# SUMMARY

CHARAN THOTA

Boston, MA, USA | +1 (857) 437-9652 | [thotac3030@gmail.com](mailto:thotac3030@gmail.com)

Results-driven Software and Machine Learning Engineer with 2.5+ years of experience building scalable, AI-driven platforms and cloud-native applications. Proven expertise in Python, SQL, AWS, LLMs, and DevOps tools, with a strong focus on designing intelligent systems for healthcare and enterprise domains. Skilled in developing end-to-end solutions involving OCR, vector databases, predictive modeling, and RAG-based chatbots. Adept at working across the stack—backend APIs, automation, data pipelines, and interactive dashboards. Holds a Master’s in Analytics and a Graduate Certificate in Agile Project Management from Northeastern University. Recognized for delivering high-impact solutions that improve performance, reduce costs, and drive data-informed decisions.

# PROFESSIONAL EXPERIENCE

**Mettles Solution LLC -** Associated Client: Centers for Medicare & Medicaid Services (CMS)  **Remote**

*Software Developer Oct 2024 - Present*

* Developed an AI-powered medical document review system that allowed patients, doctors, and hospitals to submit documents for CMS-compliant analysis using OCR and machine learning models.
* Built a Python-based rule-checking agent leveraging ML models to evaluate documents against CMS guidelines, producing detailed compliance reports for end users.
* Designed and deployed scalable RESTful APIs using Flask, containerized with Docker, integrated with Jenkins CI/CD pipelines, orchestrated them with Kubernetes for scalable and reliable cloud infrastructure, and connected to AWS services including S3, SQS, SNS, and CloudWatch.
* Created an AI tool for Review Contractors to track submissions, visualize document review statuses, and generate insights on document flow and volume.
* Automated workflows for document ingestion, virus scanning, and OCR processing; implemented embedding-based logic for intelligent document classification and used AWS CloudWatch for system monitoring.
* Conducted rigorous security checks using SonarQube and ZAP/OWASP, resolving approximately 100–150 code smells and bugs to ensure high code quality.
* Utilized Datadog and CloudWatch for log aggregation and monitoring, ensuring system reliability and quick issue resolution.
* Developed front-end interfaces using ReactJS for streamlined document management and review workflows.

**Varenya Inc Remote**

*Software Engineer Jun 2024 – Sept 2024*

* Analyzed 10M+ patient records using SQL and Python to extract key metrics like ALOS, cost per patient, and readmission rates, improving operational efficiency by 15%.
* Built data pipelines in AWS Redshift and automated workflows with Python, creating predictive models that achieved 75% accuracy in forecasting readmission likelihood and optimized resource allocation.
* Developed machine learning models (logistic regression, random forests) with data science teams, improving readmission prediction accuracy by 20% and reducing hospital readmissions by 10%.
* Automated data extraction from 50+ diverse sources and developed 5 dynamic Power BI dashboards, enabling data-driven insights that led to a $5M reduction in costs through strategic care management.

**Free Float LLC Boston, MA, USA**

*Business Intelligence Analyst | Apprenticeship at Northeastern University April 2023 – July 2023*

* + Developed a predictive model to assess board of directors performance based on individual influence and company metrics, contributing to a deeper understanding of the relationship between past and future performance with an accuracy of 88%.
  + Conducted comprehensive research on director performance traits and their impact on board effectiveness, providing valuable insights into the dynamics of boardrooms and their influence on company outcomes.

**Everyday Chemist Inc Boston, MA, USA**

*Business Intelligence Analyst | Apprenticeship at Northeastern University Jan 2023 – Mar 2023*

* Designed and deployed 20+ dashboards, reducing decision-making time and saving 500+ man-hours annually through optimized queries and data modeling.
* Analyzed large datasets with SQL, Python, and statistical methods to boost campaign conversion rates by 10%, while building ETL pipelines with Azure Data Factory to enhance data accuracy and reduce redundancy.
* Led A/B testing and predictive analytics, driving a 10% increase in conversions, 20% sales growth, and 15% improved pipeline visibility through integrated Salesforce and Azure data updates.

