Deva Kulkarni

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Education

Master of Information & Data Science - University of California, Berkeley Aug 2023

- **Courses**: Natural Language Processing with Deep Learning, Computer Vision, Experiments and Causal Inference, Applied Machine Learning, Statistics for Data Science, Fundamentals of Data Engineering

Master of Science in Mechanical Engineering - University of Illinois, Urbana-Champaign Apr 2017

Bachelor of Technology in Mechanical Engineering - Indian Institute of Technology, Bombay Apr 2015

Projects

WindSmart: Wind Turbine Failure Prediction Aug 2023

- Developed an end-to-end anomaly detection system using unsupervised learning (Gaussian Mixture Models (GMM)).
- Performed problem framing, market fit and impact analysis, in collaboration with domain experts.
- Conducted data collection, model development and deployed a Flask based web app on Amazon Web Services (AWS).

Hate Speech Detection in Hinglish and Korean Dec 2022

- Conducted comparative analysis of transformer-based language models (mBERT, LaBSE) for text classification.
- Evaluated suitability of metrics and performed error analysis to determine model applicability for specific languages.

Image Classification: Pistachios Aug 2022

- Implemented computer vision techniques for feature engineering through manual NumPy array manipulation.
- Employed dimensionality reduction via PCA and outlier detection using t-SNE.
- Explored multiple machine learning algorithms (Logistic Regression, SVM, CNN).

Experiment: Motivating Altruistic Behavior Apr 2022

- Executed a field experiment exploring the causal impact of altruistic intent on user performance on a puzzle-solving task.
- Developed the treatment methodology, crafted a puzzle-solving platform on Qualtrics, recruited participants via Prolific.
- Employed robust regression modeling in R for comprehensive statistical analysis.

Regression Analysis: Mask-use and Covid-19 Cases Dec 2021

- Evaluated multiple regression models using R into the relationship between mask usage and COVID-19 cases.
- Interpreted the significance of coefficient estimates. Assessed the validity of assumptions and analyzed limitations.
- Identified covariates and proposed a causal pathway to the outcome variable.

Real-time Data Streaming Pipeline for Tweets Aug 2021

- Constructed a data pipeline on Google Cloud Platform (GCP) for streaming climate change related tweets from Twitter API through Kafka. Performed Extract, Transform, Load (ETL) operations with Spark and stored the data in Hadoop.
- Queried the data using Presto SQL, using visualizations to address pertinent questions. Used Docker to containerize each service.

Professional Experience

Senior Research & Development Engineer Aug 2017 - Dec 2022

Medical Instrument Development Labs Berkeley, CA

- **Research Team Lead:** Led a team of 5 engineers to explore new technologies and innovations for medical devices used in ophthalmic surgery. Managed high impact projects in collaboration with multi-disciplinary teams.

Key Achievements:

- Spearheaded design and prototyping activities to showcase 5 future device concepts to Bausch and Lomb's global leadership, securing endorsement for groundbreaking projects and solidifying long-term strategic partnership.
- Invented a novel technology for the construction of a device used for intraocular illumination, increasing the illumination intensity by 400%. (patent granted)
- Implemented design improvements to outperform prevailing market standards, surpassing the state-of-the-art cut rate for vitrectomy surgery by 55%. Developed manufacturing procedures, trained assemblers and equipment technicians.

Skills

Programming: Python (NumPy, SciPy, Scikit-learn, XGBoost) | R (ggplot, dplyr) | SQL
Cloud: Amazon Web Services (AWS) | Google Cloud Platform (GCP) | BigQuery
Frameworks: Keras | Tensorflow | OpenCV
Others: Docker | PySpark | Hadoop | Kafka | Tableau

Publications

- Kulkarni Devashish. "Fiber Optic Tapered Coupler" (for use in eye surgery), *US Patent 11,614,587, Issued March 2023.*
- **Kulkarni DR**, Mujumdar SS, Kapoor SG. "Study of Film Formation on Grooved Tools in an Atomization-Based Cutting Fluid Delivery System for Titanium Machining" *ASME. Journal of Manufacturing Science & Engineering, 2018.*