# Keerthan Bhat

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**Summary:** *A passionate Machine Learning Engineer with rich implementation and research skill-set attained from prior work experience and course work in the field of Computer Vision and Machine Learning. Primarily interested in building generalizable systems which can understand the visual world as well as humans do.*

## Education

- **R.V. College of Engineering** — Bangalore, India
  *Bachelor of Engineering, Computer Science & Engineering; GPA: 8.97* — *August 2016 - August 2020*
  **Thesis:** *'Enhancement of Time-of-Flight Depth Maps using AI'* (Advisor: Prof. Prapulla SB, RVCE)
- **Deeksha Centre for Learning** — Bangalore, India
  *Pre-University Course, Science; Result: 95.3%* — *April 2016*
- **Sri Kumaran Children's Home** — Bangalore, India
  *Secondary Education - 10th Std; Result: 96.64%* — *April 2014*

## Skills

- **Areas**: Machine Learning, Algorithms, Databases, Image Processing
- **Languages**: Python, C, C++, Java, SQL, R, MATLAB
- **Frameworks**: PyTorch, TensorFlow, Keras, OpenCV, spaCy, Django, Flask
- **Tools**: Docker, git, PostgreSQL, MySQL, Linux, AWS, Azure

## Experience

- **Samsung Research Institute - Vision Research Group** — Bangalore, India
  *Software Engineer, Computer Vision* — *January 2021 - Present*
  - Improved the compression efficiency of Versatile Video Codec (VVC) by more than 10% in terms of BD-Rate using Neural Network based filters used as an in-loop filter.
  - Conducted extensive experiments with CNN based network architectures, loss functions, hyperparameters optimization and training strategies to achieve state-of-the-art results.
  - Played a key role in conceptualizing a novel network architecture and formulating a more efficient, patentable training methodology than the conventional methods used by video compression standard body.
- **Curl Analytics - Document Analysis Team** — Bangalore, India
  *Data Science Intern* — *July 2020 - December 2020*
  - Worked on text data from Commodity Trading companies for various NLP tasks such as Classification, Language Inference and Sequence Labelling.
  - Conducted R&D in Named Entity Recognition, Contextual Classification, Class Imbalance, and Table Detection in documents for the specific kind of data we were dealing with.
  - Built pipelines for data preparation and augmentation to be used for the Entity Recognition models.
- **Samsung Research Institute - Vision Research Group** — Bangalore, India
  *Research Intern (final-year thesis)* — *January 2020 - June 2020*
  - Built Deep Learning models for enhancement of Time-of-Flight (ToF) depth images by fusing RGB images.
  - Used Domain Adaptation, Flow Estimation, Image Refinement & Upscaling to devise a novel three-stage model architecture to rectify the sensor artifacts, complete sparse pixels and improve resolution.
  - Performed extensive literature studies, surveyed on ToF data generation tools and generated synthetic to tackle lack of accurate real-world ToF data.
- **Samsung Research Institute - Natural Language Understanding Group** — Bangalore, India
  *Summer Intern* — *May 2019 - July 2019*
  - Built an end to end pipeline for Video Analysis tasks on a mobile device where a video captured on an Android app is sent frame-wise to a Flask server for backend processing.
  - Used Multi-modal Emotion Classifier as a use-case where visual data analysis, audio analysis and text data analysis was performed using different neural networks on the server.
- **ZoomTail Technologies** — Bangalore, India
  *Software Engineering Intern* — *May 2018 - July 2018*
  - As the first Engineer hired in the startup, built their tech. platform v1.0; handled design, development, test and deployment single-handedly.
  - Designed an efficient architecture and built a Content Management System (CMS) from scratch for managing the vast amounts of incoming image data from apparel manufacturers.