**Northeastern University Boston, MA, USA**

*Event Specialist Feb 2023 - July 2023*

* Streamlined event operations by organizing schedules, managing registrations, and coordinating logistics across multiple campus departments.
* Maintained and updated internal tracking systems using Excel and simple automation scripts to reduce manual work and improve accuracy in attendance and resource planning.
* Took initiative to analyze event feedback data, identifying trends and sharing insights with the team to help improve future planning and student engagement.

**Global Shala Remote**

*Data Analyst Intern Jun 2021 - July 2021*

* Automated data extraction and transformation using Python, integrating SQL databases with Salesforce to improve reporting accuracy and business decision-making.
* Analyzed sales growth, customer retention, and profitability using Python, enabling data-driven strategies and improved outcomes.
* Developed dynamic Power BI dashboards with Python-enhanced insights, highlighting sales trends and driving stakeholder engagement.

**Vedamrit Technology Solutions Private Limited**

*Engineering Intern Aug 2019 – Sep 2019*

* Designed and implemented Python-based automation tools to support embedded system development, including data logging, sensor simulation, and testing workflows.
* Gained hands-on experience with microcontrollers (e.g., Arduino, STM32) by writing and debugging C/C++ code, interfacing with peripherals like sensors, actuators, and communication modules (UART, SPI, I2C).
* Participated in hardware-software integration tasks, performed real-time debugging, and optimized performance for embedded applications in a cross- functional engineering team

**Bharat Sanchar Nigam Limited**

*Student Intern Dec 2018*

* Worked with BSNL's GSM (Global System for Mobile Communications) infrastructure, gaining hands-on experience in mobile network operations, including BTS (Base Transceiver Station), BSC (Base Station Controller), and MSC (Mobile Switching Center) architecture.
* Assisted in network monitoring and fault management using telecom-grade software tools, analyzing performance logs, and scripting automation tasks in Python to streamline network diagnostics and reporting.
* Developed and tested automation scripts for SIM activation workflows and subscriber data processing, enhancing the efficiency of provisioning services through interaction with HLR (Home Location Register) databases.
* Collaborated with engineers to understand signaling protocols (SS7, MAP) and implemented simulations of call setup and SMS delivery processes using tools like Wireshark and custom packet inspection scripts.

**EDUCATION**

**Graduate Certificate in Agile Project Management March 2024**

Northeastern University Boston, MA

# Master’s in Analytics July 2023

Northeastern University Boston, MA

**Bachelor of Engineering in Electronics and Communication**

Sathyabama Institute of Science & Technology Chennai, India

# TECHNICAL SKILLS

**Methodologies:** SDLC, Agile/Scrum, Waterfall  
**Programming Languages:** Python, Java, C, C#, C++, JavaScript, TypeScript, Shell Scripting, Spring  
**Web Development:** HTML, CSS, React, Angular, Node.js (Express), Redux, jQuery, Bootstrap, Tailwind CSS, SOAP, REST APIs, GraphQL  
**Databases:** MySQL, PostgreSQL, Oracle, MS SQL Server, MongoDB, DynamoDB, Redis, Vector Databases  
**Cloud & DevOps Infrastructure:** AWS, GCP, Azure, Serverless, Docker, Kubernetes, Terraform, CloudFormation, Jenkins, GitLab, GitHub Actions, CI/CD, Ansible, Incident Response, Networking  
**Python Libraries:** Pandas, NumPy, Matplotlib, SciPy, Scikit-learn, Seaborn, PyTorch, Plotly, ggplot2  
**Data Analytics & Machine Learning:** Data Manipulation, Data Cleaning, Data Visualization, Exploratory Data Analysis, NLP, A/B Testing, Hypothesis Testing, ETL, LLM Models, RAG  
**Tools & Platforms:** Jira, Ansible, Jupyter Notebook, Visual Studio, Power BI, Tableau, Advanced Excel, Databricks, Splunk, Datadog, Elasticsearch, Kibana, SonarQube, ZAP/OWASP  
**Operating Systems:** Windows, macOS, Linux (Ubuntu, Unix)

