

Final Year Undergraduate
Dept. of Electrical Engineering
Indian Institute of Technology Kanpur

GitHub: <https://github.com/shashikg>

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KEY PROJECTS	tf_deepRL: RL library for TensorFlow Mar. '20 - Ongoing <i>Self-Project</i> <ul style="list-style-type: none"> - Developing an RL library for python for easy building of deep RL model with TensorFlow as backend. - Features implemented: Vanilla policy gradient agent, continuous visualization of reward vs. epoch curve during training, custom environment creation, gym compatible, run environment without any actual display.
	How Close are Artificial Neural Networks to the Brain? Sep. '18 – Nov. '18 <i>CS771A - Machine Learning, Prof Piyush Rai, IIT Kanpur</i> [Pres] [Report] <ul style="list-style-type: none"> - Studied different types of ANN models to compare their structure and performance to realise their biological resemblance to the processing in the human brain - Trained several neural network models on MNIST dataset to play with modelling of CNN and RNN. - Tried explaining how a rate-based neuron in conventional NN can be realised as spiking neuron in SNN - Studied variational EM method as explained by (Yoshua Bengio et al., 2015) on the biological plausibility of deep learning.
	Real Time Human Facial Emotion Recognition Nov. '18 – Dec' 18 <i>Self Project</i> [Video] [Code] <ul style="list-style-type: none"> - Extracts human faces (using OpenCV haar-cascade/ dnn based classifier) from a camera stream and classifies them into 7 different moods i.e. Angry, Disgust, Fear, Happy, Sad, Surprise and Neutral - CNN classifier (with ensemble) was designed, which was trained on the ICML 2013 dataset of Facial Expression Recognition Challenge on Kaggle to achieve an accuracy of ~65.34% on the private test data
	Cooperative Localization Using Posterior Linearization Belief Propagation Sep. '18 – Nov '18 <i>EE602A – Statistical Signal Processing, Prof R. M. Hegde, IIT Kanpur</i> [Code] [Report] <ul style="list-style-type: none"> - Implementation of a research paper, which presents the PLBP algorithm for cooperative localization - Learned about and implemented Statistical Linear Regression using unscented transform on a chosen sets of sigma points to linearize the proposed non-linear model. - Implemented the Belief Propagation algorithm to infer the marginals for different sensor nodes.
	Achieving CRLB in Sensor Network Estimation Sep. '18 – Nov '18 <i>EE602A – Statistical Signal Processing, Prof R. M. Hegde, IIT Kanpur</i> [Code] <ul style="list-style-type: none"> - Implementation of a research paper, which proposes a general framework to achieve CRLB bounds - Successfully implemented the proposed method in MATLAB to produce the results
OPEN SOURCE CONTR.	SL-COM (Sign Language Communication) Mar. '17 <i>Robotics Club, IIT Kanpur</i> <ul style="list-style-type: none"> - Patterns were generated using different hand gestures to produce different letters - Produced letters were sent to a Chat-App, where a text2speech engine was used to produce voices - Demonstrated the prototype in Techkriti Innovation Challenge and was awarded with the 3rd prize
	jsPsychSheet [GitHub] <i>Self-Project</i> <ul style="list-style-type: none"> - Developed a simple JavaScript library for running behavioral experiments online
	Open AI gym [GitHub] <ul style="list-style-type: none"> - Some issue fixations for gym environment library
	Brain-Score [GitHub] <i>DiCarlo Lab, MIT, USA</i> <ul style="list-style-type: none"> - Implement a new benchmark based on a visual search task
	PixhawkArduinoMAVLink [GitHub] <i>Self-Project</i> <ul style="list-style-type: none"> - Developed an Open Source Arduino library to communicate between Pixhawk and Arduino
RELEVANT COURSES	Machine Learning and Computer Vision <ul style="list-style-type: none"> • Introduction to Machine Learning • CNN for Visual Recognition (Stanford AI) [#] • Reinforcement Learning Specialisation (Coursera – University of Alberta) [o] [c] • Computer Vision: Foundations and Applications (Stanford AI) [#] • Deep Learning Specialisation (Coursera – deeplearning.ai) [o] [c]

Signal Processing

- Statistical Signal Processing
- Image Processing
- Signals, Systems and Networks
- Digital Signal Processing [o]

Cognitive Science

- Foundation of Cognitive Science
- Psychology of Language
- Psychology of Adjustment
- Computational Cognitive Science
- Neurobiology
- Logic and Cognitive Science [o]

Mathematics and Algorithms

- Data Structures & Algorithms
- Fundamentals of Computing [*]
- Basic Statistics, Data Analysis & Inference [o]
- Probability and Statistics
- Linear Algebra and ODE

* - Exceptional Performance

c - [Link](#) to online course certificates

- Online (Audit)

o - Ongoing

TECHNICAL SKILLS	Languages:	C • Python • MATLAB	
	Software and Tools:	TensorFlow • Keras • OpenCV • NumPy • ROS (Robot OS) • jsPsych • PsyToolkit • Git • Arduino • HTML/CSS • Jekyll	
LECTURES/ TALKS / TUTORIALS	[28-03-2020] to [20-04-2020]	Brain and Cognitive Society workshop covering topics on Basic Machine Learning, Computational Modelling, Psychophysics, Data Analysis and Experiment Design [BCS @IITK] [Around 150+ participations]	[Link]
	[13-12-2019]	Basic ML, Deep Learning Libraries and Google Colab [BCS @IITK]	[Link]
	[12-12-2019]	Artificial and Biological Neural Networks [BCS @IITK]	[Link]
	[10-12-2019]	Python, NumPy, SciPy, Matplotlib Tutorial [BCS @IITK]	[Link]
	[25-10-2019]	Talk on Role of Brain Science in AI [BCS @IITK]	[Link]
	[29-05-2017]	Introduction and Quick Start to ROS [Robotics Club, IITK]	[Link]
LEADERSHIP & ACTIVITIES	Founder and Coordinator	Brain and Cognitive Society, IIT Kanpur	Jan. '20 – Now
	Student Volunteer	PRAYAS, IIT Kanpur	Dec. '18 – Jan. '19
	Technical Head	Humanoid IITK Team, IIT Kanpur	May. '18 – Nov '18
	UG Coordinator	EEA, Dept. of Electrical Engineering, IIT Kanpur	Aug. '17 – Aug. '18
	Secretary	Robotics Club, IIT Kanpur	Apr. '17 – Mar. '18
	Secretary	Fine Art Club, IIT Kanpur	Apr. '17 – Mar. '18
	Student Guide	Counselling Service, IIT Kanpur	Aug. '17 – Jul. '18
	Student Volunteer	National Service Scheme, IIT Kanpur	Aug. '16 – May. '17