Shubhabrata Mukherjee

shubha07m@gmail.com
Website: https://kcpanda.com/
LinkedIn: https://www.linkedin.com/in/shubhabratamukherjee/
GitHub: https://github.com/shubha07m
Google Scholar: https://scholar.google.com/citations?user=rA8xSP4AAAAJ&hl=en

Machine learning and analytics:

Experience using OpenCV with TensorFlow and Pytorch in object detection and biometric privacy research.
Developed LSTM based sequential classification for network handover optimization.
Using various classical machine learning techniques of Classification, Regression, and neural network techniques like ANN, CNN, RNN (time series) in industry projects and research.
Experience in various classical Unsupervised Learning like PCA, clustering, etc.
Experience using python packages like NumPy, Pandas, scikit-learn, matplotlib, NLTK, etc.
Used and trained various pre-trained CNN models with ONNX, Apache MXNet, Pytorch, TensorFlow etc.
Implemented Reinforcement learning-based AI framework for closed-loop NFV optimization.
Worked on Multi-optimizer platform with Bayesian optimization, Genetic algorithm, etc.
Experience using R and Matlab for ML in coursework and current doctoral research.

Networking and Automation skills:

Kubernetes-based end-to-end containerized multi-NFV architecture implementation.
Using NS3 simulator for current LSTM based handover optimization research.
Developed automation for data analytics pipeline for optimization using shell scripting and python.
Perform and report testing activities and bug lists to support product validation for a new build.
Experienced in various traffic simulators like IXIA, Spirent, Mobipass, etc. in industry.

❖ Education:

University of Missouri-Kansas City: Ph.D., Computer network & comm. systems, **exp. Dec 2022.**
University of Missouri-Kansas City: Master of Science, Electrical Engineering, May 2017.
West Bengal University of Technology: Bachelor's, Electronics & Communication Eng., 2009.

❖ Professional Experience

T-Mobile (May '21 – Dec'21), Technology Strategy intern: 5G and AI

✓ **Autonomous fault management for next-generation networks**
We have developed an AI-based multi-phase framework for end-to-end autonomous fault management for 5G and beyond. An optimum combination of classical machine learning and deep learning has been implemented and their performances have been reported.
https://www.wayup.com/guide/community/t-mobile-tech-internships/

✓ **Apply machine learning for advanced UAV-based human and object detection.**
We developed a next-generation human and object detection and localization from UAV applying deep neural network and end-to-end streaming 5G UAV framework. Working towards submitting a paper on upcoming IEEE conference.

Intel Corp. (May '20 – Jan'21), Graduate Intern for Network AI

Dynamic and static Closed-loop NFV optimization:
- Multi-objective Bayesian optimization experiments of NFV workload.
- Performance comparison of various optimization like Genetic algorithm, TuRBO, etc.
- Reinforcement learning-based DAaaS framework implementation.

End-to-end Kubernetes-based NFV architecture implementation.
Automation environment development to support optimization tests and benchmarking.

Related Coursework:
    Deep learning using Python
    Computer Vision
    Pattern recognition
    Introduction to statistical learning and R
    Principal of big data management
    Neural & Adaptive Networks

University of Missouri Kansas City (Aug '19 – Current), Graduate assistant
>   Working as a graduate research assistant for computer vision at CBIT lab. (Spring 2022)
>   Instructed lab for "Electronic circuit lab (ECE 331)" (Spring 2021)
>   Assisted teacher for the graduate class of "Wireless Communication". (Spring 2020)
>   Assisted teacher for the class of "Intro to wireless networking". (Spring 2020)
>   Assisted teacher for the class "Internet of Things". (Fall 2019)
>   Assisted teacher for the class of "Foundation of Software Engineering" (Fall 2019)

Google Inc, Test & Automation Engineer
>   **Project: EPC testing and automation (Contract with Virtusa: Jan '19 – June'19)**
>   Develop test cases for testing MME, SGW & other components of the EPC core network.
>   Experience in tools like Spirent, Wireshark, TCPdump analysis, etc.
>
>   **Project: ©Loon by Google X Lab (Contract with Ercom Inc: June '17 – Dec'18)**
>   Testing emulated & real UE, analyzing logs to validate enodeB build and bug fixes.
>   Automating test environment, modifying and upgrade python / shell-based tools for analysis.

