

# Madan Baduwal

*Signal Processing, Algorithms/ML/Computing, Wireless Communication, Cybersecurity, Robotics*

## Education

- Exp. Dec 2028 **PhD in Computer Science & Engineering**, *Mississippi State University*, Starkville, MS.  
GPA: 4.0/4.0
- Dec 2024 **MS in Computer Science**, *University of Texas Permian Basin*, Odessa, TX.  
GPA: 4.0/4.0
- Dec 2019 **B.E. in Computer Engineering**, *Tribhuvan University*, Kathmandu, Nepal.  
GPA: 72.38/100

## Industry Experience

- Jan 2022 – **Senior Machine Learning Engineer**, *Fusemachines*, New York, NY, USA.
- Dec 2022
- Led, designed, and developed a no-code data-centric AI platform ([Matrice.ai](#)) for building and deploying ML apps, reducing user deployment time by 40% and development costs by 80% using PyTorch, React, Django, and AWS.
  - Developed an ML app as a SaaS product for 5+ hospitals, using PyTorch, Django, CI/CD, and Dell EMC servers.
  - Optimized and automated instance segmentation (accuracy 85%) for otitis media Otoscopy images of the tympanic membrane using CNN, driving \$100k of revenue annually by increasing the doctor-patient ratio by 1.5x.
- Feb 2020 – **Machine Learning Engineer**, *Fusemachines*, New York, NY, USA.
- Feb 2022
- Led a 10-person team to develop an AI-enabled student progress tracking platform ([fuseclassroom.com](#)), increasing the teacher-student ratio by 2x. Currently operational in ~60 Nepalese colleges with 20k active students.
  - Orchestrated a phishing detection engine for over 10 clients under WMC Global, improving accuracy from 85% to 90% by selecting the optimal number of clusters using the silhouette score, detecting millions of URLs per day.
  - Delivered over 20+ trainings, workshops, knowledge-sharing, and paper reading sessions on mathematics and machine learning. Empowered the ML skills of ~5k students by collaborating with schools, colleges, and universities.
  - Enriched affordable AI courses by researching, designing, reviewing, and refining content, including reading material, quizzes, assignments, and projects for Fusemachines AI Education Programs, focusing on AI, ML, CV, and NLP.
- Jan 2021 – **Computer Vision Engineer (R&D)**, *National Innovation Center*, Kathmandu, Nepal.
- Dec 2021
- Led & collaborated with mechanical, electrical, and electronic hardware teams to deploy computer vision tasks in robots, resulting in the creation of initial prototypes for waiter and [service robots](#) within 9 months.
  - Achieved 60% inference acceleration on computer vision tasks integrating into robots using quantization techniques and hardware-software accelerators like Google Coral TPU, NVIDIA J.Nano, Raspberry Pi., and Microsoft Azure.
  - Implemented and fine-tuned computer vision tasks, including object detection, segmentation, tracking, face recognition, and depth estimation, using PyTorch and the Intel depth camera D435i, covering the entire vision pipeline.
  - Improved pathfinding algorithms (A\* and Dijkstra), leading to a 20% reduction in execution time and faster nav.

- Aug 2019 – **Software Engineer Intern**, *Omniblue*, Kathmandu, Nepal.
- Feb 2020
- Devised and architected Django REST APIs and AWS-based background workers capable of managing millions of daily requests, facilitating third-party entities in extracting data from unstructured documents in a scalable fashion.
  - Engineered web applications using front-end and back-end technologies: HTML5, CSS, JavaScript, and Django for retail stores and consultancies, resulting in a 15% increase in revenue for the company in the first quarter.

## Research Experience

- Jan 2025 – **Graduate Research Assistant**, *Mississippi State University*, Starkville, MS, USA.
- Present
- Research: Signal Processing, Algorithms & ML, Computing, Wireless Communication, and Robotics
- Jan 2023 – **Graduate Research Assistant**, *University of Texas Permian Basin*, Odessa, TX, USA.
- Dec 2024
- Conducted research in polyp segmentation, focused on optimizing and fine-tuning advanced models such as YOLO8, U-Net, Detectron, SAM, MASK-RCNN, and OneFormer to improve accuracy and performance.
  - Optimized and fine-tuned state-of-the-art multimodal models, including OpenAI's CLIP, MMBT, VL-BERT, ViLBERT, LXMERT, ALIGN, VisualGPT, UNITER, BLIP, Flamingo, LLaVA, LaMDA, and mPLUG.
  - Collected a well-annotated multimodal dataset (text and image) that meets university requirements.
- Mar 2023 – **Student Assistant Editor**, *University of Texas Permian Basin*, Odessa, TX, USA.
- Dec 2024
- Refined the editing and proofreading of the UTPB Journal of Undergraduate Research, Volume 5, 2023, and the UG Research Book 2024 for publication under the direction of Prof. Rebecca Babcock and Prof. Mohamed K Zobaa.

## Publications

- S. U. Khan, **M. Baduwal**, V. Chaudhary, and D. Roy, "PERFECT: Personalized Federated Learning for CBRS Radar Detection," in *IEEE International Conference on Computer Communications and Networks (ICCCN)*, 2026.
- W. Patterson, **M. Baduwal**, and V. Chaudhary, "Who Ran My Circuit: Calibration Data-Based Fingerprinting of Quantum Cloud Hardware," in *IEEE International Conference on Computer Communications and Networks (ICCCN)*, 2026.
- M. Baduwal** and V. Chaudhary, "Lightweight Multimodal Radar Interference Detection at Low SINRs in CBRS," in *IEEE International Conference on Communications (ICC)*, 2026.
- M. Baduwal**, P. Paudel, and V. Chaudhary, "Federated Learning: A Survey of Core Challenges, Current Methods, and Opportunities," *Computers*, vol. 15, no. 3, 2026. **[Featured as Cover Story Article]**
- P. R. Prajapati, S. Poudel, **M. Baduwal**, S. Burlakoti, and S. P. Panday, "Signature Verification using Convolutional Neural Network and Autoencoder," *Journal of the Institute of Engineering*, vol. 16, no. 1, 2021.

