
Sunny Arokiya Swamy Bellary

Phone: +1 (980) 938 9853 — Email: sas.bellary@gmail.com

Website: <https://sunnybellary.com>

Linkedin: <https://www.linkedin.com/in/sunnybellary>

EDUCATION

Master of Science in Electrical and Computer Engineering

Jan 2017 - May 2019

The University of North Carolina at Charlotte, NC

Thesis: Human-robot Collaboration using EEG signals with Self-learning

Advisor: Dr. James M. Conrad

Committee: Dr. James M. Conrad (Chair), Dr. Andrew R. Willis, Dr. Thomas P. Weldon

Bachelor of Engineering in Electrical and Electronics Engineering

Aug 2011 - Jul 2015

M S Ramaiah Institute of Technology, Bangalore

Senior Project: Indian Sign Language to Speech and Text

Advisor: Kusumika K. Dutta

RESEARCH/INDUSTRY EXPERIENCE

Engineer/Scientist II

Sept. 2019 - present

Data Analytics, Electric Power Research Institute (EPRI), Charlotte, NC, USA

- Developing a test plan for UAS to operate within an electromagnetic environment and evaluating automated substation inspections.
- Developing a lawn mover robot using ROS to cut the grass grown above solar panels and guiding undergrads from UNC Charlotte in product development.
- Assisting Technical leaders in developing a tool for Transformer fault and life expectancy analysis.
- Implementing Machine learning and deep learning techniques for DGA analysis using tensorflow and python.
- Conducting a study relating the use of robots in substation and transmission line management system.

Masters Thesis Research

Jan. 2018 - May. 2019

Embedded Systems and Robotics Lab, UNC Charlotte, Charlotte, NC, USA

- Developed a classifier using convolution neural networks to decode the error related potentials from human brain signals to control a binary object selection task and classification task.
- Simulated a PR2 as articulated assistive robot with two 7 DOF robotic arms in Gazebo using ROS and the script was written in MATLAB and python.
- Implemented a novel self-learning algorithm using concepts of online machine learning like stochastic gradient descent for the robot to self learn the object classification task in real time.
- Implemented object detection and object recognition using computer vision techniques to select and localize the objects placed on table.

Research Intern

May 2018 - Dec 2018

Research and Development Division, Hitachi America Limited, MI, USA

- Developed a vehicle speed prediction model for long and short duration using deep learning, machine learning, probabilistic and stochastic models by acquiring real time traffic and map data from different companies.
- Used LSTM model for time series data prediction and deep probabilistic programming using Bayesian Neural Networks and approximate Bayesian LSTM for determining its confidence interval.
- Worked with different R&Ds and MDOT to develop a DSRC module for vehicle to vehicle and vehicle to infrastructure communication and to transmit messages over CAN bus.
- Performed real time validation and testing on road to evaluate the performance of the speed prediction model and DSRC data communication with traffic lights.
- Published a SAE technical paper along with other researchers on various artificial intelligence approaches to predict vehicle speed for realizing Predictive Powertrain Control.

Associate Software Engineer

Nov 2015 - Dec 2016

Accenture Services Pvt. Ltd., Bangalore, India

- DevOps Engineer under Continuous Integration Team having Agile software development methodology.
- Wrote build scripts and used Jenkins to automate the deployment process of applications to build servers.
- Worked on setup and deployment of applications to cloud servers using Pivotal Cloud Foundry.
- Worked closely with onshore and clients by providing support related to Continuous Integration team.

Project Engineer

Jun 2014 - Jul 2014

Hindustan Aeronautics Limited, Bangalore, India

- Designed Embedded Control of Fuel Flow of an Aero Engine by RVDT method.
- ATMEGA16 microcontroller was used to design the Embedded control & was programmed in C.
- Equivalent analog circuit was also designed using operational amplifiers.
- Simulated the system using Multisim (analog circuit) / Proteus (digital circuit) and the PCB was designed.

TEACHING/MENTORING EXPERIENCE

Teaching Assistant

Aug 2017 - May 2018 & Jan 2019 - May 2019

University of North Carolina at Charlotte, NC, USA

- Taught, Instruments and Networks lab to Sophomore level undergrad students for 1.5 years.
- Course was designed to provide hands on experience with electrical & electronic devices circuit construction and debugging, and operation of laboratory instrumentation.
- Gained knowledge of circuit boards, teaching experience, lab Instruments like Oscilloscope & principle involved in designing electronic circuits.
- Taught all undergrads to design, build, debug, simulate electronic circuits and develop PCB boards.

Undergrad Consultant

Jan 2020 - present

M S Ramaiah Institute of Technology, Bangalore, India

- Designed courses such as Digital Image processing and Introduction to Machine learning for various levels of undergrad students from Department of Electrical and Electronics Engineering, MSRTIT.
- Taught few concepts of machine learning classes online during COVID 19 pandemic and trained students to program in python and MATLAB concepts such as PCA and kNN.
- Designing various project based on the course work for learning concepts of Machine learning.
- Designed a pipeline collection of data of Kannada handwritten letters and Double handed Indian Sign Language and preprocessed the data.

