Gopi **Kishan**

MACHINE LEARNING ENTHUSIAST

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"What I can not create, I do not understand."

Sum**mary**

A curious computer scientist in making trying to find answers and solutions for problems in Artificial Intelligence. Familiar with Machine Learning, Deep Learning, Reinforcement Learning and Computer Science Fundamentals, with a specific interest in Computer Vision and Deep RL. Easily excited by mathematics, music and tea.

Edu**cation & Summer Schools**

AI Summer School, Google Research India *Bangalore, India*
COMPUTER VISION TRACK *Aug 20, 2020 - Aug 22, 2020*
- Attended & participated in interesting lectures, discussions and social gatherings virtually, connecting with researchers at Google AI.

CIFAR DLRL Summer School, MILA *Montreal, Canda*
SPECILISED LECTURES IN DEEP LEARNING & REINFORCEMENT LEARING *Aug 3, 2020 - Aug 7, 2020*
- Advanced lectures on topics like Deep Commonsense, Intelligence, Graph Representation Learning,
- Model-Based RL, RL by convex duality, Self-play & Multi-agent systems, Safe RL for Robotics, Meta RL.

CVR-VISTA Summer School, York University *Toronto, Canada*
LECTURES IN VISION SCIENCE *July, 2020*
- This virtual event consisted of Lectures, Discussions and Practical sessions on Vision Science explaining its roots in neuroscience, cognitive science, psychology and computer vision

Indian Institute of Technology, Roorkee *Roorkee, India*
B.TECH. IN COMPUTER SCIENCE AND ENGINEERING *2017 - Exp. 2021*
- CGPA: 9.14/10

Cambridge Public School, Raxaul *Raxaul, India*
GRADE 12 (SENIOR SECONDARY LEVEL) *2017*
- Percentage: 90%

Exp**erience**

AAAI-21 Undergraduate Consortium *Virtual*
SELECTED UNDER COHORT OF 14 STUDENTS. *Feb 2, 2021 - Feb 9, 2021*
- Accepted 2-page extended abstract at AAAI-21 proceedings.
- Selected for poster presentation, complimentary AAAI-21 conference ticket and personal mentorship.

Max Planck Institute - Intelligent System (MPI-IS) *Tübingen, Germany*
REMOTE RESEARCH INTERNSHIP *May, 2020 - Dec, 2020*
- Collaborating jointly with Empirical Inference and Physical Intelligence Departments
- Working on learning to Navigate through Complex Environments by a Magnetic Microbotic Swarm with Prof. Stefan Bauer.
- Built a gym-simulator using box2d for swarm particles navigation and applying Deep Reinforcement Learning for control.

University of British Columbia, Okanagan (UBCO) *British Columbia, Canada*
VISITING URA *May, 2020 - Sept, 2020*
- Collaborated on project under the guidance of Prof. Apurva Narayan, Department of Computer Science, UBCO.
- Primary investigator of the project titled "Probabilistic Robustness Quantification of Neural Networks".
- Worked on metrics for probabilistic verification of model hypothesis and test dataset.

Indian Institute of Science (IISc) *Bangalore, India*
RESEARCH INTERNSHIP *May, 2019 - Dec, 2019*
- Part of the Guidance, Control and Decision Systems Laboratory (GCDSL) under the guidance of Prof. Debasish Ghose.
- Worked on various model compression techniques including pruning, quantization and knowledge distillation.
- Explored latent representation priors in Variational AutoEncoder. Github *link*.

Indian Institute of Technology Bombay (IIT B)   *Mumbai, India*
INTERNSHIP   *June 2018 - July 2018*
- Associated with VIP lab under the supervision of Dr. Biplab Banerjee at CSRE department IIT Bombay
- Worked on Face detection algorithms (RCNN, Fast-RCNN, Faster-RCNN, YOLO) on VGG-16 architecture and trained on Widerface dataset.

Publication

Probabilistic Robustness Quantification of Neural Networks   *AAAI-21*
AUTHOR   *Feb 2-9, 2021*
- Paper accepted at Undergraduate Consortium (UC) at the Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI-21) (under pre-print).

Rendezvous between Robustness and Dataset Bias: An empirical study *Pre-register NeurIPS*
AUTHOR   *Dec 11, 2020*
- Paper accepted for the Preregistration Workshop on Machine Learning at NeurIPS 2020 (under pre-print).

Projects

Quantum Machine Learning   *IIT Roorkee 2020*
LAB BASED PROJECT   *Jan, 2020 - June, 2020*
- This project, under the guidance of Dr Sugata Gangopadhyay, aims at applying the advantages of quantum computing to Deep Learning.
- Explored the structure of Quantum GANs and method to discriminate a randomly initialised qubit.
- For a complete detail refer my *report* and *presentation* on this project and play around the experiments in google colab *here* and *here*.

Reproducibility Challenge   *NeurIPS 2019*
COMPETITIVE GRADIENT DESCENT   *Nov 1, 2019 - Dec, 2019*
- The paper introduces a novel algorithm for the numerical computation of Nash equilibria of competitive two-player games.
- Following baseline track, I have re-implemented the proposed CGD algorithm in python3 (using PyTorch).
- The reproducibility report is publised at *arXiv* and source code in this GitHub *repository*.

