VIJAY SWAMINATHAN

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EDUCATION

- **Master of Computer Science**, Rutgers University - New Brunswick, NJ, USA. September 2022 - Present
  Relevant Coursework: Data Structures & Algorithms, Operating Systems, Databases, Intro to AI. **Grade:** 3.6/4.0
- **Bachelor of Computer Science and Engineering**, Amrita Vishwa Vidyapeetam, TN, India. July 2018 - August 2022
  Relevant Coursework: Software Engineering, Machine Learning, Software Project Management. **Grade:** 8.59/10.0

TECHNICAL SKILLS

- **Languages and Frameworks:** C, C++, Python, Java, HTML5, CSS, JavaScript, PyTorch, TensorFlow, Node.js, FastAPI.
- **Tools and Technologies:** SQL, NoSQL, Dockers, Jupyter, Containers, Terraform, Langchain, SageMaker, AutoML, Cron, Jenkins, JIRA, Postman, REST, Uvicorn, Hugging Face Transformers.
- **Platforms:** AWS, Linux, Docker, Unreal Engine, GCP, Azure.

PROFESSIONAL EXPERIENCE

SDE Intern — iCliniq May 2023 - August 2023
Tech: Python, MySQL, ECS, Docker, Lambda, Fargate, PyTorch, FastAPI, Llama-2, Terraform, REST APIs. *Coimbatore, India*

- Developed an end-to-end 'Smart Doctor' application that answers user-submitted medical queries by leveraging Meta's Llama-2-13B instruct model and AWS services, resulting in a latency reduction of 300 minutes in query responses.
- Automated the classification of incoming patient queries into medical sub-fields to direct them only to specialized doctors by training a Support Vector Machine model (SVM) and deploying it via FastAPI, saving 20 hours of human resources per week.
- Programmatically mapped primary tags of published medical queries to corresponding ICD-11 codes using the ICD-11 API and GPT-3.5 Turbo to codify the query database, eliminating the need for manual oversight.

SDE Intern — Wireline Solutions February 2021 - July 2021
Tech: Java, HTML5, CSS, JavaScript, Jupyter. *Coimbatore, India*

- Automated root cause analysis of network failures - Designed an application that employs unsupervised K-Means ML algorithm to optimize the ISP's anomaly detection process lowering employee utilization by 85%.
- Developed a module for the company's customer helpdesk application to sort complaints across 5 departments by implementing decision components (SOA) with the ruleset consisting of ticketID and department-specific jargon.
- Application features included automatic report generation and sending auto-generated emails/alerts leading to response latency reduction of 60%.

ACADEMIC PROJECTS

PDF Doctor — Tech: Langchain, Python, Llama-2-13B, PdfPlumber, EC2, MySQL.

- Engineered an AI-enabled interactive "PDF Doctor" application to query medical report PDFs, utilizing Meta's Llama-2-13B instruct model and a pdf-to-text parser.
- The embeddings of the parsed PDF and the user query, when passed to Langchain's multi query retriever, identifies the context area relevant to the query and Llama-2 answers the query based on the context.

Visualization Of Ensemble Differential Evolution Algorithms — Tech: Python, R.

- Empirical analysis of Evolutionary algorithms (EA) fails to explain complementary nature of EA. To identify its merits, performed visual analysis of Ensemble DE algorithms by choosing optimal graph theoretic approaches extended to EA - Local Optima Networks, Barrier trees, Search Trajectory Networks, and PCA.
- Performance analysis of the graph techniques revealed that STNs rank 30% better than PCA and LON for analysis of EAs because of the comparative nature of merged STN.
- Fed data obtained from the DE algorithm into a hashing function. Mapped the data into STN locations and generated constituent and merged STNs from hashed data. Cyclical analysis of metrics file resulted in graphs converging at a 2x rate.

Visual Media Player — Tech: Python (Pandas, OpenCV, Scikit-image, G6 iris recognition, Pyfingerprint)

- Built a smart media player that uses face and iris detection to gauge the user's alertness, allowing the media player to play/pause automatically when detecting drowsy eyes and sideways head movement with a delay of 500 milliseconds.
- Employed hand gesture translation to manipulate the media player controls based on 5 gestures of the left hand.