Vishnu K. Chhabra

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Education

The Ohio State University **May. 2022 – May 2027**
PhD in Computer Science and Engineering *Columbus, Ohio*
Advisor(s): Kannan Athreya , Srinivasan Parthasarathy ***GPA**: 3.85*

University of Minnesota - Twin Cities **September. 2018 – May 2022**
Bachelors in Computer Science and Mathematics *Minneapolis, Minnesota*
Advisor(s): Joseph Konstan , Ju Sun ***GPA**: 3.4*

Relevant Coursework

- Advanced Machine Learning
- Computer Vision
- Algorithms
- Natural Language Processing
- Artificial Intelligence
- Real Analysis
- Probability Theory
- Artificial Intelligence of Things
- Trustworthy AI

Experience

The Ohio State University **May 2022 – Present**
Graduate Research Associate *Columbus, Ohio*

- **Focus**: Out-Of-Distribution Detection and Generalization, LLMs for 5G and beyond, Machine Learning for Channel Prediction/Traffic Engineering in 5G and beyond.
- Developed a **first of its kind**, novel system for estimating calories of food via WiFi signals.
- Designed an End-To-End framework based on a conditional diffusion model for cross band channel prediction, outperforming the current State-of-the-art by **2dB** SnR for downlink channel prediction.
- **Current Projects**: Out-of-Distribution detection for **LLMs** for 5G Protocol Analysis, Cross Antenna Predictions via Physics Based Machine Learning.

University of Minnesota - Twin Cities **Sept 2020 – May 2022**
Teaching Assistant *Minneapolis, Minnesota*

- Facilitated remote learning by teaching Java and OCaml to undergraduates during the pandemic.
- Designed grading schemes, project assignments, and debugging solutions to enhance student learning.

Scriptulate **May 2021 – August 2021**
Software Engineering Intern *Remote*

- Developed efficient databases and performed anomaly detection on Healthcare Data, increased the accuracy of anomaly detection algorithm by **40%**.
- Created semantically correct and timely Knowledge Graphs to analyze Doctor-Patient relationships reaching **80%** Gold Accuracy.
- Mentored by the CTO of the firm

Publications

A.Banerjee, X.Zhao, **V.Chhabra**, K.Srinivasan, S.Parthasarathy. "*HORCRUX: Accurate Cross Band Channel Prediction*" (**MobiCom 2024**) (In Review)

R. Kong, C. Zhang, R. Sun, **V Chhabra**, T. Nadimpalli, and J. Konstan. *"Multi-Objective Personalization in Multi-Stakeholder Organizational Bulk E-mail: A Field Experiment"* (**CSCW 2022**)

Research Projects

Facial Recognition for Dental-Assisting Robots | *Python, HuggingFace, PyTorch* **June 2023**

- Facilitated synthetic data generation utilizing HuggingFace pipeline and Stable Diffusion Models.
- Leveraged state-of-the-art facial recognition schemes to spearhead research for medical assisting robots.
- Achieving **90%** accuracy, creating a novel benchmark for dual factor authentication in dental assisting robots .

Food Calorie Estimation using WiFi | *Matlab, Python, Spectral Analysis, Ongoing* **March 2023**

- Using Signal Processing techniques such as spectral analysis for Estimating Calories and Nutrient Information of Food based on the WiFi Signal .
- Imputed calories of a plethora of liquid and solid foods with upto **10%** error rate.
- Model **robust** to environmental variables such as signal interference, food containers,.etc.

End-To-End Learning Based Cross Band Channel Prediction | *Python, PyTorch, Ongoing* **May 2022**

- Designed an End-To-End framework based on a conditional diffusion model for cross band channel prediction, outperforming the current State-of-the-art by **2dB** SnR for downlink channel prediction.
- Collaborated on a physics based machine learning approach, "*HORCRUX: Accurate Cross Band Channel Prediction*" **(In Review for MobiCom 2024**).

Automated Trading With RL: Deep Reinforcement Learning In Quantitative Finance | *Thesis* **January 2022**

- Spearheaded research in Deep Reinforcement Learning for Automated Cryptocurrency Trading
- Benchmarked multiple approaches such as: Deep-Q-Network, DDPG, PPO, SAC, A2C. TD3, Multiagent DDPG.
- Modelled the environment as a Partially Observable Markov Decision Process, performed **Monte Carlo Simulations** for evaluation.
- Undergraduate Thesis with **Distinguished** Poster

Recommendation Framework based on Deep Reinforcement Learning on News Data | *Tensorflow* **January 2021**

- Leveraged an Actor-Critic Based Framework for News Recommendation on the Microsoft News Dataset(MIND).
- Outperformed existing DRL frameworks on the dataset with **2%** gain in RMSE(Root Mean Squared Error) .
- Project won **Best In Class Project**

Collaborations

AIEdge REU | *Mentoring* **June 2023**

- Mentored undergraduate students and guided research projects in Resource Allocation and Deepfake Detection.

UMN Small Satellite Team | *C/C++, Communication System* **September 2020**

- Worked in the communications team to setup and secure communication systems for the satellites.

MNQuants | *Statistics, Python, PyTorch* **June 2020**

- Led a team which automated ForEx trading using PCA and CNNs to model currency prices.

Technical Skills

Languages: Python, Java, C/C++, OCaml, Rust, JavaScript, SQL
Frameworks: Docker, Kubernetes, AWS, TensorFlow, Pytorch,
Technologies/Platforms: Linux, Github, Git, MATLAB, CUDA