M Samuel Jayakumar

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Education

- **Indian Institute of Science, Bangalore** — GPA: 7.40/10
  Master of Technology in Artificial Intelligence — *Aug 2022 – Present*
- **Jawaharlal Nehru Technological University, Hyderabad** — GPA: 7.68/10
  Bachelor of Technology in Computer Science and Engineering — *Aug 2017 – Sept 2021*

Relevant Coursework

- Pattern Recognition and Neural Networks, Data Structures and Algorithms, Computer Vision, Advanced Image Processing, Data Analytics
- Linear Algebra and Applications, Stochastic Models and Applications, Real Time Systems, Advanced Deep Learning

Projects

- **Unsupervised Image Segmentation of Remote Sensing Images using Vision Transformers** *(MTech Thesis)*
  - Conducted unsupervised image segmentation on satellite images using state-of-the-art Vision Transformers.
  - Leveraged contrastive learning to learn rich semantic relationships and ensure semantic consistency in local regions.
  - Evaluated the algorithm on multiple datasets, including Vahingen and Postdam and showed that results were consistent, demonstrating its adaptability and generalization capabilities.

- **Text Summarization and Text Classification using Transformers**
  - Successfully fine-tuned the Pegasus model for text summarization, specializing in the context of conversational content improving the rogue score from 0.22 to 0.48.
  - Successfully fine-tuned a BERT model for sentiment analysis of Amazon food reviews dataset resulting in classification accuracy of 79% .

- **Facebook Friend Recommendation System using Graph Partitioning and Graph Mining**
  - Developed a novel graph partitioning algorithm utilizing spectral decomposition techniques. Recommended friends based on communities formed.
  - Performed extensive featurization on facebook data. Designed and implemented a Random Forest classifier and recommended friends based on predictions of the classifier.

- **Image Classification and Segmentation using CNNs:**
  - Built and trained a CNN model using PyTorch and compared the results with pre-trained ResNet18 model after finetuning. Extracted features from the last layer of the ResNet18 model and used kNN Classifier for Image Classification.
  - Finetuned MobileNetv2 backbone for Image Segmentation and compared pixel-wise accuracy and mean IOU with existing FCN ResNet50 model resulting in 89.80% for the ResNet-based FCN and 82.38% for the MobileNetv2-based FCN.

- **Self-Supervised Learning Applied to Visual Assessment of Cluster Tendency**
  - Developed a framework to process highdimensional data into a lower dimension. Generated embeddings/representations of the data and then proceed to evaluate the clusters visually and not numerically, by generating highly interpretable visual representations.

- **Mobile Recommendation System**
  - Developed a full stack project with small component of NLP that helped users make informed decisions on selecting the best mobile phones.
  - Utilized data analysis techniques to evaluate various factors such as specifications, brand reputation, and price to determine the most suitable mobile phones for individual users.
  - Performed sentiment analysis of user reviews using natural language processing techniques to classify user sentiments as positive, negative, or neutral

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Mini Projects

- **Obstacle Avoidance in Mobile Robots Using Deep Learning**
  - The project is concerned with the problem of obstacle avoidance in indoor environments for vision based mobile robots.
  - Adapted the VGG16 deep learning architecture for five-class classification where the classes represent navigation commands.

- **Recommendation system using Graph Neural Networks**
  - Implemented a Graph Neural Network (GNN) model to predict the user's rating for a movie, by creating a graph that represents the similarity relationships between movies.

Technical Skills

- **Languages:** JAVA, C++, Python
- **Technologies:** PyTorch, Pandas, Numpy, Matplotlib, SciPy, Scikit-Learn

Experience

- **Cognizant** Chennai, Tamil Nadu
  Programmer Analyst Trainee *Oct 2021 - Jun 2022*
  - **Insurance Application Development**: Played a key role in developing an insurance application using Java. Developed a secure user authentication and authorization system to ensure data privacy and access control. Implemented a user-friendly interface for policyholders to view and manage their policies and file claims. Additionally, actively participated in code reviews and implemented enhancements based on user feedback.

Achievements

- All India Rank **121** in GATE 2022(CS/IT)
- All India Rank **546** in GATE 2021(CS/IT)
- Published a paper in IJAEMA Journal,Volume XII,Issue VI,June 2020 on Mobile Recommendation System.