## Academic Projects

- **Monocular Depth Estimation using Single RGB Image** (Advisor: Dr. Deepamala, RVCE) Jan'20 - Apr'20
  - Achieved a high RMSE score with considerably fewer parameters than state-of-the-art models with the usage of U-Net for Depth Estimation on KITTI and NYU Depth V2 datasets for usage in low compute devices.
  - Conducted extensive literature survey and gave a technical seminar on this topic highlighting the achieved tradeoff between model complexity and accuracy for deployment in embedded devices.
- **Landmark Recognition using CNNs** (Advisor: Dr. Sathish Babu, RVCE) Sept'19 - Nov'19
  - Trained a VGG-16, ResNet and Xception network for the Google Landmark Recognition Challenge on Kaggle and achieved high accuracies for all the networks.
  - Performed data preparation using bounding boxes for training.
- **Stock Prediction using Twitter Sentiment Analysis** (Advisor: Prof. Jyoti Shetty, RVCE) Feb'19 - Apr'19
  - Predicted public sentiment about companies using tweets from last 1 year via a jointed CNN and RNN architecture making use of coarse-grained local features from CNNs and long-distance dependencies from RNNs.
  - Using the predicted public mood and previous stock price data, predicted the future stock price using fully connected neural networks and achieved more than 80% accuracy.
- **Dynamic Pricing and Automated Billing for Retail** (Advisor: Dr. Badari Nath, RVCE) Sept'18 - Nov'18
  - Trained a pricing model using LSTMs to dynamically predict prices of retail products using Mercari Price Suggestion dataset.
  - Built a system to retrieve prices from AWS to a Raspberry-Pi based embedded system fitted in a shopping cart where a product is detected using its RFID tags when a customer drops it in.

## Publications

- D. Sinha, K. Cottur, **K. Bhat**, G. C. and B. N. K., "Automated Billing System using RFID and Cloud", *IEEE Innovations in Power and Advanced Computing Technologies (i-PACT)*, 2019 [link]
- **Keerthan Bhat**, Prapulla S B, "Advances in Depth Sensing Technologies for Computer Vision", *International Research Journal of Engineering and Technology (IRJET)*, 2020 [link]

## Achievements

- 3rd/400, Toastmasters International Speech Contest - Divison level (South Bangalore & Mysore) 2021
- 1st/100, Toastmasters International Speech Contest - Area level 2020
- 3rd/100, InGenius PESIT Bangalore Hackathon 2019
- Selected for JP Morgan's Code For Good Challenge in South India 2019
- 7/30, Reached finals of Business Marathon, E-Summit RVCE 2019
- Reached finals of Microsoft Code.Fun.Do++ 2019, 2018
- 1/10, Toastmasters Best Debater - Club level 2019, 2018
- 30/120, Reached finals of IBM IoT Hackathon, RVCE 2018
- Completed an open-source program, Kharagpur Winter of Code at IIT Kharagpur 2017

## Positions of Responsibility

- **President - Toastmasters Club** Jan 2018 - June 2021
  - As the President of a community club, Utthishta Toastmasters, I led a 12-member team & 40-member club to achieve Hall-of-Fame Gold, becoming the 3rd highest-rated club across Karnataka and Kerala among 200 clubs.
  - Have also been in VP-Education, VP-Membership, VP-Public Relations, and Secretary positions.
- **Deputy Subsystem Head - Team Antariksh** Sept 2016 - Dec 2017
  - Co-led the Command & Data Handling subsystem of RVCE nano-satellite team. Spearheaded the drafting of Basic Design Review of RVSAT-1 and got approval from Indian Space Research Organization (ISRO).
  - Represented the team at Manipal Institute of Technology to collaborate and share knowledge with their nano-satellite team.
  - Designed a compatible micro-controller system for the onboard computer of the satellite, wrote programs for sensor data processing and designed algorithms for sub-routine scheduling.
  - Played a pivotal role in the project-management and sponsorship teams.
- **Speaker Curator - TEDx RVCE** Aug 2017 - Dec 2017
  - Collaborated with the guest speakers to help them with their speeches and presentations.
  - Wrote content for social media, publicity and helped in managing the event.