**CERTIFICATIONS**

* Microsoft Certified: Azure Data Fundamentals
* Microsoft Certified: Azure Fundamentals
* Microsoft Certified: Power BI Data Analyst Associate
* Microsoft Certified: Azure Data Engineer Associate
* Completed LinkedIn learning course on ‘R Statistics Essential Training’, September 2021.
* Completed LinkedIn learning course on ‘R Essential Training: Wrangling and Visualizing Data’, September 2021.
* Certified in ‘Critical Thinking for Better Judgment and Decision-Making’ from National Association of State Boards of Accountancy (NASBA) through LinkedIn learning course, September 2021.
* Certified in ‘Learning SQL Programming’ from National Association of State Boards of Accountancy (NASBA) through LinkedIn learning course, September 2021.
* Certified in SQL for Data Science, on Coursera from University of California, Davis, October 2020.
* Completed course on ‘game development Using PyGame’, April 2020

**WORKSHOPS**

* Undergone one day workshop on “Smart Manufacturing” conducted by MSME Agra on 09th October, 2017.
* Undergone 15-day workshop on “Strategic Leadership” at Cavalier India, Bangalore from 04th December to 17th December, 2017.

**LEADERSHIP SKILLS**

* Served as the president of the NSS Student Chapter of Sathyabama Institute of Science and Technology
* Served as the president of the Science Club of Sathyabama Institute of Science and Technology

**HONORS & AWARDS**

Star of Excellence Award 2021

Issued by Sathyabama Institute of Science and Technology, Chennai · Sep 2021

**PROJECTS**

**AI-Powered Chatbot System for USCIS Manual (RAG-based Python Web App)**  
**Oct 2024 – Oct 2024**  
*Associated with Mettle Solutions*  
Developed a Python-based web application that functions as a chatbot to answer user questions based on the USCIS Manual using Retrieval-Augmented Generation.  
Built an intuitive Streamlit interface for seamless user interaction with the chatbot and integrated LangChain for dynamic LLM responses using document retrieval.  
Embedded the USCIS manual into a vector database FAISS to enable semantic search and accurate document-specific answers.  
Integrated Llama 3.1 (8B model) via Ollama for lightweight local inference and language understanding.  
Delivered an advanced design module for extending the chatbot to use a custom-trained model where document knowledge is embedded directly as model weights—future-proofing the system for offline or real-time use without relying on live document access.  
Developed a Python-based web application that functions as a chatbot to answer user questions based on the USCIS Manual using Retrieval-Augmented Generation. Built an intuitive Streamlit interface for seamless user interaction with the chatbot and integrated LangChain for dynamic LLM responses using document retrieval. Embedded the USCIS manual into a vector database FAISS to enable semantic search and accurate document-specific answers. Integrated Llama 3.1 (8B model) via Ollama for lightweight local inference and language understanding. Delivered an advanced design module for extending the chatbot to use a custom-trained model where document knowledge is embedded directly as model weights—future-proofing the system for offline or real-time use without relying on live document access.

**LLM-Based Intelligent Query Assistant for Electronic Health Records**  
**May 2024 – Aug 2024**  
Developed a Retrieval-Augmented Generation (RAG)-based chatbot to assist clinicians in querying unstructured EHRs using natural language.  
Implemented document chunking and embedding pipelines using Bedrock embeddings and FAISS, enabling contextual responses to complex queries like treatment recommendations, diagnosis summaries, and medication history.  
Integrated with Streamlit for an interactive frontend where doctors could upload records and interact with AI-generated answers backed by medical document context.  
Used AWS Bedrock’s Claude model for natural language reasoning and integrated with OpenSearch for scalable vector search and retrieval.  
Reduced query time from 20 minutes of manual record reading to under 10 seconds with 90%+ accuracy, improving clinical decision support significantly.  
Developed a Retrieval-Augmented Generation (RAG)-based chatbot to assist clinicians in querying unstructured EHRs using natural language. Implemented document chunking and embedding pipelines using Bedrock embeddings and FAISS, enabling contextual responses to complex queries like treatment recommendations, diagnosis summaries, and medication history. Integrated with Streamlit for an interactive frontend where doctors could upload records and interact with AI-generated answers backed by medical document context. Used AWS Bedrock’s Claude model for natural language reasoning and integrated with OpenSearch for scalable vector search and retrieval. Reduced query time from 20 minutes of manual record reading to under 10 seconds with 90%+ accuracy, improving clinical decision support significantly.  
**Skills:** LangChain · FAISS · Hugging Face Transformers · Streamlit · Python (Programming Language)

