

# ASHWIN BADUNI

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## EDUCATION

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**Mahindra University (MU)**

Oct 2021 – Aug 2025

*B.Tech in Computational Mathematics*

## EXPERIENCE

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**National Informatics Centre (NIC)** | *AI Software Intern*

Jan 2025 – April 2025

Built an AI chatbot that streamlined vehicle registration support using NLP and real-time analytics. Improved backend scalability with FastAPI, ensured secure user access via CAPTCHA, and boosted engagement through interactive data visualizations.

**Gurugram Metropolitan Development Authority (GMDA)** | *Full-Stack Intern*

June 2022 – Aug 2022

Revamped the UI/UX of GMDA's internal dashboard using Bootstrap and JavaScript, delivering a more responsive, accessible, and cohesive user experience across platforms. Collaborated closely with backend teams to streamline data workflows, minimizing manual input and elevating operational efficiency.

## PROJECTS

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**Obstacle Avoidance and Path Planning via Reinforcement Learning** 🔗

July 2025

- Implemented a custom GridWorld environment for path planning with obstacles.
- Developed and trained a reinforcement learning agent through Q-Learning, Deep Q-Network (DQN), and Actor-Critic algorithms on the GridWorld environment.
- Developed analysis tools for comparing algorithm performance and generating training reports.

**Building a Transformer from scratch** 🔗

June 2025

- Implemented a transformer model from scratch in PyTorch, faithfully reproducing the "Attention Is All You Need" architecture with custom multi-head self-attention, positional encoding, and layer normalization.
- Developed an automated pipeline for training, hyperparameter tuning, checkpointing, and real-time experiment tracking on large NLP datasets.

**Graph Neural Net Comparison Toolkit** 🔗

May 2025

- Created a toolkit for benchmarking and visualizing multiple GNN architectures, supporting standardized evaluation and plug-and-play model integration.
- Enabled comparative analysis across datasets with unified metrics and detailed reporting to streamline GNN research workflows.

**AI Powered Analytics Dashboard Chatbot** 🔗

Jan 2025 – April 2025

- Engineered an intelligent FastAPI chatbot for the Parivahan Dashboard that leverages quantized LLMs, adaptive data parsing, and real-time analytics to process natural language vehicle registration queries, deliver dynamic visualizations and statistical insights, and ensure security with CAPTCHA verification and response caching.

## Video Based Motion Amplification and Vibration Analysis

Dec 2023

- Developed an award-winning self-supervised tool for motion magnification and vibration analysis in videos, featuring targeted ROI amplification, optical flow-based processing, and support for multiple amplification settings.
- Integrated FFT and time-series vibration analysis, 3D graph plotting, and heatmap visualization, leveraging motion magnification techniques for non-contact diagnostics.




## ACHIEVEMENTS

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<b>Smart India Hackathon (SIH)</b>   <i>Winner</i>	2023
<b>Indian International Model United Nations (IIMUN)</b>   <i>High Commendation</i>	2017
<b>Scindia School Model United Nations (SCIMUN)</b>   <i>Special Mention</i>	2016

## CERTIFICATIONS

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<b>Google Cybersecurity Professional Certificate</b>    <i>Credential ID: DXRLYIKE4D2T</i>	2025
<b>IBM Data Analyst Professional Certificate</b>    <i>Credential ID: 9WRKVKV2DUIH</i>	2025
<b>IRM Enterprise Risk Management - Level 1</b>    <i>Credential ID: IRMIN/L1CIM/2023/00000000000675</i>	2023

## EXTRACURRICULAR ACTIVITIES

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### **Mahindra University Student Council** | *Finance Representative*

Managed end-to-end budgeting for student-led initiatives, ensuring strategic fund allocation, financial transparency, and optimal resource utilization. Also implemented structured financial reporting.

### **Mahindra University Maths Society** | *Member*

Collaborated with peers to organize mathematics workshops and competitions, promoted analytical thinking, and contributed to fostering a vibrant mathematical community on campus.

## SKILLS

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**Programming:** Python (pandas, NumPy), JavaScript, C, C++, Java, SQL, R, HTML

**Machine Learning/AI:** Reinforcement Learning (Q-Learning, DQN, Actor-Critic), Deep Learning, Transformers, Graph Neural Networks (GCN, GAT, GraphSAGE), Computer Vision (Optical Flow, Lucas-Kanade, Eulerian Video Magnification), Natural Language Processing, Model Interpretability, Hyperparameter Optimization, Automated Training Pipelines, TensorFlow, PyTorch

**Data Science:** Data Visualization (Matplotlib, Seaborn), Interactive Dashboards, Real-time Analytics, Time-Series Analysis, Data Wrangling and Cleaning

**Tools/Frameworks:** Git, GitHub, Linux, Flask, Node.js, React, Docker, RESTful APIs, TensorBoard, Optuna, Python package management, Clear project organization (modular code, structured repositories)

**Cloud/DevOps:** AWS, Azure, Google Cloud, CI/CD pipelines, Cloud Computing

**Cybersecurity:** Network Security, Secure Authentication, Risk Management

**Emerging Tech:** Quantum Computing, Vibe Coding