Sprint Corp., Network Implementation Engineer (Contract with Yoh LLC: Aug '16 – May'17)
>   Responsible for Integration & testing various Nokia & Airspan Mini Macro & UE Relay products.
>   End-to-end system testing, Software Upgrade, OAM, troubleshooting & performance testing.

Past work experiences in India:

- Ericsson Global services ltd.: Assurance Engineer (Full-time, India, Nov 2011 – Dec 2013)
- Nokia Siemens Networks: Transmission Engineer (Full-time, India, May 2010 - Nov 2011)
- Birla VXL technologies ltd.: Graduate Engineer trainee (Full-time, India, June 2009 – May 2010)

❖ **Academic Research Projects:**

Privacy preserving biometrics using deep neural networks
In our **CBIT** (Computational Intelligence and Bio-Identification Technologies) lab, currently we are using deep neural network for preserving biometric privacy. This project is funded by TrippleBlind©. This project is also a part of NSF CBL initiative. Working towards a journal submission on IEEE transaction.
https://sce.umkc.edu/research-sites/cibit/index.html#about

UAV based handover optimization in heterogeneous network scenario using deep learning
A traditional signal-based handover may not ensure the best user experience in terms of throughput, packet loss, or latency. We are developing a deep learning-based handover technique using coordinated feedback from the associated UAVs. We have used LSTM based sequential classification to choose the optimum time to handover for various types of users based on their unique QoS requirements.
https://github.com/shubha07m/Coordinated-handover-optimization-using-deep-learning

Load balancing algorithm development for optimizing heterogeneous network using ML
Proper prediction of network performance is crucial for various application-specific requirements. Mobile devices frequently send various data for monitoring & optimization which can be used in a device-assisted ML for instant processing and making data-driven decisions.
https://github.com/shubha07m/Load-balancing-algorithm-development-for-optimizing-heterogeneous-network-using-machine-learning

Facial-Expressions-recognition-using-Machine-Learning
Our primary goal is to identify when a human is talking and when remains silent by classification of facial expression. We would also like to identify the nature of dialog from the expression if time and complexity permit.
https://github.com/shubha07m/Facial-Expressions-recognition-using-Machine-Learning

Object classification and object localization
The problem is to Identify the type/class of an Image & Localization of the identified object in the image. We will be implementing YOLOv3 and Mask R -CNN to compare the efficiency and using Keras as the ML library for our task.
https://github.com/night2wolf/CS490-FinalProject

Development of ultra-reliable communication techniques for MCPTT (Master's thesis project):
We developed the techniques to achieve a 99.999% reliability for the 5G MCPTT communication. A paper was presented on the research performed at **IEEE WTS 2017 conference, Chicago.**
http://ieeexplore.ieee.org/document/7943546/

Twitter data analysis:
Developed a system to store, analyze, and visualize Twitter's tweets using Python, Apache Spark, Scala, Spark SQL, IBM Bluemix.
https://github.com/shubha07m/Twitter-analysis_shubh

❖ **Awards & Achievements:**
  ✓ Submitted a paper based on the work done on autonomous fault management at T-Mobile at IEEE wireless communications magazine special issue. (2022 Summer)
  ✓ Submitted internal invention disclosure based on the UAV-based object detection research done at T-Mobile Internship (2021 Fall).
  ✓ Volunteered as a judge in T-Mobile Artificial Intelligence Ops Hacksgiving. (2021 Fall) https://t-mobileaimlopshacksgiving2021.splashthat.com

  ✓ The Autonomous fault management project done at T-Mobile featured in WayUp. (2021 Summer)

  ✓ Submitted two internal invention disclosures based on the work and research done in NFV optimization at Intel Internship (2021 Spring).
  ✓ Published journal paper on spatial network performance prediction for Special issue of ETRI journal. (2020) (https://doi.org/10.4218/etrij.2020-0188)
  ✓ Doctoral NR Award from UMKC SCE. (2019 - current)
  ✓ Presented the work on "Load balancing heterogeneous network using deep learning" in NSF, CBL seminar meeting (2019)
  ✓ Successful implementation of test platform of Ercom testbed in project Loon (2018).
  ✓ IEEE conference paper on 5G ultra-reliable low latency communication (2017) (http://ieeexplore.ieee.org/document/7943546/)
  ✓ Dean's International Scholar Award from UMKC Dean's office. (2015)
  ✓ "Kudos! For being Alive" award from MS Head, Bharti Airtel, LTE Operations (2014).