Yash Mukund Kant

University of Toronto

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EDUCATION

- **University of Toronto** — Ontario, Canada
  Ph.D. in Computer Science; Advisor: Igor Gilitschenski — *September 2021 – Present*
- **Indian Institute of Technology, Roorkee** — Uttrakhand, India
  B.Tech in Electrical Engineering; GPA: 8.405/10.000 — *July 2015 – May 2019*

PUBLICATIONS

- **Contrast and Classify: Alternate Training for Robust VQA**
  Yash Kant, Abhinav Moudgil, Dhruv Batra, Devi Parikh, Harsh Agrawal.
  Accepted at International Conference on Computer Vision (ICCV), 2021

- **Spatially Aware Multimodal Transformers for TextVQA**
  Yash Kant, Dhruv Batra, Peter Anderson, Alex Schwing, Devi Parikh, Jiasen Lu, Harsh Agrawal.
  Accepted at European Conference on Computer Vision (ECCV), 2020

WORK EXPERIENCE

- **Visiting Research Scholar** — Atlanta, GA
  Georgia Institute of Technology — *September 2019 - August 2021*
  - Published two works in Vision and Language as the lead author. Currently, working on two projects and mentoring one.
  - Organized the VQA Workshop and the TextVQA, TextCaps, and VQA challenges at CVPR, 2021.

- **Foreign Undergraduate Thesis** — Singapore
  National University of Singapore — *August 2018 - January 2019*
  - **Automated Machine Learning**:
    * Designed experiments to search for low memory consuming CNN architectures using Neural Architecture Search.
    * Implemented quantization and parameter sharing across the child models to optimize the search procedure.
  - **Resource Efficient Machine Learning**:
    * Explored ways to lower the compute of inference and training in ML models with quantization.

- **Software Development Intern** — Bengaluru, India
  Microsoft IDC, Bengaluru — *May 2018 - July 2018*
  - Developed a tool for to automate the creation of environments in Azure Data Lake Store.
  - Built a framework to extract configurations and detect malformed expressions in the Azure codebase.
  - Awarded with a **pre-placement offer(PPO)** for successful completion of the internship project.

- **Winter Research Intern** — Singapore
  National University of Singapore — *November 2017 - January 2018*
  - **Adversarial Machine Learning**:
    * Built experiments on adversarial machine learning methods like DeepFool and Fast Gradient Signed Method.
  - **Privacy in Machine Learning**:
    * Implemented Memebership Inference Attack on ML models under a white-box setting.

- **Software Development Intern** — Bengaluru, India
  Qureto Labs — *May 2017 - July 2017*
  - Developed an android app to handle end-to-end API calls and built UI layouts in XML.
  - Lauched the first version a week prior to the proposed deadline, and patched memory issues in the second version.

- **Android Development Intern** — Reliance Headquarters, Navi Mumbai
  Sizzle Labs — *November 2016 - February 2017*
  - Integrated Google Physical Web services in an android application to handle connections with nearby Bluetooth Low Energy beacons.

Projects

- **Automated YouDescribe**　　　　　　　　　　　　　　　　　　　September 2019 - Present
  https://youdescribe.org/　　　　　　　　　　　*Collaborators: Dr. Ilmi Yoon and Dr. Abhishek Das*
  - YouDescribe is a utility tool for visually impaired, which tags and narrates online videos from YouTube.
  - Helping to automate tagging of videos with descriptions using Visual Chatbot and Image Captioning models.

- **Visual Dialog Chatbot**　　　　　　　　　　　　　　　　　　　　　May 2019 - July 2019
  https://demo.visualdialog.org/
  - Ported Visual Dialog Chatbot Demo hosted on Cloud-CV from Lua-Torch backend to Pytorch.
  - Trained better Captioning and Visual Dialog models and implemented Beam-Search decoder.

- **ICLR Reproducibility Challenge, 2019**　　　　　　　　　　December 2018 - January 2019
  https://github.com/yashkant/Padam-Tensorflow　　　　*arXiv: https://arxiv.org/abs/1901.09517*
  - Reproduced the experiments in the ICLR 2019 submission PADAM in Tensorflow.
  - Exposed shortcomings of the work and proposed future directions of study.