## Skills

Languages	Python, R, Julia, C++, C, Java, JavaScript, C#, Go, Kotlin, Rust, Bash, MATLAB, SQL, LaTeX
Machine Learning	PyTorch, TensorFlow, JAX, Scikit-learn, NumPy, Pandas, OpenCV, NLTK, Hugging Face, Transformers, CNNs, GNNs, Diffusion Models
Data Engineering	PostgreSQL, MySQL, MongoDB, Snowflake, Apache Spark, Hadoop, Kafka, Databricks, ETL Pipelines, Tableau, Power BI
Frameworks	Django, Flask, Node.js, React, Angular, React Native, Streamlit, REST APIs, ROS, Unity
DevOps	AWS, GCP, Azure, Docker, Kubernetes, Jenkins, Airflow, MLflow, DVC, SageMaker, Git, GitHub
Other Tools	Redis, RabbitMQ, Elasticsearch, Ansible, Datadog, Agile, Jira, Confluence

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## Awards and Achievements

- Apr 2026 **NSF Student Travel Grant** (IEEE ICC 2026). Awarded \$1,538 NSF-funded travel grant (16 selected from 42 applicants) to present research in Glasgow, UK.
- Feb 2026 **Travel Assistance Grant for Graduate Students (TAGGS)** (Mississippi State University). Awarded \$800 competitive travel grant for conference presentation.
- Feb 2026 **Dean's Travel Award** (Bagley College of Engineering, Mississippi State University). Received \$500 funding for IEEE ICC 2026 presentation.
- 2026 **Departmental Travel Support** (Computer Science & Engineering, Mississippi State University). Awarded \$200 funding for international conference travel.
- Aug 2015 – Dec 2019 **Merit-Based Scholarship** (Tribhuvan University). Awarded \$3,000 for highest GPA performance (3 of 7 semesters).
- Jul 2019 **Best Logic Code Award** (Sagarmatha Engineering College). Secured 1st place and received \$600 prize.
- Mar 2018 **Hackathon Runner-Up** (Kathmandu University). Awarded 1st runner-up position with \$1,000 prize.
- Jan 2017 **Best Idea Award** (Kantipur Engineering College). Won best idea award with professional training prize (approximately \$200 value).

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## Projects

- Jun 2021 – Feb 2022 **Phishing Detection** | Python 3, Scikit-learn, Git, GitHub, AWS, Docker, Kubernetes, CI/CD.
  - Classified websites into phishing and non-phishing categories using deep learning algorithms for GoDaddy, Bitly, InfoBip, and ICANN under WMC Global. Transformed unstructured data into structured data format using RegEx.
- Jan 2021 – Jun 2021 **Student Status Engine** | Python 3, Snowflake, Scikit-learn, Git, AWS.
  - Crafted feature extractor pipeline that automatically extracts features from the data warehouse (e.g., Snowflake). Leveraged machine learning algorithms on extracted features to classify student status into different classes.
  - Collaborated with back-end, front-end, and DevOps engineers to test and deploy a model into large-scale production.
- Jan 2021 – Dec 2021 **Mina (AI-Robot)** | Python 3, PyTorch, ROS, Gazebo, Coral TPU, Jetson Nano, Raspberry Pi.
  - Retrained a classification model for Edge TPU using post-training quantization (23fps, 85% mAP score with pre-training), face recognition using the Python 3 face recognition library, depth calculation using RealSense depth camera, Centroid-based object tracking, and wrote a rule-based algorithm from scratch.
  - Incorporated and validated computer vision tasks into the ROS and gazebo simulation environments and implemented them into waiter and service robots. Visualize robot sensor data into rviz.
- Jan 2020 – Oct 2020 **Text Extractor** | Jupyter Notebook, Python 3, OpenCV.
  - Conducted research and experiments on building image preprocessing techniques like erosion and dilation. Built a framework that uses Google Tesseract and RegEx to extract information from the form (e.g., buyer name, seller name, etc.).
- Jan 2017 – Dec 2019 **Hastakshar** | Python 3, OpenCV, Keras, Django.
  - Performed research and experimentation on image localization to boost classifier model accuracy to 83% with NumPy and OpenCV.
  - Built a signature verification CNN classifier system using TensorFlow and Django web interfaces on local machines.
- 2015 – 2019 **Android apps and websites** | C#, Unity, Python 3, HTML, CSS.
  - Android apps: Asteroid Smash, Antigravity Ball, Saveme, Beat Creator, and 1K downloads
  - Web apps: horizonsglobal.edu.np, youthcareer.edu.np: between 10,000 and 15,000 visitors per month

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## Academic Service

- Peer Reviewed submissions for major IEEE conferences including: **COMSNETS 2026, IEEE CCNC 2026, IEEE ICNC 2026, and IEEE ICCCN 2025** (Total: 6 papers).
- Reviewer
- TPC Member **IEEE CCNC 2027** - Tracks: Edge/Cloud Computing and Networking; Security, Privacy, and Content Protection.
- Research Undergraduate Research Symposium, Mississippi State University, 2026
- Evaluator