

Ravi Raja

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EDUCATION

Indian Institute of Science, Bangalore

Aug. 2019 – April 2022 (Expected)

M. Tech. Research in Computer Science and Engineering, GPA: 7.6/10

- **Labs:** Machine Learning Lab / Programming Languages Lab
- **Advisors:** Prof. Chiranjib Bhattacharyya and Prof. Deepak D'Souza
- **Research Area:** Machine Learning and Program Synthesis.
- **Courses:** Linear Algebra and Probability, Computational Methods of Optimisation, Design and Analysis of Algorithms, Machine Learning, Program Synthesis meets Machine Learning, Topics in Software Engineering

Panjab University, Chandigarh

Aug. 2013 – May 2017

B. E. in Computer Science and Engineering, GPA: 7.3/10

PROJECTS

Boolean Function Synthesis using GCLN (Research Project)

Jan. 2021 – On Going

Project Advisors: Aditya Kanade, Chiranjib Bhattacharyya, Deepak D'Souza

- The focus of this project is to understand how well a neural network can capture the semantics of a Boolean formula, for synthesis.
- Used modified GCLN i.e, **Gated Continuous Logic Network** as model architecture **for the first time** in context of Boolean Function Synthesis.
- Ideas used: 1. Fractional Sampling, 2. Learning using GCLN, 3. Validity Checking.
- Preliminary results show promise.

Generating Grammar Rules for Syntax-Guided Synthesis (Course Project) Report

Oct. 2020 – Jan. 2021

- This project aimed at restricting the solution space of SyGuS problem by predicting set of relevant grammar rules for deriving the final program.
- Model architecture used is **gated graph neural network** to feed forward neural network.
- Achieved 91% accuracy over validation data.

Synthesizing Programs from Logical Constraints using Machine Translation (Course Project)

Jan 2020 – Jun. 2020

- Posed the **synthesis problem as Machine Translation** problem and attempted to solve it using **GGNN on top of a Seq2Seq** model architecture.
- Modeled logical constraints using gated graph neural network.
- **Challenge:** Unavailability of training data.

Sentiment Analysis on IMDB Movie Reviews

July 2021 – Aug. 2021

- This project aimed at studying various deep learning models for sentiment analysis and evaluating their performance.
- Implemented **Yoon Kim's TextCNN** model which achieved accuracy of 86.34%
- Proposed a new architecture on top of textCNN that improved the accuracy by approx. 1.5%.
- Using BERT gave an improved accuracy of 92.65%

Kernel Methods (Course Project)

Jan 2020 – Jun. 2020

- Implemented following **kernelized machine learning algorithms** and studied the properties of a valid kernel:
- Support Vector Machines, Regression, K Means, Linear Discriminant Analysis.

SKILLS

Languages/Tools : Python, C, PyTorch, Git

Technicals : Machine Learning, Deep Learning, Optimization, NLP, DSA

POSITIONS OF RESPONSIBILITY

TA, Linear Algebra and Probability, Fall 2020 [IISc]

Member, Webteam CSA [IISc]

Volunteer, Interactive Demo, Open Day 2020 [IISc]

Placement Coordinator, [Panjab University]

Founder, Symphonic Vibrations (Music Group), [Panjab University]

ACHIEVEMENTS

AIR 888 in GATE (Computer Science) 2019