- **Complement Objective Training for Pythia**　　　　　　　　　February 2019 - April 2019
  https://github.com/facebookresearch/pythia/pull/32　　　*Report: https://bit.ly/2XnOzZI*
  - Added a new training scheme Complement Objective Training to Pythia (Facebook's open-source framework for vision and language).
  - Analyzed non-convergence issues of Complement Objective Training with Pythia.

- **Quantized Neural Networks**　　　　　　　　　　　　　　August 2018 – September 2018
  https://github.com/yashkant/Quantized-Nets
  - Designed and conducted experiments on Binarized, Ternarized and N-bit Quantized Neural Networks in Tensorflow.
  - Performed a comparative study of quantization schemes and activation functions vs. compute needed for inference.

- **Progressive Neural Architecture Search for Secure Machine Learning**　　July 2018 – August 2018
  National University of Singapore
  - Designed and added a new penalty function proportional to latency of communication of the MLaaS protocol.
  - Quantized the search space of PNAS with binary networks.

- **Decision Flip Experiments**　　　　　　　　　　　　　　November 2017 - January 2018
  https://github.com/yashkant/Decision-Flip-Experiments
  - Studied and implemented adversarial machine learning methods (FGSM, DeepFool) and their explainability with LIME .
  - Conducted experiments studying the effect of overfitting on the classification boundaries of an ML model.

- **Skip The Queue (Microsoft Code Fun Do 2017 National Finalist)**　　January 2017 - March 2017
  https://github.com/yashkant/Skip-The-Queue
  - Developed a productivity app on Android using Physical Web and Location Services.

- **Modeling Anomalies in Temporal Data using LSTM Networks**　　January 2018- February 2018
  Industry Oriented Course Project　　　　　　　　　　　*Supervisor: Dr. Felix Orlando*
  - Performed a comparative study of LSTM networks against simple feed-forward networks for modeling temporal data and anomalies in it.
  - Studied different types of anomalies which occur in practice in temporal data using real-world datasets.

- **Students Affairs Council Official Website**　　　　　　　　　　January 2017 - May 2017
  Institute Technical Council

- Developed the backend of Institute's official SAC website on Python Django framework.

- **Driverless Car** April 2016 - June 2016
  Artificial Intelligence and Electronics Society, IIT Roorkee
  - Worked in lane detection, responsible for navigation and environment mapping.

Teaching Assistantships

- **CSC477: Introduction to Mobile Robotics, Fall 2021** Instructor: Florian Shkurti
  Mathematical and Computational Sciences, University of Toronto, Mississauga *August 2021 - December 2021*

Achievements

- The only student of 2019 Batch at Indian Institute of Technology Roorkee to work on undergraduate thesis abroad without extending the duration of B.Tech program.
- 99.89 percentile in Joint Entrance Examination 2015 among 1.3 million students.

Relevant Courses and Books

CS231N: CNNs for Visual Recognition (Stanford)	Deep Learning Book (by I. Goodfellow et al.)
Linear Algebra	Machine Learning
MIT OCW 6.006 (Introduction to Algorithms)	Reinforcement Learning (UCL, David Silver)

Position of Responsibilities

- **Joint Secretary**
  Artificial Intelligence and Electronics Society, IIT Roorkee *May 2017 - May 2018*
  - Mentored three teams of four members each working on AI and IOT based projects.

- **Core Team Member**
  Institute Technical Council, IIT Roorkee *January 2017 - May 2017*
  - The group oversees technical reforms in the Institute, proposed circulation of RFID based ID cards.

- **Executive Member**
  Counselling Cell, IIT Roorkee *September 2015 - May 2017*
  - Served as an executive member of an active student welfare group, managed and anchored events conducted by the cell.

References

Igor Gilitschenski	**Devi Parikh**	**Dhruv Batra**
DCS, University of Toronto	CoC, Georgia Tech	CoC, Georgia Tech
Research Scientist, TRI	Research Director, FAIR	Research Director, FAIR
igor@gilitschenski.org	parikh@gatech.edu	dbatra@gatech.edu