Srikrishna Iyer

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EDUCATION

Master of Science in Computer control and automation **Aug 2019 - Aug 2020**

Nanyang Technological University, Singapore

- Research Assistant at Singtel Cognitive and AI lab for enterprises (SCALE@NTU) under the supervision of Dr. Muhammad Fayez Karim
- Related courses : Machine Learning and Genetic Algorithms, Machine Vision, Robotics and Sensors

Bachelor of Technology in Electronics and Communications **July 2015 - July 2019**

Vellore Institute of Technology

- Related courses : Problem solving and Object oriented programming ,Probability and Random Processes, Statistics, Linear Algebra, Neural Networks and Fuzzy Control, Digital Image & Signal Processing, Information theory & coding

EXPERIENCE

Senior AI Research Engineer

AI.DA STC, ST Engineering IHQ, Singapore **Sep 2022 - Present**

- **Multi-agent systems for efficient vision-based modeling** **Dec 2024 - TBD**
  - Planned collaboration with Prof. Mike Shou (NUS), Prof. Gedas Bertasius (UNC) on *multi-agent planning and collaboration* for efficient data sampling, annotation, segmentation augmentation and model domain adaptation.
- **Multi-Agent LLMs** [IMDA presentation][SWITCH demo] **June 2024 - Present**
  - Proposed, designed and Implemented a hierarchical state machine based multi-agent conversational *chatbot* that can empathize, provide counseling advice (RAG), administer surveys for CBT and retrieve mental health information from young adults who are part of a mandatory civic duty program.
  - Tools: Python, Langchain, Langsmith, DSPy, Supabase (postgres), Scrapy, FastAPI, OpenWebUI
- **AI assistant RAG for Call Center agents** [docs] **Oct 2023 - May 2024**
  - Design and developed a RAG agent, a Large language model (zephyr-7B) based chatbot for customer service agents of a government entity using retrieval augmented generation (RAGs).
  - Proposed a sample-efficient and compute efficient knowledge distillation framework using diversity-induced weighted mutual learning (DWML) [code], used to distill the self-hosted LLM for RAG.
  - Tools: Python, Llama Index, DVC, Scrapy, MinIO, MLFlow, Streamlit, FastAPI, Postgres, MongoDB, Docker, vLLM, PyTorch, Weights & Biases, TruLens
- **Advanced Predictive Maintenance System using Graph-Attention Based GANs** [code][Arxiv]
  - Proposed a predictive maintenance system using a novel graph-attention based generative adversarial networks (GANs) for thermal and lubrication sub-systems of ST's patrol boat diesel engines. Improved average anomaly recall rate by 76% compared to pre-existing systems. Benchmarked higher than best state-of-the-art GAN method for time-series data by ~59% based on Frechet Inception Distance (FID) scores.
  - Tools: Python, PyTorch, MATLAB, Simulink

R&D Engineer I

Wirebond R&D, ASMPT pvt. Ltd., Singapore **Sep 2020 - Aug 2022**

- **Multi-sensor fusion architecture for quality prediction** **Sep 2020 - Sep 2021**
  - Implemented a hybrid fusion architecture for wire bonding quality prediction, leveraging a multi-stage feature fusion approach. The system extracts statistical and temporal features from multiple process signals across six distinct bonding stages, with each stage's features processed through a dedicated neural network for dimensional reduction and representation learning. These learned stage-wise representations are then aggregated and fed into an XGBoost model for final quality prediction.
  - Tools : Python, scikit-learn, MATLAB, matplotlib, streamlit
- **Domain Adaptation** **Sep 2021 - Aug 2022**
  - Designed an efficient domain adaptation model that uses a causal inference based algorithm to select a subset of features from unseen data for model retraining. Using Bayesian Optimisation, the algorithm selects a feature set from the target domain (unseen data) to maximize model performance while preserving the underlying causal structure. The average measurement error reduced by 19% and a 2X minimisation of model re-training time.
  - Tools : Python, scikit-learn

Research Assistant

SingTel Cognitive and AI lab for enterprises (SCALE@NTU) **Oct 2019 - August 2020, Singapore**

- **Contactless vital signs monitoring system using mm-wave radars** [paper][code]
  - Formulated a contactless vital signs monitoring system to measure the heart and breathing rate of individuals using a milli-meter wave (mm-wave) radar at 77 GHz. Utilized range-bin tracking, phase extraction, motion denoising and adaptive band-pass filtering to estimate quasi-periodic vibrations of the chest correlating 70% of the time with ECG readings.
  - Developed a deep learning model trained to classify arrhythmia based on the heartbeat waveforms with an accuracy of 75%.
  - proposed and implemented a patent-pending non-contact blood pressure prediction system using dual mm-wave radar, with an average absolute error of ~0.8 with the ground truth.
  - Tools : MATLAB, IWR1443 mmWave radar development kit

PUBLICATIONS

1. **S. Iyer,"When Babies Teach Babies: Can student knowledge sharing outperform Teacher-Guided Distillation on small datasets"** , Proceedings of the BabyLM Challenge, CoNLL 2024 (TBP)
2. **S. Iyer ,**Teng Teck Hou "**GAT-GAN: A Graph-Attention-based Time-Series Generative Adversarial Network"** [paper], arXiv preprint arXiv:2306.01999 2023
3. **S.Iyer,** Velmurugan T, Prakasam P and Suresh Kumar T R, "**Support Vector Machine based Spectrum Handoff Scheme for Seamless Handover in Cognitive Radio Networks"** [paper], Concurrency and computation: Practice and Experience 2023
4. **S. Iyer**, L. Zhao, M. P. Mohan, F. Zhong, M. Y. Siyal, A. Alphones and M. F. Karim, "**mmWave Radar based Vital Signs Monitoring and Arrhythmia Detection using Machine Learning"** [paper], Sensors MDPI 2022
5. **S. Iyer**., Velmurugan, T., Gandomi, "**Structural health monitoring of railway tracks using IoT-based**

multi-robot systems” [paper], Neural Computing & Applications 2020

6. **S. Iyer**, A. P. Nadkarni and Padmini T. N, **Antlion optimization and Whale optimization Algorithm for multilevel thresholding segmentation** [paper],(i-PACT) 2019, IEEE

TALKS/EXHIBITIONS

1. **Invited Speaker at IMDA, Singapore**
   Title : **"Agentic Apps: Lessons learnt from creating Agentic applications"**[presentation]
   Venue : **Infocomm Media Development Authority, SIngapore (IMDA)**[details]
   Date : 30th September, 2024
   Description : Presented a novel approach to improving the reliability of agentic Large Language Models (LLMs) using Hierarchical Finite State Machines (HFSMs). Demonstrated how our team's HFSM-based solution offers greater reliability and control compared to pure agentic systems, potentially addressing key challenges in AI safety and robustness.
2. **Exhibitor at SWITCH, Singapore**
   Title : **"AGIL AI Assistant"**[demo]
   Venue : **Singapore week of innovation and technology, Singapore (SWITCH)** [details]
   Date : 28th-30th October, 2024
   Description : Showcased the above Multi-agent conversational chatbot as part of ST Engineering’s AGIL product suite.