Wrik Bhadra

email: wrik-bhadra@uiowa.edu

phone: +1-(319)-333-9843

website: https://mavewrik.github.io

Research Interests

Medical Image Analysis, Computer Vision, Machine Learning

Work Experience

The University of Iowa, Iowa City

- *Graduate Research Assistant - Lung Imaging* — Jan 2023 – present

Rakuten India, Bangalore

- *Software Engineer II - Machine Learning* — Jan 2022 – Oct 2022
- *Software Engineer I - Machine Learning* — Aug 2021 – Dec 2021
- *Software Engineer I* — Aug 2020 – Jul 2021

Education

The University of Iowa, USA

Ph.D. in Biomedical Engineering — 2023 – present

IIIT Delhi, India

M.Tech. in Computer Science and Engineering — 2018 – 2020

Publications

Transcriptional advantage influence odorant receptor gene choice

Briefings in Functional Genomics (Oxford Academic journal) [published Dec 2022]
doi https://doi.org/10.1093/bfgp/elac052 link

Method, Apparatus, and Computer Readable Medium (Patent)

US Patent and Trademark Office (app. number: 17/645,726) [filed Dec 2021]

Generalized Prediction of Hemodynamic Shock in Intensive Care Units

AAAS Science Translational Medicine [submitted June 2022 - pending review]
medRxiv 2021.01.07.21249121 link

PROJECTS

5G Cellular Antenna Damage Detection

{*object detection, large-scale training, transfer learning*}   Team size: 5

A computer vision-based fully automated system for detecting physical damage to 5G cellular antenna towers, which impact their operational effectiveness.

- Part of a two-member sub-team responsible for developing the core AI solution.
- Devised a method for semi-automated curation of a labelled dataset from video footages. This technique has been submitted as a utility patent at USPTO in Dec 2021.
- Developed system for fine-tuning Faster R-CNN ResNet-50 FPN on the curated labelled dataset of about 100k images of cellular antenna towers.
- The model achieved 95% validation accuracy within a 3° tolerance.
- Additionally, implemented solutions for crack detection, fire detection and intruder detection in the vicinity of towers.

Forecasting & Anomaly Detection

{*time-series analysis, data pipeline, apache kafka*}   Team size: 2

Forecasting & Anomaly Detection in application log streams as part of Rakuten SixthSense.

- Created baselines with ARIMA for usage forecasting and implemented Isolation Forest algorithm for detecting anomalies in both univariate and multivariate time-series data.
- Developed data pipelines using Apache Kafka and Python to process application logs.

Distracted Driver Detection

{*visual recognition, feature engineering, classifier ensembles*}   Team size: 3

Given dashboard images, our system classifies the driver on the basis of 10 predefined actions (texting, speaking on the phone, reaching backwards etc.)

- Project poster / GitHub repo / Kaggle link

Movie Recommendation System

{*collaborative filtering, feature selection, kNN*}   Team size: 3

Revisiting movie recommendation systems by analysing item-based collaborative filtering, wrapper method for feature selection and other relevant techniques such as kNN similarity.

- Project poster / Project report / GitHub repo

SKILLS

Machine Learning PyTorch, TensorFlow, scikit-learn
Programming languages Python, MATLAB, Java
Application development Flask, MongoDB, SQL, Docker, Kafka
Tools Bash, LaTeX, Git, Jupyter Notebook/Lab

HONORS, AWARDS & RECOGNITION

Rakathon India excellence award   Aug 2022

Recognition by management for our work on anomaly detection in Rakuten SixthSense using ML.

Rakuten India annual awards   Dec 2021

Part of the winning team under the Rakuten Eureka (Innovation) category.