Yuvaraj Munian

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Education

Texas A&M University-San Antonio (A&M-SA) — **San Antonio, Texas**
Post-Doctoral Research Associate — *August 2023 – August 2025*
- *Department of Computational, Engineering, and Mathematical Sciences*
- *Specialization: High Performance Computing & Cyber Security*

The University of Texas at San Antonio (UTSA) — **San Antonio, Texas**
Ph.D. in Electrical Engineering — *August 2019 - May 2023*
- *GPA: 3.82/4.0*

The University of Texas at San Antonio — **San Antonio, Texas**
MS in Electrical Engineering — *January 2018 – July 2019*
- *GPA: 3.81/4.0*

PSG College of Technology — **Tamil Nadu, India**
M.E. in Electrical Engineering (Applied Electronics) — *June 2008 – June 2010*
Cumulative GPA: 8.42/10

Arulmigu Meenakshi Amman College of Engineering — **Tamil Nadu, India**
B.E. in Electronics and Communication Engineering — June 2003 – June 2007
- Cumulative GPA: 3.54/4.0

Teaching Experience

Sep 2025 -	*Present*	*Texas A&M University-San Antonio, USA*	*Instructional Assistant Professor*
Aug 2023 -	*Aug 2025*	*Texas A&M University-San Antonio, USA*	*Post- Doctoral Research Associate and Adjunct Instructor*
Aug 2019 -	*May 2023*	*University of Texas at San Antonio, USA*	*Teaching Assistant*
Jun 2012 -	*May 2016*	*Agni College of Technology, India*	*Assistant Professor*
Jun 2010 -	*Apr 2012*	*Mailam Engineering College, India*	*Assistant Professor*
Jun 2007 -	*May 2008*	*Sri Venkateswara Polytechnic, India*	*Lecturer*

Courses Taught (1 = Independently taught, 2 = Taught as a TA)

- *Digital Image and Signal Processing* [1,2]
- *Neural Networks and Fuzzy Systems* [1]
- *Digital Communication and Wireless Communication* [1]
- *VLSI Design* [1]
- *Introduction to Control Systems* [1,2]
- *Introduction to Electrical Engineering* [1,2]
- *Electronic Devices and Circuits Analysis* [1]
- *Digital Electronics and Logic Design* [1]
- *Embedded Systems* [1]
- *Programming Languages* [1,2]
- *Microprocessors and Microcontrollers* [1]
- *Machine Learning & Deep Learning* [2]
- *Artificial Intelligence* [1,2]
- *Computer Architecture and Organization* [1]
- *Advanced Engineering Mathematics* [2]

Teaching Roles & Responsibilities

- ***As Independent Instructor***
    - *Undergraduate and graduate courses, taught lectures and labs as a full time faculty member at three institutions in India. Created Lab Manuals, Mentored and Advised students, Supervised student research, Senior Design Projects, Service to the department and college, Placement officer for seniors, Class In-charge for juniors, seniors, and post graduate students, Participated in All India Council for Technical Education (AICTE) and ABET accreditation (at UTSA, provided documentation and data on courses taught), and Department Coordinator for multiple sections of engineering courses.*
    - *Lab Manager of the research laboratory at Agni College of Technology and Mailam Engineering College for six years and trained students on real-time projects: auto-detection, rover design for the planet's solid surface, watermarking using MatLab, and image classification and object detection.*
    - *Instruction on the use of Tanner, PSPICE, Matlab, java, c, C++, HTML, and Xilinx.*
    - *Hardware systems like Arduino board, Raspberry pi 1 model A and B, DSP kit, Communication systems kit, and Microprocessor (8051, 8086) kit used for the labs.*
    - *Taught lecturers for Computer Networks, Computer Network Laboratory, Computer organization and architecture as a full time adjunct professor in Texas A&M-SA.*
    - *Lab Manager for CAMSA lab at Texas A&M – SA, where I am conducting one-on-one training sessions for faculties and students to utilize the computing nodes in the cluster and HPC environment.*
- ***As Research and Teaching Assistant***
    - *At UTSA, acted as Research and Teaching Assistant, Taught Computer Networks & Computer Networks Lab, Logic Design, Electronic Circuits I, Network Theory, Communication Systems, Introduction to Control Systems, Introduction to Electrical Engineering, Advanced Engineering Mathematics, and Artificial Intelligence.*
- ***Service as Supervisor of REU Program – Guided undergraduate students***
    - ***October 2025 – November 2025 (Miykael Yisrael , Student from Alamo Colleges) – Funded by NSF***
      Project Title: *Comparison of LSTM, CNN+LSTM and Random Forest machine learning techniques for Credit card fraud detection*
    - ***June 2022 – August 2022 (Derian Mowen, Student from Trinity University) – Funded by NSF***
      Project Title: *Leveraging Road security during nocturnal hours by characterizing animal poses utilizing Convolutional Neural Network based analysis of thermal images.*
    - ***June 2021 – August 2021 (William Gracia, Student from Texas A&M University, Kingsville)***
      Project Title: *Thermal Image data analysis using Structural Similarity Index (SSIM) and Mean Square Error (MSE)*