LEADERSHIP EXPERIENCE

Team Leader

Dec 2015 - Aug 2016

Project Belaku - "An effort towards rural electrification"

- Led a team of 17 undergrad students to electrify 3 villages in India which had never seen electricity before.
- Communicated with local NGOs, community people, government officials, technical leaders and funding organizations in the process of successful implementation of project Belaku.
- Designed a charge controller circuit - Buck boost converter to charge battery from solar panel, etched on PCB board, and installed in villages along with DC LED bulbs.
- Electrified two villages with standalone solar module and another village with microgrid.

PUBLICATIONS

Book Chapters

- Dutta, K., Sridharan, P., **Bellary, S.** *Recurrent neural networks and it's application in seizure classification* in Deep Learning in Visual Computing and Signal Processing (DLVCSP), Apple Academic Press, chapter accepted for publication August 2020.
- Indira, K., Dutta, K., Sridharan, P., **Bellary, S.** *Deep Learning Methods for Data Science* in Advanced Analytics and Deep Learning Models, Wiley Scrivener Publishing, chapter accepted for publication September 2020.

Conference & Journal Papers

- **Bellary, S. A. S.**, Grabowsky, D., & Conrad, J. M. (2020). *Indoor Navigation for Assistive Robots using EEG Signals as Feedback*. SoutheastCon 2019. IEEE
- Lonari, Y., Kundu, S., Agrawal, M., & **Bellary, S.** (2020). *Drive Horizon: An Artificial Intelligent Approach to Predict Vehicle Speed for Realizing Predictive Powertrain Control* (No. 2020-01-0732). SAE Technical Paper.
- **Bellary, S. A. S.** (2019). *Human-Robot Cooperation Using EEG Signals With Self-Learning* (Doctoral dissertation, The University of North Carolina at Charlotte).
- **Bellary, S. A. S.**, & Conrad, J. M. (2019, January). *Classification of Error Related Potentials using Convolutional Neural Networks*. In 2019 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence) (pp. 245-249). IEEE.

- **Bellary, S. A. S.**, Shetty, N. S., Hill, R. C., Weldon, T. P., & Conrad, J. M. (2018, April). *Investigation of a Digital Non-Foster RC Circuit Using Pade and Prony Approximations*. In SoutheastCon 2018 (pp. 1-4). IEEE.
- Kusumika Dutta, **Sunny Arokia Swamy Bellary**, K. Venugopal (2017). *Removal of muscle artifacts from EEG based on ensemble empirical mode decomposition and classification of seizure using machine learning techniques*. 2017 International Conference on Inventive Computing and Informatics (ICICI).
- Kusumika Dutta, **Sunny Arokia Swamy Bellary** (2017). *Machine Learning Techniques for Indian Sign Language Recognition*. 2017 International Conference on Current Trends in Computer, Electrical, Electronics and Communication (CTCEEC).
- Kusumika Dutta, **Sunny Arokia Swamy Bellary**, S. K. Raju K., A. Kumar G.S. (2015). *Double handed Indian Sign Language to speech and text*. 2015 Third International Conference on Image Information Processing.
- Kusumika Dutta, **Sunny Arokia Swamy Bellary**, Anil Kumar GS, Satheesh Kumar Raju (2014). *Indian Sign Language to Speech*. International Journal of Advances in Engineering Research,(IJAER).
- Satheesh Kumar Raju, **Sunny Arokia Swamy B.** *Wireless Biometric Student Attendance System*. National Conference on Zen and Tao of Electrical & Electronics Engineering, MSRIT, Bangalore, Jan 7-9, 2014.

AWARDS AND RECOGNITION

- 2021 Outstanding Master's Thesis Award (Nominated)** Oct. 2020
- Awarded to one student from the STEM category who completed their master's thesis during the period of Fall 2018 and Summer 2020.
- Joanna R. Baker Memorial Fellowship** 2017-2018
- One of the prestigious awards of UNC Charlotte and received by one and only student across the university working towards interdisciplinary research and application of information technology in the public sector.
- Outstanding Teaching Assistant** 2017-2018
- Awarded to a graduate student who demonstrates excellent teaching skills and utilized classroom management and discipline strategies.
- Winner of Anveshana Project Competition 2014** April 2014
- A Science & Engineering competition involving undergraduate engineering students and underprivileged school going students making models based on engineering science concepts.

