# Mainak Malay Saha

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## Summary

Motivated Software Engineer specializing in full-stack development, data engineering, and applied machine learning. Experienced in designing scalable systems and deploying intelligent solutions on cloud platforms. Actively seeking Software Engineer or AI/ML Engineer roles starting December 2025.

## Education

**MS in Robotics and Autonomous Systems (Artificial Intelligence)**                   *12/2025*
Arizona State University                                                              GPA: 3.71

*Relevant Coursework:* Artificial Intelligence, Real-Time Embedded Systems, Machine Learning Acceleration, Knowledge Representation & Reasoning, Space Robotics & AI, Data Visualization.

**Bachelor of Engineering in Computer Engineering**                                   *06/2024*
Terna Engineering College, Mumbai University                                          GPA: 3.3

## Technical Skills

**Programming & Scripting:** Python, C++, JavaScript (React.js, Node.js), TypeScript, SQL, Rust
**Web Development:** HTML5, CSS3, Responsive UI Design, Full-Stack Development, API Integration
**Cloud & DevOps:** AWS (EC2, S3), Azure, Docker, Git, CI/CD, REST APIs
**Data Science & ML:** TensorFlow, PyTorch, scikit-learn, OpenCV, Pandas, NumPy, MLOps
**Data Engineering & Analytics:** MongoDB, Data Pipelines, Feature Engineering, Spark, Cassandra
**Visualization & BI:** Tableau, Power BI, Matplotlib, Seaborn, Excel (Advanced)

## Experience

**Graduate Research Assistant**, ASU Center for Engagement Science — Adidas, ASU          *05/2025 – Present*

- Collaborated with Dr. Aurel Coza on a multidisciplinary projects integrating real-time video analytics in Swift and OpenCV to detect and classify ball and human movement, generating insights for athletic performance and audience engagement.
- Engineered computer vision and motion analysis pipelines with real-time feedback, optimizing detection accuracy and latency for mobile deployment.
- Deployed an AI Emotion Detection and Conversational Agent Platform using FastAPI, AWS EC2, PostgreSQL, and React, featuring real-time sentiment analysis, adaptive responses, and analytics dashboards for trend visualization.

**Graduate Research Associate**, TEAL Lab — Arizona State University, Tempe, USA          *08/2025 – 10/2025*

- Developed the *Audio-Vibration Rating Explorer*, an interactive web application to evaluate how four vibration designs map to over 1,000 real-world sounds, incorporating more than 4,000 user ratings for perceptual analysis.
- Built and deployed a real-time audio-to-vibration generation system using ML models for feature extraction, classification, and mapping, with synchronized playback and waveform visualization (WaveSurfer.js).
- Optimized scalability and latency through AWS EC2-based deployment for model inference and hosting, ensuring smooth, real-time user interaction and robust system performance.

**Full-Stack Developer**, The Language Network, India                                    *08/2021 – 12/2022*

- Designed and developed a full-stack web platform and LMS using React.js, Node.js, and MongoDB, enabling scalable user management and integration with multiple third-party marketing tools.
- Improved online visibility by 60% through SEO/SEM optimization using SEMrush and Google Analytics, achieving first-page rankings for 10+ high-value keywords.
- Built analytics dashboards with Salesforce to track engagement and conversions, boosting overall site traffic and interaction rates by 50% while collaborating cross-functionally to enhance UI/UX and platform performance.

## Projects

**AI-Powered Emotion Detection & Intelligence Platform**                                 *Present*
*Developed to analyze human emotions for interactive AI interfaces and enhance adaptive conversational systems.*

- Engineered a full-stack AI platform for real-time emotion analysis, integrating sentiment, valence, and arousal metrics with an adaptive conversational agent.
- Deployed scalable infrastructure using FastAPI, React, PostgreSQL, and AWS EC2, reducing inference latency and ensuring secure, high-availability APIs.
- Designed interactive dashboards for visualizing emotional trends and engagement analytics, improving interpretability and user interaction efficiency.

**Emotion Classification — Distinguishing Excitement and Fear from Physiological Data**   *Present*
*Built to understand physiological signals for emotion classification and improve real-time affective computing applications.*

- Developed ML models using CNN and LSTM architectures to classify biometric signals (heart rate, $SpO_2$) and distinguish between excitement and fear in real time for audience engagement analysis.
- Applied advanced signal processing for feature extraction and optimized models for real-time deployment, ensuring high performance and responsiveness, Created interactive visualizations with Matplotlib and Seaborn to illustrate emotional state transitions, signal dynamics, and model performance metrics.