Nihal Murali

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Google Scholar

Education

Education Level	Institute	GPA/%	Rank
Ph.D. (Intelligent Systems Program)	University of Pittsburgh (Pennsylvania)		
Graduate degree	BITS Pilani, Pilani campus	**9.63/10.0**	
Undergraduate degree 2014-2018	BITS Pilani, Pilani campus *B.E. (Hons.) Electrical and Electronics*	**9.83/10.0**	**Department Rank: 1/146** **University Rank: 4/993**

Fields of Interest

Machine Learning, Medical AI, Computer Vision, Healthcare

Publications

[Google Scholar Link]

(in-progress) *Nihal Murali, Harsh Sinha, Joshua Anderson, Yash Raka, Rick Chang, Parthasarathy Thirumala, Kayhan Batmanghelich, Shyam Visweswaran.* "Hybrid Human–AI EEG Monitoring for Intraoperative Ischemia Detection"

TMLR'23, ICMLW'23 *Nihal Murali, Aahlad Puli, Ke Yu, Rajesh Ranganath, and Kayhan Batmanghelich.* "Beyond Distribution Shift: Spurious Features Through the Lens of Training Dynamics" [Link] [Poster]

WACV'23 *Nihal Murali, Sumedha Singla, Forough Arabshahi, Sofia Triantafyllou, and Kayhan Batmanghelich.* "Augmentation by Counterfactual Explanation - Fixing an Overconfident Classifier." [Link]

WACV'19 *Nihal Murali, Jon Schneider, Joel Levine, and Graham Taylor.* "Classification and Re-Identification of Fruit Fly Individuals Across Days With Convolutional Neural Networks." [Link]

PlosOne'18 *Jonathan Schneider, Nihal Murali, Graham W. Taylor, and Joel D. Levine.* "Can Drosophila melanogaster tell who's who?." [Link]

ICSIPA'17 *Nihal Murali, Kunal Gupta, and Surekha Bhanot. "Analysis of Q-learning on ANNs for robot control using live video feed."* [Link]

Research Experience

- **BatmanLab and VisLab** *(May'20-Dec'25)*

  University of Pittsburgh (Pennsylvania)

  Title: From Spurious Learning to Safe Collaboration: Building Reliable Human–AI Systems for Clinical Decision Support

  Supervisors: Dr. Kayhan Batmanghelich , Dr. Shyam Visweswaran

  Objective: My work develops trustworthy and uncertainty-aware machine learning systems for safety-critical healthcare applications. I study model fragility—spurious learning, miscalibration, and over-confidence—and design hybrid human-AI frameworks that defer to human expertise when uncertain, improving reliability and interpretability in clinical decision-making.

- **Machine Learning Research Group (MLRG)** *(May'17-Dec'19)*

  University of Guelph (Ontario) and University of Toronto (Mississauga)

  Title: Classification and Re-Identification of Fruit-Fly Individuals Across Days using CNNs

  [Bachelor's Thesis] [Presentation] [Github] [Dataset] [News]

  Supervisors: Dr. Graham Taylor , Dr. Joel Levine , Dr. Jon Schneider

  Objective: This is the first work to investigate and successfully re-identify unmarked fruit flies across multiple days. We made our dataset public and trained our deep learning models to achieve a high accuracy ($\geq$98%). Domain adversarial networks were used to solve the declining accuracy across days. State-of-the-art Compute Canada clusters like Cedar (a 3.7-petaflop supercomputer) were used to train our models.

- **Robotics Research Center**, *International Institute of Information Technology (IIIT), Hyderabad (May'16-Aug'16)*

Title: Viewpoint and Keypoint detection using Deep Learning.

Supervisors: Dr. Madhav Krishna , Krishna Murthy

Objective: To estimate pose (viewpoint and keypoint) of rigid objects like cars using pretrained and finetuned VGG Net. ImageNet and PASCAL VOC datasets were used. We looked at recent advances in keypoint prediction and reproduced results on KITTI dataset.

