Madhu Lakkoju

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Education

Stony Brook University, State University of New York **August 2023 – December 2024**
Masters of Science in Computer Science *Stony Brook, NY, USA*
Coursework: Distributed Systems, Decentralized Systems, Operating Systems, Database Management, Computer Vision

Gokaraju Rangaraju Institute of Engineering & Technology, JNTU **August 2017 – July 2021**
Bachelor of Technology in Computer Science *Hyderabad, India*
Coursework: Computer Networks, Cloud, Databases, Web Technologies & Security, Operating Systems, Big Data

Technical Skills

Languages: Java, Core Java, C++, C, C#, Python, JavaScript, HTML/CSS, SQL, NoSQL, React, Angular
Cloud: AWS (Lambda, DynamoDB, SNS, SQS, Athena), Azure (Web Jobs, Logic Apps, Redis, SQL, Kubernetes)
Technologies: Spring Boot, ASP.NET, .NET Core, JUnit, Kafka, RabbitMQ, Docker, MySQL, Jenkins, GraphQL
Certifications: Cisco CCNA, MTA - Networking Fundamentals, PCAP: Python, Data Structures
Interests: Web Development, Distributed Systems, Object Oriented Programming, Web3, Artificial Intelligence

Work Experience

Software Developer Intern - WolfieONE **August 2024 - Present**
Stony Brook Medicine IT *Stony Brook, NY*

- Building WolfieONE, an Oracle ERP system to address several business functions at Stony Brook University.
- Implementing real-time Data Integrations and Synchronizations module for Stony Brook Medicine IT - WolfieONE.
- **Tech Stack: Java, C#, .NET, Javascript, SQL, ETL pipelines, DB Design, Performance Tuning**

Graduate Research Assistant - Distributed Systems Research **Jan 2024 – Present**
Stony Brook University *Stony Brook, NY*

- Researching on core **Adaptive Blockchain Systems** under supervision of Prof. Mohammad Javad Amiri
- Developed core architectures and Byzantine Fault Tolerant protocols in performing State Machine Replication.
- Implemented Adaptivity in choosing these Architectures and Protocols based on real-time performance metrics.
- **Improved Throughput by 27%** over fixed architectures using a Reinforcement Learning Agent that learns optimal architecture - protocol combinations considering features such as contention, write ratio & latency in episodes.
- **Tech Stack: Java, Distributed Systems, Threads, Machine Learning, Python, gRPC**

Software Developer **Aug 2021 – Aug 2023**
Standard Life UK | Tata Consultancy Services *Hyderabad, India*

- Optimized SQL Queries and Angular UI, significantly **reducing load time from 3.5 to 1.8 seconds** with efficient data structures, async calls, and caching to improve experience of **12 million customers** & enhanced reliability by 22%.
- Designed and implemented event-driven features with **AWS Lambda, SNS & SQS** improving performance by 15-20% and custom **Glue ETL jobs** to perform data synchronizations between customer app and internal CRM systems.
- Implemented a new set of APIs with **API Gateway** which uses **Athena queries and KDAs** to generate real-time metrics from huge data streams and leveraged **DynamoDB** and **S3** to allow external systems to access results
- Designed and deployed Microservices architecture with REST API, improving overall website performance by over **30%** more than legacy MVC implementations (Metrics: FCP, FMP, LCP, load time, HTTP requests, errors).
- Implemented Magnolia approach using dynamic text from multiple JSON files on UI led to improved content load time (FCP, FMP) via better browser caching and faster deployment of new updates.
- Collaborated closely with Clients in designing and building an end-to-end CRM System on **Microsoft Power Platform** using Dataverse, custom C# actions, HTML/JS web resources, and REST endpoints through plugins.
- Identified redundancy and implemented necessary Power Automate flows and workflows to send progress acknowledgments, reducing manual work by 85-90% with an event-driven model and achieving resource efficiency.
- Employed Agile methods, emphasizing quality enhancement with continuous **code reviews** and **optimizations** during iterative product development in a cross-functional team.
- **Tech Stack: AWS, Angular, Typescript, Javascript, Java, REST API, Spring Boot, SQL**

