

# Aaron Jacob Varghese

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## EDUCATION

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### Boston University

*Master of Science in Computer Science*

Boston, MA

*Expected December 2020*

### International Institute of Information Technology (IIIT-H)

*Bachelor of Technology in Computer Science and Engineering (Honors in Computer Vision)*

Hyderabad, India

*April 2019*

## EXPERIENCE

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### Intel Corporation

*Machine Learning Intern*

Bangalore, India

*June 2018 - July 2018*

- Performed an extensive research study on efficient semantic segmentation methods with a goal to devise a method for real-time segmentation for autonomous driving applications (Variable Quantized Ensemble Networks)
- Implemented and trained newly released segmentation models for comparison with existing state-of-the-art models using PyTorch and Tensorflow on Berkeley Deep Drive Dataset and Indian Driving Dataset

### Center for Visual Information Technology, IIIT-H

*Undergraduate Researcher*

Hyderabad, India

*May 2017 - May 2019*

- Developed a portal with React and Express.js allowing multiple annotators to simultaneously annotate video datasets
- Built an Android app using Tensorflow Lite to process and analyze facial expressions and actions of drivers
- Developed a system using quantization and ensemble learning to improve the efficiency of semantic segmentation

### Froogal - A digital loyalty startup

*Software Development Intern*

Hyderabad, India

*May 2017 - August 2017*

- Built a mobile app for Froogal's web-based services using React Native, Android Studio and Xcode
- Released on Google's Play Store and Apple's App Store with more than 10,000 downloads

### International Institute of Information Technology

*Teaching Assistant*

Hyderabad, India

*August 2017 - April 2019*

- Teaching Assistant for Computer Vision (Spring '19, 120 students) and IT Workshop (Fall '17, 200+ students).

## PROJECTS

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### Distributed TicTacToe and chat room

- Developed a distributed TicTacToe game, in a client-server setup using the Java RMI protocol
- Parallelized the game server to handle multiple games, along with a chat server for multiple clients/client groups

### Variable Quantized Ensemble Networks

- Developed a system geared towards real-time semantic segmentation through variable quantization of ensembles of neural networks, trained on pre-determined groups of classes of Cityscapes Dataset and Indian Driving Dataset
- Applied proposed method to state-of-the-art semantic segmentation models PSPNet and Deeplab-v3+, showing a 10% accuracy trade-off for large improvements in inference time and almost 20% reduction in memory usage

### Mini SQL Engine

- Built an SQL engine in Python to parse and execute SQL commands, with relevant error handling

### AngelSafe

- Designed and implemented a website focused on promoting safety of women during travel by making use of crowdsourced data to generate heat maps representing threat levels in a particular area
- Secured first place in the Code.Fun.Do hackathon organized by Microsoft India in Hyderabad

### Game development projects

- Developed variations of the popular games BrickBreaker and Bloxorz in 2D and 3D respectively using OpenGL
- Designed and developed a game in Unity3D, incorporating particle effects, projectile physics and collider mechanics

### Computer Vision and ML projects

- Implemented a music genre classification system using Mel Frequency Cepstral Coefficients (MFCC)
- Developed an application for automated cartoon coloring using level-set and continuity of patterns and intensity

## TECHNICAL SKILLS AND RELEVANT COURSES

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**Programming Languages:** C++, Python, Javascript, SQL, Java, Bash, C#

**Libraries and Tools:** React, Android Studio, PyTorch, scikit-learn, OpenCV, Keras, OpenGL, Unity, Selenium

**Relevant Courses:** Software Engineering, Database Systems, Computer Vision, Principles of Programming Languages, Distributed Systems, Algorithms, Data Structures, Digital Image Processing, Artificial Intelligence, Game Design