- **Computer Vision Lab**, *Central Electronics Engineering Research Institute (CEERI), Pilani (Aug'15-Dec'15)*

Title: Saliency based Expression Recognition and Analysis

Supervisors: Dr. A. S. Mandal

Objective: Recognize and classify different facial expressions using Saliency based feature extraction and machine learning algorithms.

Academic Achievements

- Our research on **"Building a fly brain in a computer"** is featured in several news articles [link1], [link2], [link3], [link4]
- Recipient of the prestigious **MITACS Globalink Scholarship** in 2017 (Stipend: ~7000 CAD)
- Institute Merit Scholarship Recipient (at BITS-Pilani) for being in the **top 1% for seven consecutive semesters** (Stipend: ~700,000 Rs)
- EEE **Department Rank 1/146** and **University Rank 4/993**
- **GRE Quant: 170/170** (96 percentile), **TOEFL: 116/120** (99 percentile)
- Our robot secured **19th position** in the **ABU Robocon Nationals, Pune 2015** (over 90 teams participated all over India)
- Among **top 0.25% out of 1.5 million** students in India who appeared for Joint Entrance Examination (JEE-2014)
- **Ranked 27 amongst 150 Thousand candidates** in Karnataka Common Engineering Test (KCET-2014)
- National Science Olympiad - **State Rank: 5, International Rank: 107** in Feb 2014
- SSLC Board Examination 2012 - **Rank: 60/850,000 in State** with a score of 616/625 (98.56%). Honored by Judicial Minister of the State of Karnataka.
- NTSE-2010 (**Rank 28 in State**), Recipient of State Level Scholarship

Academic Service

- Journal Review: TMLR (2025)
- Workshop Review: SCSL@ICLR (2025)

Teaching Experience

- (Teaching assistant, Fall-2018) Neural Networks and Fuzzy Logic at BITS-Pilani, with Prof. Surekha Bhanot

Projects

Data Mining	K-Medoids Clustering for Streaming Data using ClusTree *(Jan'19-May'19)*
AI	1. AI Agent for Playing Checker Game using Adversarial Search *(June'18)* [Video]
	2. Probabilistic Reasoning using Bayesian Networks *(July'18)* [Video]
	3. Maze Game Solver Using ANNs in MATLAB *(Dec'15-May'16)* [Documentation]
NLP	Sentiment Analysis using Amazon Product Review Data *(Jan'18-May'18)* [Documentation]
ComputerVision	Autonomous recognition of Registration Number from a moving vehicle using Image Processing and Machine Learning Algorithms *(Aug'15-Dec'15)* [Documentation]
Robotics	1. Semi-Autonomous Arduino Controlled Badminton Playing Robot *(Aug'14-Mar'15)* [Video]
	2. Gesture Controlled Robot using MPU-6050 Inertial Measurement Unit *(Aug'14-Nov'14)*
	3. 'MOPOBOT': An 8051 microcontroller based mopping robot *(2010)* [Video]
Automation	Home Automation using Power-Line Modem (X10 standard) communication *(Aug'14-Dec'14)*

Technical Skills

Languages	PyTorch, Python, C, MATLAB, OpenCV, Arduino IDE, Octave, LATEX, Assembly Language
	GUI programming: Qt Creator IDE, Microsoft Visual Studio, Tkinter

Graduate Courses	Advanced Data Mining, Artificial Intelligence, Design and Analysis of Algorithms, Object Oriented Analysis and Design, Software Engineering, Data Warehousing, Advanced Operating Systems, Software Testing and Methods
Undergraduate Courses	Neural Networks and Fuzzy Logic, Machine Learning, Information Retrieval, Non-linear Optimization, Discrete Structures for Computer Science, Database Management Systems, Microprocessors and Interfacing, Digital Design, Computer Programming
Online Courses/Books	Convolutional Neural Networks for Visual Recognition *(CS231n,Stanford Classroom Course)*, Machine Learning *(CS229, Stanford Classroom Course)*, Linear Algebra by Gilbert Strang *(MIT OpenCourseWare)*, Artificial Intelligence *(UC Berkeley, EdX)*, 'OpenCV 2 Computer Vision Application Programming Cookbook' *(by Robert Laganiere)*