**Home Health Care Web Application (Agile Development)**  
**Jan 2024 – Mar 2024**  
*Associated with Northeastern University*  
Led the development of Agile web applications to support home healthcare services. Utilized JIRA for project management and Confluence for documentation.  
Defined the project scope, objectives, and user stories, ensuring a prioritized product backlog.  
Facilitated iterative sprints and daily stand-ups within the Agile framework.  
Maintained comprehensive project documentation, integrating stakeholder feedback for successful deployment.  
Led the development of Agile web applications to support home healthcare services. Utilized JIRA for project management and Confluence for documentation. Defined the project scope, objectives, and user stories, ensuring a prioritized product backlog. Facilitated iterative sprints and daily stand-ups within the Agile framework. Maintained comprehensive project documentation, integrating stakeholder feedback for successful deployment.  
**Skills:** Project Management · Jira · Confluence · Project Planning · Sprint Planning · Agile Methodologies

**Project Portfolio Management (MS Project)**  
**Sep 2023 – Dec 2023**  
*Associated with Northeastern University*  
Directed a project portfolio encompassing three projects for Handstar, Inc.  
Crafted a meticulous 190-day project plan, strategically allocating resources and defining timelines.  
Conducted thorough project analysis, evaluating development hours, sales projections, market potential, and web usage for each project.  
Aligned project objectives with Handstar Inc.'s market strategies and growth goals.  
Directed a project portfolio encompassing three projects for Handstar, Inc. Crafted a meticulous 190-day project plan, strategically allocating resources and defining timelines. Conducted thorough project analysis, evaluating development hours, sales projections, market potential, and web usage for each project. Aligned project objectives with Handstar Inc.'s market strategies and growth goals.  
**Skills:** Microsoft Project · Project Management · Project Planning · Scope Management · Project Finance · Agile Project Management

**Data Warehousing and Business Intelligence**  
**Jul 2022 – Sep 2022**  
*Associated with Northeastern University*  
Accomplished BI tools to provide real-time insights & reporting capabilities, resulting in to increase in efficiency & revenue growth.  
Developed and implemented a data warehousing solution to improve data accessibility and reporting capabilities, resulting in a 50% increase in the speed of data-driven decision-making.  
Accomplished BI tools to provide real-time insights & reporting capabilities, resulting in to increase in efficiency & revenue growth. Developed and implemented a data warehousing solution to improve data accessibility and reporting capabilities, resulting in a 50% increase in the speed of data-driven decision-making.

**Improving Patient Outcomes through Predictive Modeling and Data Analysis**  
**Apr 2022 – Jul 2022**  
*Associated with Northeastern University*  
Created and performed a model for hospital readmission using machine learning techniques, resulting in a reduction in readmissions.  
Conducted a data analysis of electronic health records to identify patterns and trends in patient outcomes, leading to the development of targeted care plans and improved patient outcomes.  
Created and performed a model for hospital readmission using machine learning techniques, resulting in a reduction in readmissions. Conducted a data analysis of electronic health records to identify patterns and trends in patient outcomes, leading to the development of targeted care plans and improved patient outcomes.

