

# Abhidutta Mukund Giri

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## Education

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**Manipal Institute of Technology,** July 2023 – Present  
Bachelor of Technology in Computer and Communication Engineering

**Canara Pre-University College,** June 2021 - March 2023  
Grade XII Diploma

## Experience

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**Co-founder, Researcher & Head of Management** March 2024 – Present  
Innotech Manipal – Manipal

- Co-founded Manipal's first multidisciplinary student-centered research initiative, uniting students in biotechnology, computer science, IT, AI / ML, electronics and VLSI design.
- Currently focused on developing automation algorithms to manage and analyze complex cell data, aimed at enhancing data processing speed and providing detailed insights for transcription, genomics, and cell therapy.

**Medical AI Researcher,** August 2025 – Present  
Center for Advanced Scientific and Industrial Research, School of Computer Engineering – MIT, Manipal

- Implemented a label-free image segmentation model for clinical data and developed a specialized annotation dashboard to streamline haematologist review and data labeling.
- Engineering a multi-modal classification model for red-blood cell (RBC) morphology to automate the identification of non-normal cells and diverse clinical pathologies.
- Architected an end-to-end diagnostic pipeline for Brightfield microscopy, integrating automated segmentation and morphology classification into a comprehensive clinical software suite.

## Projects

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**AR-Assisted Surgical Diagnostics on Private 5G Edge Network** April 2025 - July 2025

- Designed and prototyped an AR-enabled surgical diagnostics workflow using private 5G to stream high-resolution slide images with minimal latency to an on-premise edge node for real-time AI inference.
- Implemented a lightweight U-Net segmentation model on the edge server to spot tumor regions, achieving end-to-end inference and overlay update.
- Built a tablet-based AR interface with fiducial marker tracking (OpenCV) to align AI segmentation overlays in the clinician's field of view, supporting on-the-fly adjustments.
- Engineered a six-stage integration pipeline—capture, pre-processing, edge inference, post-processing, AR rendering, and feedback loop—ensuring secure on-premise data flow and incremental model retraining from user corrections.
- **Tools & Technologies:** Python, PyTorch (U-Net), OpenCV, Docker, RESTful APIs, Unity (AR SDK), private 5G emulator, SQLite

**Catalyst Recommender** May 2025

- Built a serverless AWS recommender that unifies Prime Video, Kindle & Music tastes into one embedding space, cuts P99 latency below 200 ms and lifts cross-service engagement 30
- Implemented End-to-end encryption—TLS in transit + KMS-managed keys for Kinesis, DynamoDB, S3, SageMaker and Redis; IAM least-privilege roles restrict every micro-service to its exact resource ARNs.
- Leveraged Kinesis, Lambda, Glue, SageMaker, DynamoDB, Redis, and API Gateway to ingest, process, train, and serve real-time personalized recommendations (sub-200ms P99 latency).
- Added Zero-trust API: mTLS + fine-grained IAM per micro-service to block all unauthorized cross-service calls at the network edge.
- **Tools & Technologies:** Python, Jupyter Notebooks, AWS Kinesis, Lambda, Glue, SageMaker, DynamoDB, Redis, API Gateway

## Health Data Management and Informatics System

January 2025 - March 2025

- Architected a normalized MySQL relational schema with transaction integrity and an MVC-inspired PHP backend featuring secure session authentication and prepared statements.
- Developed a responsive dashboard using Bootstrap and SASS, integrating FullCalendar.js to facilitate interactive AJAX-driven appointment booking and availability tracking.
- Implemented comprehensive CRUD operations for patient registration and doctor directories, ensuring secure data flow and efficient administrative management.
- **Tools & Technologies:** PHP, MySQL, JavaScript (jQuery, AJAX), HTML5, CSS3 (Bootstrap, SASS), FullCalendar.js, Git/GitHub

## Scalable Network Intrusion Detection & Prevention System

July 2025 - Nov 2025

- Engineered a multi-layered SDN security platform on Mininet that automates threat neutralization (DDoS, brute-force) in <1.2 s via programmable OpenFlow rules.
- Integrated Suricata IDS with custom STRIDE rules, achieving a 97% detection rate with <3% false positives across 100k pps traffic loads.
- Developed a scalable multi-threaded Ryu controller backed by Redis shared state to serve real-time distributed threat intelligence via a dynamic web dashboard.
- **Tools & Technologies:** Python, Ryu SDN, Mininet/Open vSwitch, Suricata IDS, Flask/Chart.js, Redis, OpenFlow, STRIDE/Microsoft Threat Modeling Tool.

## RFID-Based Access Control and Verification System

July 2025 - Nov 2025

- Engineered a secure authentication system on NXP LPC1768 using SPI (Master Mode) to interface with MFRC522 modules, achieving card detection and anticollision in <100ms.
- Developed optimized C firmware to manage a local UID database with duplicate detection logic and robust hardware-level GPIO handling for peripheral integrity.
- Integrated a 4x3 matrix keypad and 16x2 LCD to create an interactive, menu-driven workflow for seamless switching between registration and verification modes.
- **Tools & Technologies:** C, LPC1768 (ARM Cortex-M3), MFRC522, SPI, Keil uVision, GPIO, Matrix Keypads, LCD Interfacing, Git

## Technologies

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<b>Programming:</b>	Python, C, C++, Java, R, HTML, CSS, JavaScript, Kotlin, C#
<b>Libraries:</b>	Pandas, NumPy, Scikit-learn, TensorFlow, Seaborn, Matplotlib, PyTorch, Keras, SciPy
<b>Software Engineering:</b>	Object-Oriented Programming (OOP), Software Development, Version Control (Git & GitHub), Modular & Extensible System Design
<b>AI &amp; Machine Learning:</b>	Large Language Models (LLMs), Fine-Tuning LLMs, Prompt Engineering, Neural Networks & Transformers, Machine Learning (ML) Fundamentals, Deep Learning Frameworks, Model Optimization & Deployment
<b>Data Processing &amp; Analysis:</b>	Data Preprocessing & Cleaning, Data Processing Pipelines, Handling Structured & Unstructured Data, Data Analysis & Visualization
<b>Cloud &amp; DevOps:</b>	Cloud Computing (AWS, Azure), Containerization (Docker), Model Deployment in Cloud Environments, CI/CD for AI Workflows
<b>Operating Systems:</b>	Windows, Linux (Kali, Arch, Ubuntu & Debian), Android

## Hackathons

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- **CodeBot Hackathon (2025)**, ARTPark @ IISc, Bangalore (Finalist)
- **Hackon with Amazon, Season 5 (2025)** (Semi-Finalist)
- **Hack to Future 2025**, Karnataka Law Society's Gogte Institute of Technology, Belgaum (Finalist)

## Extracurricular

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- **Class Representative**, Computer and Communication Engineering, Manipal Institute of Technology 2024–25
- **Specialization Certificate**, 5G QoS: RAN Scheduling & Network Slicing, IISc Bengaluru *Expected Feb. 2026*

## Certifications

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- **Introduction to Data Science, IBM** (Coursera)
- **Foundations of Cybersecurity, Google** (Coursera)
- **India Semiconductor Workforce Development Program (Level 1 & 2)** Nov 2025  
*Samsung Semiconductor India Research (SSIR) & IISc*
  - **Score:** 86% (73.04 Percentile).
  - **Curriculum:** Practical Device Structure Creation (Scripts), Advanced Device Simulation, Meshing Strategies, Realtime Device Analysis, Physical Models.