Skills

- Python
- MATLAB
- C
- Xilinx
- SQL
- Pspice
- LabVIEW
- Tanner
- Simulink
- Tableau

Core Competencies

- ***Deep Learning Algorithms:*** *State-of-the-art methods, CNN, DenseNet, ResNet, AlexNet, EfficientNet, Inception, Xception, NASNetLarge, DNN, LSTM, and CNNLSTM.*

- ***Machine Learning Algorithms:*** *SVM, Logistic Regression and Linear Regression, Classifiers, Decision Tree, Clustering models, Random Forest.*
- ***Scientific Libraries:*** *Numpy, Scipy, Matplotlib, Pandas, Keras, Pytorch, Tensorflow, Deep Learning Toolbox.*
- ***IDE:*** *Anaconda, Spyder, PyCharm, Jupyter Notebook, Tableau Desktop*
- *Data and Quantitative Analysis*
- *Predictive Modelling,* ***Gitlab***

Research Experience

As a graduate researcher, I conducted in-depth research on **artificial intelligence, machine learning, cybersecurity, virtualization, storage systems, and high-performance computing**. My work involved contributing to the writing and preparation of **scientific publications** and conference presentations. I also assisted in preparing and **submitting research grant proposals** and played an active role in organizing academic workshops and conferences. Additionally, I contributed to the design and enhancement of existing healthcare systems by integrating AI-based implementations for improved diagnostic accuracy. My PhD thesis focused on developing an AI-powered vision system to enhance road safety in wildlife-prone areas for nocturnal hours to decrease the human and animal fatality rate and extended the methodology to power systems, architectural analysis, and cybersecurity domains.

AI-Driven Solutions for Real-World Problems: Methods, Models, and Applications

a. Automobile Applications

- *Intelligent system to prevent accidents by detecting animals and alert service system to warn drivers of potential collision using thermography images for autonomous vehicles.*
- *Image processing for improving the accuracy of accident avoidance to 91%.*

b. Biomedical Applications

Medical Image Classification – Aorta Aneurysm - DICOM

- *Image Segmentation and Artificial Intelligence-based Image Processing Techniques in Bio-Medical Applications (Abdominal Aortic Aneurysm Detection) in collaboration with UT Health, San Antonio, Texas.*

Tissue Remodelling and myopathy in Peripheral Arterial Disease

- *Developed 11 different Artificial Neural Network Models for objective peripheral arterial disease patient classification.*

c. Power Systems Applications - PV Panel dust and soil classification

- *AI-based classification method, Convolutional Neural Network and Long short-term memory (CNN-LSTM) to circumvent problems in solar panels deployment.*
- *Novel image classification method for increasing the efficiency of large-scale industry co-generation plants' efficiency by detecting and classifying dust and soil on PV arrays simultaneously.*

d. Environmental architectural applications

- *Analysis of time series raw data using LSTM and CNN to predict the best times for fitness center use, based on interior environmental conditions.*

e. AI based High Performance Computing and Cyber Security (Post-Doctoral Research)

- *Developed and implemented cutting-edge AI solutions for cybersecurity applications and big data analysis.*
- *Proven expertise in adversarial machine learning, computer security and public trust, sentiment analysis, spam detection, and vulnerability assessment of machine learning algorithms.*

