Subin Erattakulangara

erattakulangara@uiowa.edu • 319-569-9553

Portfolio Github LinkedIn Scholar

Summary

Passionate Engineer with 5+ years of experience in deep learning, specializing in computer vision and NLP. Proven expertise in designing efficient AI algorithms and open-source software development. Seeking to leverage my skills for innovative solutions.

Professional Experience

R & D Engineering Intern – Kitware Inc, NY

Data Analysis & Visualization *Jul 2023 – Dec 2023*

- Designed an AI adapter for the Digital Slide Archive, enabling developers to construct and integrate AI applications with the open-source HistomicsTK toolkit.
- Collaborated with various stakeholders to craft an SBIR application aimed at developing an AI image analysis tool.
- Managed debugging and maintenance of the HistomicsTK library & Digital Slide Archive (DSA).
- Developed AI tutorials for the DSA AI adapter.

Research Assistant – The University of Iowa, IA

Laboratory of Quantitative and Dynamic MRI *Aug 2019 - Present*

- Developed AI/ML tools for upper airway segmentation in 2D, 3D, and 3D + time MRI data, enhancing analysis capabilities.
- Built segmentation models for quantitatively assessing upper airway dynamics for sleep apnea, improving diagnostic accuracy.
- Led the development of transfer learning methods for small dataset network training, improving model performance with limited data.
- Served as a Journal Reviewer for IEEE ISBI, ICASSP conferences

Robotics and cognitive services – TCS Kochi, India

Hardware and Software engineer *Dec 2017 - Aug 2019*

- Developed and implemented intelligent chatbot systems to scrape details from new product updates and answer user queries.
- Led the design and 3D printing of a humanoid robot's outer shell and contributed to the development of an ATM testing robotic hand.
- Brought in keyword-based voice chatbot for customer interactions with the indigenously developed humanoid robot.

Education

PhD Scholar, Biomedical Engineering *Aug 2019 - Present*

The University of Iowa; Graduate GPA: 3.89/4.00 (Expected Graduation – Dec 2024)

- Thesis: Focused on developing data-efficient segmentation tools for quantitatively accessing upper airway dynamics.
- Relevant courses: Deep learning, Scientific computing, Human physiology, medical imaging physics.

Bachelor of Technology, Biotechnology *Jun 2013 - Jun 2017*

National Institute of Technology Calicut, India; Undergraduate GPA: 8.33/10.00

- Thesis: Developed computational methods for drug development and protein-protein interaction.
- Achievements: Neuroscience fellowship at NCBS Bangalore, Robotics interest group member, developed Cube PCR and Switchless AR projects.

Projects

DSA AI Adapter

- Build an AI Adapter application for connecting the Digital Slide archive enterprise software with custom build AI models
- Utilized Fast API to host AI models that can be accessed through the DSA user interface.
- Build multiple image segmentation models for the histopathology data – Repo Link

RAG PDF Explainer

- LLM based application allowing users to query from an uploaded pdf
- Used Langchain, chainlit and OpenAI API to build it – Repo Link

3D-time series MRI segmentation based on self-supervised UNETR

- Data efficient algorithm for segmenting upper airway from 3D-time MRI scans.
- Used self-supervised training method for achieving fine tuning with small sized dataset

Publications and Conferences

- **Erattakulangara, S**., Kelat, K., Meyer, D., Priya, S., & Lingala, S. G. (2023). Automatic Multiple Articulator Segmentation in Dynamic Speech MRI Using a Protocol Adaptive Stacked Transfer Learning U-NET Model. Bioengineering, *10*(5), 623.
- Rusho, R.Z., Zou, Q., Alam, W., **Erattakulangara, S.**, Jacob, M., Lingala, S.G. Accelerated Pseudo 3D Dynamic Speech MR Imaging at 3T Using Unsupervised Deep Variational Manifold Learning, Medical Image Computing and Computer Assisted Intervention (MICCAI 2022)
- SGL **Subin Erattakulangara**, Karthika Kelat, Knowledge-net (K-net): a transfer learning network for detection of COVID-19 from chest X-ray images, Biomedical engineering society (BMES).
- **S Erattakulangara**, SG Lingala, Airway segmentation in speech mri using the u-net architecture 2020 IEEE 17th International Symposium on Biomedical Imaging (ISBI)

Honors / Awards

- Startup accelerator participant: Builders and Backers, 2023 Cohort
- Startup games: University of Iowa, 3rd Prize.
- Shark tank competition: ISMRM international conference, 2022 Finalist
- Univ of Iowa's College of Engineering: Research Open House, 2022 Best poster award

Technical Skills

Programming Languages: *Python, C++ (MATLAB)*
Frameworks & Libraries: *PyTorch, TensorFlow, Keras, MONAI, NumPy, scikit-learn*
Tools & Platforms: *Git, Flask, FastAPI, MLflow, W&B, Chainlit, LangChain*
Databases: *SQL*
Other: *MLOps, Arduino*