

# SANKET WAGHMARE

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## EDUCATION

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**M.Tech in Electrical Communication Engineering**, Indian Institute of Science, Bangalore 2021-2023  
CGPA : 8.49/10

**B.Tech in Electronics Engineering**, Vishwakarma Institute of technology, Pune 2017 - 2021  
CGPA : 8.81/10

## SKILLS

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- **Programming Languages:** Python, C++, SQL, LaTeX
- **Tools/Frameworks:** Scikit-learn, PyTorch, TensorFlow, Docker, PEFT, Autogen, LangGraph, LLMs, RAG

## EXPERIENCE

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**AI Software Engineer** July 2023 - Present  
Banyan Intelligence Bangalore

- **Root Cause Analysis Agent – Ell3** Python—LoRA—RAG—Faiss—Docker
  - Designed and developed a GenAI-powered agentic application enabling customizable AI agents for business operations, with enterprise data integration via MCP (Model Context Protocol) to external sources like PostgreSQL, Shopify, Google Analytics, Calendar, and Gmail. Implemented dual reasoning modes using Chain-of-Thought prompting and Tree Search for iterative inference within the CodeAct framework, with custom session/context layers supporting persistent, explainable multi-turn interactions.
  - Fine-tuned the Qwen 7B language model using the PEFT techniques for RAG applications on telecom 3GPP documents. Parsed and curated training data from 3GPP PDFs, achieving a ROUGE score improvement to 0.67 via supervised fine-tuning.
- **Self-Supervised Anomaly Detection** Pytorch—Python—Transformer—Isolation-forest—VLM
  - Built a custom pipeline to detect anomalies in large-scale telecom KPI time-series data using the Anomaly Transformer model, where association discrepancy compares learned temporal correlations against prior patterns. Achieved a ~23% F1-score improvement (from 0.71 to 0.94) over baseline models like Isolation Forest through robust windowing, scaling, and evaluation.
  - Designed a system to generate descriptive explanations of anomalies in KPI time-series plots by comparing local trends and neighboring patterns. Fine-tuned the attention layers of a vision-language model using a custom training pipeline, achieving a ROUGE score improvement of 0.41.
- **Enhanced Semantic Search Engine for Telecom Metrics** Python—PyTorch—Transformers—SciPy
  - Built an end-to-end search engine to process natural language queries. Performed algebraic experiments on embeddings derived from models such as BERT for better representation of telecom phrases. Curated a test dataset, and achieved 84% STOA accuracy compared to embedding models from openai, etc. Created custom tools to rate various SOTA embedding models using distinction in the embeddings space.
- **Network failure prediction in irregular time series** Python—PyTorch—Time-Series—XGBoost
  - Developed a solution to predict network failures using irregular time series of EMS alarms. Conducted feature engineering, created baseline prediction models using XGBoost classifiers achieving precision of around 60%. Trained an LSTM model with attention, to get sequential information of the failure and surrounding events, achieving best precision of 80%.

## ACADEMIC WORK & PROJECTS

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- **Pandemic response optimization :** July 2022-June 2023  
- Master's Thesis - Advisor: Prof. Rajesh Sunderasan, IISc Bangalore  
*Developed and analyzed a mathematical disease model using SIRV equations and Pontryagin's principle to study non-pharmaceutical interventions' impact on infectious disease spread. Proposed timing control policies near the herd immunity to reduce economic and social burdens.*
- **LMSYS : Predicting preferable llm response :** July 2024  
-LMSYS - Chatbot Arena Human Preference Predictions  
*Given llm responses from two models with task to predict the human preferred response. Implemented a custom Siamese BERT-based architecture, using a pre-trained transformer model to extract embeddings for prompts and responses with ColBERT relevance, followed by a binary classifier achieving a log-loss of 1.097.*
- **Forecasting warehouse orders :** August 2024  
-Rohlik Orders Forecasting Challenge  
*Preprocessed historical data of orders for different warehouses, performed feature engineering to extract temporal, statistical and lag based features. Created sequence out of the timeseries and modelled the number of orders using a Bi-directional LSTM model, achieving MAE of 0.063.*
- **Estimating Travel Time for BMTC buses :** Nov 2022  
- DS Hackathon CNI 2022  
*Performed data analysis to extract segments of source and destination pairs from BMTC bus's travel history, assigned each segment to a localised cluster and trained regression and ensemble models individually over each cluster to predict the travel time. Achieved minimum MAE of 16.7 with an ensemble of LR and GBR.*

## COURSEWORK

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- Pattern Recognition and Neural Networks
- Deep Learning
- Detection and Estimation Theory
- Digital Image Processing
- Machine Learning with Large Datasets
- Probabilistic Machine Learning

## ACHIEVEMENTS & EXTRA-CURRICULAR ACTIVITIES

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- Won a cash prize of 25k/- in hackathon by CNI.
- Received fellowship for MTech research on designing optimal intervention strategies under the Centre for Networked Intelligence.
- Volunteered in organizing the SPCOM 23 conference.