**Automate Identification and Recognition of Handwritten Text from an Image**  
**Jan 2022 – Mar 2022**  
This project is primarily concerned with the identification and detection of handwritten text from an image using optical character recognition (OCR) techniques that combine CNN and RNN.  
A recurrent neural network (RNN) was utilized to solve the sequence recognition problem, while a convolutional neural network (CNN) was employed to solve the image-based problems.  
While performing preprocessing the images were converted into grayscale, padded, expanded image dimensions, and normalized the pixels. Then designed the network architecture with seven convolutional layers of which six are having kernel size (3,3) and one (2,2) and then two max-pooling layers with sizes (2,2) and (2,1) respectively following this added normalization layer which accelerates the training process. Then used two bidirectional LSTM layers of each 128 units.  
Finally, the RNN layer gives an output of size (batch size, 31, 63) where 63 is the no of output classes. Using the CTC loss function obtained the required accuracy in both training and testing data. Developed using Jupyter Notebook, Python, Neural Networks, and Machine Learning Algorithms.  
This project is primarily concerned with the identification and detection of handwritten text from an image using optical character recognition (OCR) techniques that combine CNN and RNN. A recurrent neural network (RNN) was utilized to solve the sequence recognition problem, while a convolutional neural network (CNN) was employed to solve the image-based problems. While performing preprocessing the images were converted into grayscale, padded, expanded image dimensions, and normalized the pixels. Then designed the network architecture with seven convolutional layers of which six are having kernel size (3,3) and one (2,2) and then two max-pooling layers with sizes (2,2) and (2,1) respectively following this added normalization layer which accelerates the training process. Then used two bidirectional LSTM layers of each 128 units. Finally, the RNN layer gives an output of size (batch size, 31, 63) where 63 is the no of output classes. Using the CTC loss function obtained the required accuracy in both training and testing data. Developed using Jupyter Notebook, Python, Neural Networks, and Machine Learning Algorithms.

**Design and Development of a Database System for the ‘Resident Center’ Application**  
**Sep 2021 – Dec 2021**  
*Associated with Northeastern University*  
Constructed and designed a database application that included a resident’s data and produced an Entity Relationship diagram, and implementation of SQL queries. Developed the database with the 3-tier architecture which is conceptual design, physical and logical design.  
ER models, queries, access, and security validation codes are mentioned in the conceptual design. The tables, columns, relationships, constraints, and normalized sets of tables are mentioned in the logical design. In physical design we have indexes, view physical organization, define users, security groups, roles, access controls, and query execution parameters.  
ERD is composed of nine entities and their attributes. Analyzed the business requirements by dividing them into subject areas and understood the data flow within the database. Analyzed data using statistical techniques and provided reports and applied SQL queries for the application. Developed using MySQL and Python.  
Constructed and designed a database application that included a resident’s data and produced an Entity Relationship diagram, and implementation of SQL queries. Developed the database with the 3-tier architecture which is conceptual design, physical and logical design. ER models, queries, access, and security validation codes are mentioned in the conceptual design. The tables, columns, relationships, constraints, and normalized sets of tables are mentioned in the logical design. In physical design we have indexes, view physical organization, define users, security groups, roles, access controls, and query execution parameters. ERD is composed of nine entities and their attributes. Analyzed the business requirements by dividing them into subject areas and understood the data flow within the database. Analyzed data using statistical techniques and provided reports and applied SQL queries for the application. Developed using MySQL and Python.

**Design and Analysis of a Circular Patch Antenna for 5G Applications**  
**Oct 2020 – Feb 2021**  
*Associated with Sathyabama Institute of Science & Technology, Chennai*  
The 5G technology requires and provides the high speed and high capacity for wireless communication like IoT, which has been used for all previous and current generations of mobile communication.  
In this project, a circular micro strip patch antenna has been designed at frequency of 28 GHz. A design has been analyzed at various stages of development. The patch has been designed on an FR-4 epoxy substrate material that has a dielectric constant of 4.4.  
Various parameters such as return loss, bandwidth, VSWR, gain, and radiation patterns are stimulated employing Ansys HFSS software.  
The designed antenna resonante at 28 GHz with return loss of -32.5274 dB, bandwidth of 4.52 GHz, VSWR of 0.2384, and gain of 2.9 dB which can be used for 5G applications.