Publications

Journals

- *Karaiskos Panagiotis, **Munian Yuvaraj**, Martinez-Molina Antonio, Alamaniotis Miltiadis "Indoor air quality prediction modeling for a naturally ventilated fitness building using RNN-LSTM artificial neural networks" Smart and sustainable built environment, 13 May 2024. https://doi.org/10.1108/SASBE-10-2023-0308.*
- ***Munian, Y.,** 2023.* A Robust Approach in the Design of Intelligent System for the Detection of Wild Animals in Nocturnal Period Using HOG and CNN in Automobile Applications *(Doctoral dissertation, The University of Texas at San Antonio).*
- *Dimitrios Miserlis, **Yuvaraj Munian**, Emma Fletcher, Josh Crapps, Pedro Teixeira, Lucas Ferrer, Joseph DuBose, William T. Bohannon, Peter Monteleone, Miltiadis Alamaniotis, Panagiotis Koutakis, "Evaluating the diagnostic ability of six different artificial neural networks, from the subcellular nano-micro environment to the clinical manifestation"doi: 10.1161/atvb.43.suppl_1.544, Journal of Arteriosclerosis, Thrombosis, and Vascular Biology, AHA journals, 2023. https://doi.org/10.1161/atvb.43.suppl_1.544,*
- *Dimitrios Miserlis, **Yuvaraj Munian**, William T. Bohannon, Marissa Wechsler, Miguel Montero-Baker, Lucas Ferrer-Cardona, Mark G. Davies, Panagiotis Koutakis, Miltiadis Alamaniotis," Benchmarking EfficientNetB7, InceptionResNetV2, InceptionV3, Xception Artificial Neural Network Applications for Aortic Pathologies Analysis", Journal of Vascular surgery, DOI, 2023. : https://doi.org/10.1016/j.jvs.2023.03.475*
- ***Yuvaraj. M**, A. Martinez-Molina, Dimitrios Miserlis, Hermilo Hernandez and M. Alamaniotis, Intelligent System Utilizing HOG and CNN for Thermal Image-Based Detection of Wild Animals in Nocturnal Periods for Vehicle Safety, Applied Artificial Intelligence, 2022. https://doi.org/10.1080/08839514.2022.2031825*
- *Mowen, D., **Munian, Y.**, & Alamaniotis, M. (2022). Improving Road Safety during Nocturnal Hours by Characterizing Animal Poses Utilizing CNN-Based Analysis of Thermal Images. Sustainability, 14(19), 12133. https://doi.org/10.3390/su141912133.*
- ***Yuvaraj. M**, A. Martinez-Molina, and M. Alamaniotis, Active Advanced Arousal System to Alert and Avoid the Crepuscular Animal Based Vehicle Collision, Intelligent Decision Technologies, vol. 15, no. 4, pp. 707-720, 2021. https://doi.org/10.3233/IDT-210204*
- ***Yuvaraj. M**, Kumaratharan. N, An efficient optimized comparative analysis of genetic algorithm and particle swarm optimization for digital watermarking in image processing, International Journal of Applied Engineering and Research, vol.10, Special issue, pp.-12474-12756, 2015.*

Conference Presentations and Publications

- ***Y. Munian**, I. Alsmadi and G. Crumrine, "AlexNet and Convolutional Neural Network Analysis in Thermogram Images for Automobile Application Using High Performance Computing," 2024 International Symposium on Networks, Computers and Communications (ISNCC), Washington DC, USA, 2024, pp. 1-8, doi: 10.1109/ISNCC62547.2024.10759037.*
- *G. Crumrine, I. Alsmadi, J. Guerrero, **Y. Munian** and M. Al-Abdullah, "Transforming Computer Security and Public Trust Through the Exploration of Fine-Tuning Large Language Models,"* 2024 4th Intelligent Cybersecurity Conference (ICSC), *Valencia, Spain, 2024, pp. 39-47, doi:10.1109/ICSC63108.2024.10895437.*
- ***Y. Munian**, A. Martinez-Molina and M. Alamaniotis, "Comparative Analysis of Thermogram and Pre-Processed HoG Images Using Machine Learning Classifiers," 2023 14th International Conference on Information, Intelligence, Systems & Applications (IISA), Volos, Greece, 2023, pp. 1-8, doi: 10.1109/IISA59645.2023.10345890.*

- *Dimitrios Miserlis, **Yuvaraj Munian**, William T. Bohannon, Marissa Wechsler, Miguel Montero-Baker, Lucas Ferrer-Cardona, Mark G. Davies, Panagiotis Koutakis, Miltiadis Alamaniotis "Convolutional Neural Network Analysis of Tissue Remodeling and Myopathy in Peripheral Arterial Disease,"* 2022 13th International Conference on Information, Intelligence, Systems & Applications (IISA), *Corfu, Greece, 2022, pp. 1-8, doi: 10.1109/IISA56318.2022.9904385.*
- *K. S. Ayyagari, **Y. Munian**, D. Inupakutika, B. Koti Reddy., R. Gonzalez and M. Alamaniotis, "Simultaneous Detection and Classification of Dust and Soil on Solar PhotoVoltaic Arrays Connected to A Large-Scale Industry: A Case Study," 2022 18th International Conference on the European Energy Market (EEM), 2022, pp. 1-6, doi: 10.1109/EEM54602.2022.9921140.*
- ***Y. Munian**, A. Martinez-Molina and M. Alamaniotis, "Comparison of Image segmentation, HOG and CNN Techniques for the Animal Detection using Thermography Images in Automobile Applications,"* 2021 12th International Conference on Information, Intelligence, Systems & Applications (IISA), *Chania Crete, Greece, 2021, pp. 1-8, doi: 10.1109/IISA52424.2021.9555562.*
- ***Yuvaraj. M**., A. Martinez-Molina, & M. Alamaniotis, Design and Implementation of a nocturnal animal detection intelligent system in Automobile Applications. International Conference on Transportation and Development 2021 – Transportation operations technologies and safety, American Society of Civil Engineers (ASCE), 2021. 438-449, https://ascelibrary.org/doi/ 10.1061/9780784483534.038*
- ***Y. Munian,** A. Martinez-Molina and M. Alamaniotis, "Intelligent System for Detection of Wild Animals Using HOG and CNN in Automobile Applications,"* 2020 11th International Conference on Information, Intelligence, Systems and Applications (IISA, *Piraeus, Greece, 2020, pp. 1-8, doi: 10.1109/IISA50023.2020.9284365.*
- ***M. Yuvaraj**, P. Surekha, and S. Sumathi, "An efficient optimization technique for digital watermarking in image processing," 2010 International Conference on Intelligent Control and Information Processing, 2010, pp. 803-808, doi: 10.1109/ICICIP.2010.5565254.*

