

**Education****SRMIST***B.Tech., Biomedical Engineering (CGPA: 8.11)(Upto 4th Sem)*

Chennai, India

2023 - 2027

**Nandha City School***Senior Secondary level (Score: 77%)*

Erode, India

2023

**The BVB School***Secondary School Examination (Score: 78.6%)*

Erode, India

2021l

**Programming Skills***Languages:* Python, HTML*AI/ML:* Retrieval-Augmented Generation(RAG)*Web Development:* Frontend development with HTML*Operating Systems:* Windows,**CAD Softwares***AutoCAD**Sketchup**OrCAD**KiCad***Embedded Systems***Arduino**Raspberry Pi**ESP32***Work Experience****Internship – Medsby***Biomedical Engineer Intern*

Coimbatore, India

June 2025 – July 2025

- Gained hands-on experience with FDM 3D printers, including slicing, filament types, and calibration.
- Explored bioprinting concepts, including the use of bio-inks with living cells for printing tissue-like structures in medical research.
- Independently designed and 3D-printed a custom ultrasonic sensor case.
- Worked with design software such as **SketchUp** and **Meshmixer** for 3D modeling, repair, and refinement of models; prepared print files using **Ultimaker Cura** and **Anycubic Slicer**.
- Built a pick-and-place robotic arm using **Arduino Uno** and a joystick module, learning servo motor control, real-time interfacing, and gaining an introduction to Raspberry Pi basics.
- Developed simple GUI applications with **Tkinter**; applied **NumPy** for data operations and **PySerial** for embedded device communication.

## Projects

### Retrieval-Augmented Generation (RAG) System with FastAPI

- Designed and implemented a Retrieval-Augmented Generation (RAG) system using FastAPI, integrating a custom knowledge base with an LLM for accurate and context-aware responses.
- Developed a user-friendly web interface with HTML, CSS, and JavaScript, enabling corpus upload, prompt tuning, and an interactive chat system.
- Built a text preprocessing pipeline that chunks documents efficiently with overlap handling to improve semantic retrieval and reduce context loss.
- Integrated FAISS (Facebook AI Similarity Search) for high-performance vector search, enabling real-time retrieval of relevant knowledge snippets.
- Leveraged SentenceTransformers (all-MiniLM-L6-v2) for generating embeddings, ensuring precise semantic similarity matching.
- Configured and utilized Google Gemini API to generate context-enriched answers by combining retrieved knowledge with generative AI.
- Enhanced system usability with persistent storage, professional UI/UX (light green + dark theme), and modular design for scalability.

### CRISPR In Silico: LLM

- Addressed the major safety concern in CRISPR-Cas9 gene editing: unintended off-target cuts across the genome.
- Developed an LLM-based system to analyze DNA sequence similarity and proactively flag risky regions.
- Simulated Cas9 cutting activity *in silico* to predict biological outcomes of potential off-target edits.
- Helped prevent harmful mutations that could affect essential genes or regulatory elements.
- Improved on existing tools by modeling both the likelihood of a cut and its biological impact.
- Established a foundation for integrating synthetic simulations into real-time gene editing workflows for safer designs.

### Hand Reflex Action (Arduino Simulation)

- Simulated human hand withdrawal reflex using an **Arduino**, **LM35 temperature sensor**, and **servo motor**.
- The LM35 detects rising temperature as a harmful stimulus, which is processed by the Arduino acting as the spinal cord.
- If the temperature exceeds a threshold, the servo motor is triggered to move the hand model away, imitating the reflex response.
- Demonstrated how sensory input is instantly translated into motor output, reinforcing biological learning.
- Showcased how technology can effectively mimic human physiological processes.

## Achievements/Activities

- National Yoga Competition Participant *Represented at the national level, showcasing discipline and physical fitness.*
- Swimming Champion *Won multiple events at school and college-level swimming competitions.*
- Basketball Achievements *Played at Sahodaya level, won inter-hostel competitions, and served as team captain in college.*
- U&Me State-Level Hackathon *Participated and gained exposure to real-world problem-solving in a competitive environment.*
- CRISPR Safety Project
  - Addressed major safety concerns in CRISPR-Cas9 gene editing by reducing off-target risks using AI.
  - Designed an LLM-based system to analyze DNA sequence similarity and flag risky regions.
  - Simulated Cas9 cutting activity *in silico* to predict biological outcomes of potential edits.
  - Improved on existing tools by modeling both cut likelihood and biological impact.
  - Established a foundation for integrating synthetic simulations into real-time gene editing workflows.