Full Stack Developer Intern **Mar 2021 – May 2021**
Tata Consultancy Services *Chennai, India*

- Built a Chat service with Web sockets, WebRTC, SSO, and OAuth Services on Angular JS UI and Hibernate ORM.
- Deployed these Service and UI packages in **Amazon Elastic Compute Cloud (EC2)** using CI/CD pipelines
- **Tech Stack: AngularJS, Javascript, Java, AWS, SQL, Hibernate**

Dynamics 365 and Power Platform Developer **Jan 2020 – Feb 2021**

D365 Solutions Ltd *Remote*

- Utilized Dataverse, business process flows, actions, scheduled jobs, security roles with solution architecture, and Azure integration in the Microsoft Dynamics 365 CE in performing Case Management, Data Sync, ETL & Automation tasks
- Integrated custom processes with efficient C# plugins to perform business logic in Pre-validation, Pre & Post Operation modes and Power Automate Flows to send acknowledgments, perform Dataverse updates & trigger dependent systems
- Created Power Portals to work closely with CRM functionalities and customized the pages using PCF, Ribbon Work Bench, Liquid templates, HTML, JavaScript, jQuery & CSS along with Model Driven Apps.
- Developed and managed HTML web resources and event handler JavaScript functions using Client Reference & XRM that saved users the time-consuming task of switching between modules to view the data.
- Built Reports and Visualizations using SQL Server Reporting System, Adobe Experience Manager & Power BI.
- **Tech Stack: Microsoft Power Platform, C#, Javascript, HTML/CSS, JQuery, REST, Azure**

Projects

APaxos | *Distributed Systems, Java, gRPC, Multi-Threading, Shell Scripts, Database Management*

- Developed a variant of Paxos Protocol with XOV architecture similar to Hyper Ledger Fabric Blockchain.
- Implemented Leader Election, State Transfer, Synchronize states and handled Node Failure adhering to Paxos

Linear PBFT - Two Phase Commit

- Impelemented PBFT, State replication, checkpointing, View-Change, Sharding, and acive Re-Sharding mechanisms
- Optimized consensus efficiency by minimizing communication overhead by implementing Optimistic Phase Reduction, Threshold signatures, and robust checkpointing to increase transaction throughput.
- Implemented Cross Shard Transaction management with 2-Phase Commit across multiple clusters in each transaction

PAXOS - Two Phase Commit

- Developed Paxos and configurable clustering mechanism, event-based re-sharding, and 2PC for Cross Shard Tnxs.

Incremental Web Crawler | *AWS, Lambda, Dynamo DB, CDK, Java, React JS, SQL, AWS SDK*

- Developed and deployed **Web Explorer**, an advanced web crawling application leveraging AWS features and Jsoup.
- Implemented robust rate-limiting to reduce 429 code on Too Many Requests to a server and optimized performance resulting in a **30% increase in crawl efficiency** and response times.

Leaf Growth Analysis | *Python, OpenCV, Machine Learning* | **Advisor: Dr. Y Krishna Bhargavi**

- Analyzed leaf's apparent characteristics to anticipate the growth phase using classifiers like Naïve Bayes, Support Vector Machine, and Decision Trees with a **Weighted Voting Classifier** to increase **accuracy by 14%**.
- Incorporated a Support Queue for Reinforcement Learning along with Digital Image acquisition - OTSU Thresholding, Gaussian Blur, and segmentation to ascertain the features that increased the model's **accuracy** from **51% to 82%**.

Expense Management System | *AWS, Lambda, RDS, React JS, Spring Boot, Mongo DB, Hibernate, Java*

- Multi-tier Full-Stack Web Application to display reports & visualizations on **React UI** using **MongoDB NoSQL** and **Spring Boot** to store and process transactions. Hosted on the Heroku server through CI/CD pipelines

Involvement & Experience

- Teaching Assistant for ISE-305: Database Design and Practice Course.
- Active Contributor to Linkedin Articles in Distributed Systems, System Architecture, and System Design Domains.
- Built new-age solutions using real-time Cloud systems and GenAI at Hackathons (RUHealth Hack and HackPrinceton)
- Active Project member at Advanced Academic Centre (AAC), Computer Society (CSI) & Challenge ACI organizers