Book Chapters

- *Generative AI for Cybersecurity and Privacy, CRC Press, 2025*

Graduate Research Projects & Mini Research Projects at UTSA

- *Image Processing with Binary Classification or Object Recognition - April 2020*
- *Comparison of Classifiers Using Thermal Images for Animal Detection - November 2019*
- *Convex Optimization for Modern Machine Learning in Image Processing - November 2019*
- *Face Detection Using CNN(Vgg16, Vgg19, Resnet20) - April 2019*
- *Network Intrusion Detection Using Decision Tree Classification of KDD'99 DATA Set Utilizing Parallel Computing Application - November 2018*
- *Design of IIR and FIR Filter to Remove the Noise from the Original Source Signal - November 2018*
- *A Simple Dependency Solver - April 2018*
- *Design of CMOS Inverter using Mentor Graphics and L-Edit.*
- *Traffic Light Controller using VHDL.*

Industry Experience

Internship ***25: 2 Solutions LLC, 815 S. First Ave STE A, Pocatello, ID 83201 May – August, 2021***
Computer Engineer Intern

- *Development of **Image Processing and Deep Learning tools** for agricultural data collection and analysis.*
- *Applications developed to reduce the time consumption and manual resources in agricultural fieldwork.*
- ***Auto-cropping time from 3 days to 45mins**. (Most Efficient method)*
- ***Heat-map python library** is used to identify the health of plants based on their temperature.*
- ***Pretty table python libraries** about the health of the plants.*

- *Retrieval of **Unmanned Aerial Vehicle image data** from hybrid data sources using Tableau and creating dashboards for reports.*

Service, Mentoring, and Academic Responsibilities

- **Mentor and project coordinator** for Graduate Students (India).
- **Student Counsellor** (India).
- **Internal and External Examiner** for Engineering Program Examinations conducted by Anna University, India.
- **Student counsellor/Advisor for IEEE TAMUSA chapter in Texas A&M University-San Antonio.** To provide a platform for networking and collaboration in fields related to **electrical and electronics engineering and computer science.**

Reviewer

- *International Journal on Artificial Intelligence Tools (IJAIT), World Scientific Publishing, https://www.worldscientific.com/worldscinet/ijait*
- *Intelligent Decision Technologies (IDT), SAGE publications, https://journals.sagepub.com/home/IDT*
- *Internet of Things (IoT), Aries Systems, https://www.ariessys.com/*
- *Artificial Intelligence (AI), AAA, AI Access Foundations, https://aiaccess.org/*

Workshops, Seminars, and Faculty Development Programs

- *Three workshops on MATLAB - control system application and image processing, signal and image processing, and circuit design using PSPICE.*
- *Three seminars on wireless network security, beforming data in the tether-free world, and faculty development skills.*
- *Nine faculty development programs on instructional design and delivery techniques, Fuzzy systems in image processing, wireless communication and network technology, antennas, wave propagation, electromagnetic fields, transmission lines and waveguides, and real-time embedded system applications using LABVIEW.*

Award & Funding Award

- ***NSF Award #2504465:** "Enhancing Cyberinfrastructure for multidisciplinary Research at Texas A&M University-San Antonio (ECMR – TAMUSA)"*
  *Role: **Postdoc**, PI: Dr. Izzat Alsmadi • Texas A&M University – San Antonio, 2025*
- *Awarded the 2022* **Outstanding Graduate Research Award by the Faculty in the Department of Electrical and Computer Engineering at UTSA**, *for best performance in academics and research.*

Membership of Professional Organizations

- *Life Member - Indian Society for Technical Education (ISTE): LM 84027.*
- *Life Member - Institution of Electronics and Telecommunication Engineers (IETE): AM-236113.*
- *American Society for Civil Engineers (ASCE – Student Member)*
- *Active Association for Computing Machinery Member*
- *Active IEEE Member - 101375982*

Professional IDs

- *Google Scholar ID - nKbd0DkAAAAJ*
- *LinkedIn ID - yuvarajmunian361985*
- *ORCID ID - 0000-0002-5410-0037*