences and behavior efficiently.
- **Oil Price Forecasting:** Developed a predictive model using time series and machine learning techniques to forecast price fluctuations in the oil industry.

Detail

Waterloo, Ontario, Canada

(+1) 226-989-5194

valiollahi.reza@gmail.com

Links

Website | Google Scholar | LinkedIn | GitHub

Skills

- **Statistical Analysis**
  - Bayesian Statistics
  - Anomaly Detection
  - Graphical Models
  - Time Series Analysis
  - Experimental Design / Testing
- **Machine Learning**
  - Predictive Modeling
  - Neural Networks
  - Deep Learning/Reinforcement Learning (TensorFlow, PyTorch, Keras, Spark)
  - Data Pre-processing/Cleaning
  - Data Visualization (Tableau/Power BI, Matplotlib/Streamlit)
  - Data Mining / Pattern Recognition
  - Web Scraping (BeautifulSoup, Scrapy)
  - Ensemble/Clustering Methods (Random Forest, Boosting, XGBoosting)
- **NLP / LLM**
  - Natural Language Processing (Pipelines/ Transformers in HuggingFace)
  - Large Language Model (Langchain, GPT)
- **Programming Languages**
  - Python (Pandas, Scikit-learn, Requests, sqlite3, Django/Flask, NLTK)
  - R (ggplot2, tidyr, caret, shiny, forcast)
  - SQL/NoSQL Database Management (MySQL, MS SQL, SQLAlchemy)
  - API Development (Git, Docker, postman)
- **Cloud Computing**
  - AWS (Sagemaker, EC2 instances, Lambda)
  - Azure (Databricks, CI/CD pipelines)
- **Interpersonal Skills**
  - Effective Communication
  - Mentoring/Advising

PROJECTS

Interactive Video Content Analysis Platform:

- **Video Content Analysis:** Utilized ***Natural Language Processing (NLP)*** techniques, leveraging models from ***Hugging Face*** and ***Langchain***, to extract, transcribe, and summarize video content, while also performing sentiment analysis and entity recognition, enhancing insights and interactivity.
- **Chatbot Integration (LLM-Powered - Llama2):** Integrated an LLM-Powered chatbot using ***Llama2***, derived from ***Langchain***, to enable users to engage in interactive discussions and ask questions about the video content.
- **Website Development (API Integration):** Designed a website for YouTube video content analysis, creating a user-friendly interface with ***Streamlit*** and incorporating custom APIs.

Real-Time Object Detection and Tracking Using Compute Vision:

- **Object Detection/Tracking Application:** Developed a computer vision application using the ***OpenCV*** library in Python, enabling seamless object detection and tracking in both images and videos.
- **Website Development (API Integration):** Designed a user-friendly website with a Streamlit-based API for uploading and processing images and videos, enabling real-time object detection and tracking upon upload.

Data Analytics of Artificial Intelligence Trends on YouTube:

- **Web Scraping:** Conducted web scraping of YouTube data, employing ***Google API*** credentials, ***Beautiful Soup***, and ***Requests*** libraries for secure and effective data extraction.
- **Data Preprocessing:** Performed data preprocessing with ***SQL***, using ***PostgreSQL*** to comprehensively clean and structure the scraped data.
- **Analysis and Visualization:** Employed Python libraries, including ***scikit-learn*** and ***NLTK***, to derive valuable insights, along with ***Matplotlib*** and ***Plotly*** libraries, providing a deep visual understanding of the evolving trends in AI content on YouTube.

EDUCATION

Doctor of Philosophy in Statistics, University of Waterloo, Ontario

September 2017 – August 2021

- Provided expert statistical consultation and collaborative research support to faculty and industry partners.
- Collaborated on a wide range of projects, offering valuable insights and data analysis solutions that facilitated evidence-based decision-making and problem-solving.

Masters in Statistics, University of Waterloo, Ontario

September 2016 – August 2017

SELECTED PUBLICATIONS

- Shu, K., **Mehrizi, Reza. V.**, Li, S., Pirani, M., & Khajepour, A. (2023). Human Inspired Autonomous Intersection Handling Using Game Theory. IEEE Transactions on Intelligent Transportation Systems.
- Sun, C., Cui, Y., Đào, N. D., **Mehrizi, Reza V**., Pirani, M., & Khajepour, A. (2023). Medium-Fidelity Evaluation and Modeling for Perception Systems of Intelligent and Connected Vehicles. IEEE Transactions on Intelligent Vehicles.
- **Mehrizi, Reza V.**, and Shojaeddin Chenouri. "Valid post-detection inference for change points identified using trend filtering." arXiv preprint arXiv:2104.12022 (2021).
- **Mehrizi, Reza V.**, and Shojaeddin Chenouri. "Detection of change points in piecewise polynomial signals using trend filtering." arXiv preprint arXiv:2009.08573 (2020).
- **Mehrizi, Reza V.**, Akbar Asgharzadeh, and Mohammad Z. Raqab. "Prediction of future failures times based on Type-I hybrid censored samples of random sample sizes." Communications in Statistics-Simulation and Computation 48, no. 1 (2019): 109-125.

View More Publications on My Google Scholar.