

# Hemanth S Kumar

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## 1. Professional Summary

A highly versatile and analytical final-year Electronics & Instrumentation Engineering student with extensive, hands-on experience across full-stack development, machine learning, computer vision, and embedded systems. Proven ability to architect and deploy end-to-end solutions using a diverse technology stack, including TypeScript, Python, JavaScript, and C++. Possesses a deep understanding of **Data Structures and Algorithms**, ready to contribute to complex and innovative projects. Familiar with **Cybersecurity** practices and **Cloud platforms (AWS, Azure, GCP)** to enhance solution security and scalability.

## 2. Technical Skills

- **Languages:** Python, JavaScript, C++, C, SQL (Advanced), HTML5, CSS3
- **Web & Backend:** Node.js, REST APIs, Flask/Django (Familiarity)
- **Databases:** SQL, Database Management Systems (DBMS)
- **ML & Data Science:** Scikit-learn, Pandas, NumPy, MATLAB
- **Developer Tools:** Git, GitHub, Docker, VS Code, npm, Jupyter Notebook
- **Key Concepts:** Data Structures & Algorithms, Object-Oriented Programming (OOP), Time & Space Complexity, Computer Vision, Embedded Systems (ESP32, Raspberry Pi), Cybersecurity, Cloud (AWS, Azure, GCP)

## 3. Projects & Technical Experience

### 3.1 Full-Stack & Web Development

- **Livestock Management System** | *TypeScript, Node.js, npm*
  - Developed a comprehensive, full-stack application to streamline farm operations, featuring modules for livestock tracking, medical records, and breeding management.
  - Engineered a role-based user management system and implemented reporting features to analyze stock levels and operational efficiency.

- **Professional Weather Dashboard** | *JavaScript, HTML, CSS, REST API*
  - Built a modern, responsive weather dashboard to provide real-time data for any city by integrating with the OpenWeatherMap API.
  - Implemented key features including data caching for performance, auto-updating city lists, and robust error handling for a seamless user experience.
- **LifeCompass AI** | *JavaScript, Python, CSS*
  - Architected a dual-component project featuring a responsive JavaScript web interface and a Python backend for intelligent life guidance and analytics.

### 3.2 Machine Learning & Data Science

- **Predictive Maintenance for Industrial Machinery** | *Python, SQL, Scikit-learn*
  - Engineered a machine learning model to predict Remaining Useful Life (RUL) using NASA's Turbofan Engine Degradation Simulation Data Set.
  - Achieved a Root Mean Square Error (RMSE) of 41.52, providing a robust framework for proactive industrial equipment maintenance.
- **Crop Prediction** | *Python, Machine Learning*
  - Developed a data-driven system to provide accurate predictions for crop suitability and yield forecasting based on environmental and agricultural data.

### 3.3 Automation & Scripting

- **Instagram Non-Followers Checker** | *Python, Instaloader*
  - Developed a privacy-focused Python tool to identify accounts that don't follow a user back, handling secure login with two-factor authentication.
  - Implemented smart rate-limiting and provided data export options in both TXT and JSON formats.

### 3.4 Computer Vision

- **Automated Vehicle Behaviour Analysis** | *MATLAB, Image Processing*
  - Created computer vision algorithms to track vehicles and detect unsafe driving patterns, improving detection accuracy by 25% in tests.

### 3.5 Embedded Systems & Signal Processing

- **Real-Time Elevator Safety System (Ongoing)** | *ESP32, C++, HX711 Load Cell, GSM Module*
  - Engineered a safety-critical system with custom firmware in C++ to automatically detect elevator power failures and passenger occupancy.
  - Integrated and calibrated an HX711 load cell to accurately determine if the elevator is occupied.
  - Implemented a GSM module to autonomously send SMS alerts to maintenance personnel during a power outage.
- **Multichannel Stethograph for Cardiac Monitoring (2023 to 2024)** | *Raspberry Pi 3B, Python, Vibration Sensors*
  - Developed a non-invasive cardiac monitoring device using a Raspberry Pi to capture and process heart signals from specialized vibration sensors.
  - Implemented digital signal processing algorithms in Python to filter noise and analyze sensor data, successfully identifying key cardiac events.

### 4. Certifications & Achievements

- SQL (Advanced), SQL (Intermediate), SQL (Basic) – HackerRank
- Data Structures & Algorithms, ATT – C++ – CodeChef
- Python Essentials 1 & 2, CCNA: Introduction to Networks – Cisco (Completed August 2025)
- **Competitive Programmer:** Solved over 100 algorithmic problems on CodeChef, consistently optimizing solutions for reduced time complexity (Jan 2024 – Feb 2024).

### 5. Education

- **B.E. in Electronics and Instrumentation Engineering**
  - Siddaganga Institute of Technology, Tumakuru | Expected Graduation: June 2026
  - Current CGPA: 6.05

## **6. Leadership and Extracurricular Activities**

- **2023 AND 2024 Volunteer, Technisium Tech Event**, Siddaganga Institute of Technology (SIT), Tumakuru, Karnataka
  - Assisted in the organization and logistics for Technisium, the department's annual technical festival, contributing to its smooth execution for over 200 participants.