SKILLS

Programming Languages	: C, C++, Python, Markdown, LaTeX
Graphical Programming	: LABVIEW
Simulation Packages	: Multisim, PSpice, PSim, PSCAD, and Proteus
Embedded Software	: Keil vision, IDE Arduino, AVR Studio, Energia, and CCS
Embedded Boards	: dSpace MicroAutobox II, TI MSP430, TIVA, and Raspberry Pi
Scientific Computing Tools	: MATLAB and SciLab
PCB Design	: Eagle and Ultiboard
Machine Learning & Deep Learning tools	: Scikit, TensorFlow, Keras, PyMC3, Edward
Version Control	: Apache subversion (SVN) and git
Robot Simulator	: Gazebo
CAN tools	: Vector CANape, BUSmaster

CONFERENCE PRESENTATIONS

- **Sunny Arokia Swamy Bellary**, David Grawbosky. (Mar. 2020) *Indoor Navigation for Assistive Robots using EEG Signals as Feedback*. Paper presented at SoutheastCon 2020, Huntsville, Alabama.
- **Sunny Arokia Swamy Bellary**, James M. Conrad. (Mar. 2019) *Brain Computer Interface to Assistive Robots* Paper presented at 19th Graduate Research Symposium, UNC Charlotte, NC.
- **Sunny Arokia Swamy Bellary**, James M. Conrad. (Jan. 2019) *Classification of Error related potentials using convolutional neural networks*. Paper presented at Confluence 2019, Noida, India.
- **Sunny Arokia Swamy Bellary**, Samyak Shetty, Ryan Hill, Thomas Weldon, James M. Conrad. (Apr. 2018) *Investigation of a Digital Non-Foster RC Circuit Using Pade and Prony Approximations*. Paper presented at SoutheastCon 2018, St. Petersburg, Florida.

- **Sunny Arokia Swamy Bellary**, Satheesh Raju. (Dec. 2015) *Double Handed Indian Sign Language to Speech and Text*. Poster presented at ICIIP 2015, Wagnaghat, Shimla, India.
- **Sunny Arokia Swamy Bellary**, Satheesh Raju. (Jan. 2014) *Wireless Biometric Attendance System*. Paper presented at National Conference of Zen & Tao of EEE, MSRIT, Bangalore, India.

PROFESSIONAL MEMBERSHIPS

Institute of Electrical and Electronics Engineers

Member since 2015

- IEEE Robotics and Automation Society Membership - 2 years
- IEEE Signal Processing Society Membership - 2 years
- IEEE Sensors Council - 2 years

UNIVERSITY AND PROFESSIONAL SERVICE

Event Developer

Jan 2017 - May 2019

- IEEE Student Branch, UNC Charlotte
 - Conducted workshop on how to use Latex for preparing lab reports, resume, and research papers for around 70 undergrad students.
 - Conducted three part workshop series on designing a circuit, PCB design, and etching & soldering a PCB where in total more than 100 students attended.
 - Organized various other events such as Piano resistor, Industry visits, preparation for SoutheastCon, etc.

Chair, Awards Committee

Oct. 2017 - April 2018, Oct. 2018 - Apr 2019

- 18th & 19th Annual Graduate Research Symposium, UNC Charlotte
 - Formed and Led a team from various colleges for calculating awards those were manually written.
 - Developed an automatic award calculation using SQL system for GRS which saved lot of manual calculation time which was later used also in Undergrad Research Symposium.

Conference Reviewer

- HONET-ICT 2020: IEEE International Conference on Smart Communities: Improving Quality of Life Using ICT & IoT and AI, Charlotte, Dec 2020.
- HONET-ICT 2019: IEEE International Conference on Smart Cities: Improving Quality of Life Using ICT & IoT and AI, Charlotte, Oct 2019.
- SPACES 2018: IEEE Conference on Signal Processing and Communication Engineering Systems, Vijayawada, India, Oct 2017.
- 18th Annual Graduate Research Symposium, UNC Charlotte, Apr 2018.
- 17th Annual Graduate Research Symposium, UNC Charlotte, Feb 2017 - Mar 2017.

IEEE Humanitarian Activities Committee

Jan 2019 - present

- Reviewed more than 10 proposals in various phases received by IEEE HAC for funding from various parts of the world.
- Currently reviewing HAC and SIGHT COVID response project proposals.

REFERENCES

Dr. James M. Conrad

Professor, CPE Associate Chair
 Department of Electrical and Computer Engineering
 UNC Charlotte
 Phone: 7046878597
 Email: jmconrad@uncc.edu

Dr. Andrew R. Willis

Associate Professor, EE Associate Chair
 Department of Electrical and Computer Engineering
 UNC Charlotte
 Phone: 7046878420
 Email: arwillis@uncc.edu

Dr. Thomas P. Weldon

Associate Professor
 Department of Electrical and Computer Engineering
 UNC Charlotte
 Phone: 7046878432
 Email: tpweldon@uncc.edu

Bhavin Desai

Senior Program Manager
 Transmission and Substations sector
 Electric Power Research Institute (EPRI)
 Phone: 7048041188
 Email: bdesai@epri.com