PunyNet   *DeepMind, hosted at NeurIPS 2019*
MICRONET: LARGE-SCALE MODEL COMPRESSION COMPETITION   *May, 2019 - Oct, 2019*
- This project aims at efficient inference on CIFAR100 dataset by compressing the model size.
- Quantized a resnet18 model by learning a codebook C that minimizes the difference between the output activations and their reconstructions.

Self Balancing Bot using RL   *IIT Roorkee, India*
PROJECT UNDER ArIES, IIT ROORKEE   *October, 2018 - March, 2019*
- This project aims at stabilising a two-wheeled robot using Reinforcement Learning.
- Q-learning algorithm is used to train the bot in a virtual environment made using gym and pyBullet.

Honours & Achievements

2021	**AAAI-21 Undergraduate Consortium,** Selected under a cohort of 14 students (17 % acceptance rate).		*AAAI-21, Virtual*
2020	**Google AI Summer School,** Shortlisted under 50 students for virtually attending the event (vision track).		*Bangalore, India*
2020	**DLRLSS, MILA,** Selected under highly competitive CIFAR MILA summer school. Goes virtual due to COVID-19		*Montreal, Canada*
2020	**ICML,** Selected for volunteering at virtual ICML conference.		
2020	**CVRSS,** Selected (under 30) for Vision Science Summer School. Goes Virtual due to COVID-19		*Toronto, Canada*
2020	**MITACS GRI Fellow,** Selected for the MITACS GRI program. Cancelled due to COVID-19		*UBCO, Canada*
2019	**Micronet Challenge,** TPU Credits Awardee, Awarded to global top 25 proposals.		*Global*
2019	**Flipkart Grid-Challenge,** Under top 5 at IITR (and 36th in India).		*India*
2017	**All India Rank - 1114,** JEE Advanced, administered by Indian Institutes of Technology		*India*
2017	**All India Rank - 2700,** JEE Main, taken by more than a million students.		*India*

AI-Challenges

IDAO 2020   *Online Round*
INTERNATIONAL DATA ANALYSIS OLYMPIAD 2020   *Jan 15, 2020 - Feb 11, 2020*
- The problem statement involves modeling of accurate trajectories of satellites from previous data. Repo at *link*.

Inter-IIT Tech Meet 8.0   *India*
BITGRIT'S DATA SCIENCE CONTEST   *Nov. 2019 - Dec. 2019*
- The problem statement involves modeling of variation of exchange rates between local and foreign currency.

PanIIT Challenge 2019
India
ORGANISED BY TATA CONSULTANCY SERVICES LIMITED (TCS)
Jan. 2019
- Built a tuberculosis detection andriod app based on Deep Visual Attention using TFLite.

Microsoft AI Challenge 2018
India
ORGANISED BY MICROSOFT
December 2018
- phase 1 : Involved improvement in classical page rank algorithm.
- phase 2 : Involved exploration of NLP based technique to find relevant search results on bing search engines.

Skills

Programming	Python, C++, JAVA, C, Javascript
Frameworks and Packages	Tensorflow, Keras, scikit-learn,, openCV, gym, Numpy, Pandas, Matplotlib
Utilities	Git, Linux Shell, Vim, VS Code, GitHub, jupyter
Relevant Courses (online)	Deeplearning.ai Specialization (by Andrew Ng), csn231n (for Computer Vision)
	csn229 (for Machine Learning), RL course by David Silver, stat110 (for Probability and Statistics)
Books Referred	Deeplearning by Goodfellow, Pattern Recognition and Machine Learning by Bishop,
	Reinforcement Learning : An Introduction by S. Sutton
Courses	Mathematics-1 (covered Linear Algebra and Calculus), Optimization Techniques, Artificial Intelligence
	Signal and Systems, Discrete Structures, Data Structures and Algorithms, Machine Learning, Quantum Computing

Extracurricular Activity

ACM-IIT Roorkee Chapter
IIT Roorkee, India
OUTREACH HEAD, (PREVIOUSLY MODERATOR)
July 2019 - PRESENT
- As Outreach Head, I connect researchers from ACM network and organise talks.
- As Linux discussion moderator, my responsibility was to organise discussions on Linux OS for freshers and sophomores.

Artificial Intelligence and Electronic Society (ArIES)
IIT Roorkee, India
CORE MEMBER
May 2019 - PRESENT
- Here, I am currently working on robustness against Adversarial Attacks. I am studying various attacks and defence mechanisms with a particular interest in vision models.
- Alongside, I have mentored the project "Translational Tools" for SHRISTI, an Annual Technical Exhibition of IIT Roorkee.

Google Code-in 2019
India
TENSORFLOW MENTOR
Dec,2 2019 - Jan., 2020
- Here, I lent a helping hand to pre-university students to learn what it's like to work on an open source project.

Smart India Hackathon Grand Finale
India
ORGANISED BY MHRD, INDIA
2019
- Built a Blockchain based complaint system to assist fixing water wastage issues.

References

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