# Sameer Dharur

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| **Research Interests** | I am interested in building AI agents that can *see* (computer vision), *communicate* (natural language processing) and *act* (robotics) in novel settings in reasonable, logical and interpretable ways. |
| **Education** | **Georgia Tech**, Atlanta, USA<br>*Master of Science*, Computer Science, August 2019 - May 2021.<br>Advised by Prof. Dhruv Batra.<br><br>**Birla Institute of Technology and Science (BITS)**, Pilani, India<br>*Bachelor of Engineering*, Computer Science, August 2012 - May 2016.<br>Advised by Prof. Chittaranjan Hota. |
| **Conference Papers** | **SOrT-ing VQA Models : Improving Consistency via Gradient Alignment**<br>*Under Review, 2020*<br>**S. Dharur**, P. Tendulkar, D. Batra, D. Parikh, R. Selvaraju.<br><br>**Extracting User Behavior at Electric Vehicle Charging Stations with Transformer Deep Learning Models**<br>*3rd International Conference on Advanced Research Methods and Analytics (CARMA), Valencia, 2020*<br>D.J. Marchetto, S. Ha, **S. Dharur**, O.I. Asensio. |
| **Journal Articles** | **Using machine learning techniques to aid environmental policy analysis: a teaching case in big data and electric vehicle infrastructure**<br>*Case Studies in the Environment, 2020*<br>O.I. Asensio, **S. Dharur**, X. Mi. |
| **Patents** | **Motion Assisted Image Segmentation and Object Detection**<br>*United States Patent and Trademark Office (Filed by Qualcomm)*<br>**S. Dharur**, V. Jain, R. Tyagi, H.S. Dhoat. |
| **Selected Projects** | **Visually Interpreting Point Goal Navigation (In Progress)**: Conducting gradient-based interpretability experiments on Point Goal Navigation to answer the question - 'Where does a deep reinforcement learning (RL) model look while navigating a novel environment?'. Results from our experiments are coming soon.<br><br>**SOrT-ing VQA Models: Improving Consistency via Gradient Alignment (Under Review)**: Used gradient-based techniques to rank relevant perception sub-questions for a higher order reasoning question, and trained models by aligning the gradient representations of sub-questions with reasoning questions to improve logical consistency in Visual Question Answering (VQA). *Achieved an improvement of 6.5% points on consistency over baselines.*<br><br>**Extracting User Behavior at Electric Vehicle Charging Stations with Transformer Deep Learning Models**: An inter-disciplinary project aimed at developing policy recommendations for electric vehicle charging stations across the United States. This was done by classifying unstructured user reviews into multiple relevant topics using Transformer models (BERT and XLNet), and performing econometric analysis based on Fractional Response Models (FRMs). *Improved mean F1 scores on topic classification by 9% points over baselines.* |

**Generating hashtag sequences on image based social media posts**: Introduced a multi-modal vision-and-language application of generating hashtag sequences on social media posts. Scraped a dataset from publicly available Instagram posts to trained a CNN + LSTM encoder and an LSTM decoder for the task of hashtag sequence generation. *Reported a BLEU score of 0.69 on the validation split.*

**Improving cancer detection in lung X-rays via data augmentation by VAEs**: Used Variational Autoencoders (VAEs) for data augmentation to generate realistic malignant and benign lung X-rays and help train more accurate detection models. *Improved mean F1 scores on cancer detection by 4.5% points over baselines.*

**User Privacy via Face Detection in a Video Call**: Built a feature to enhance user privacy in a video call by obscuring the background, through object detection and semantic segmentation on Qualcomm's Snapdragon Neural Processing Engine (SNPE). *Top 5 among 350 projects at the Qualcomm India Maker Challenge 2018.*

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| **Work Experience** | **Conversational AI Intern** | **Salesforce** |

**Conversational AI Intern** — **Salesforce**
May 2020 - Aug 2020 — Bellevue, USA
Interning in the Einstein Reply Recommendations team on generating natural language responses to user queries. Working on a feature to reduce semantic redundancy among recommended responses.

**Machine Learning Software Engineer** — **Qualcomm**
Feb 2018 - July 2019 — Hyderabad, India
Developed the Snapdragon Neural Processing Engine (SNPE) and adapted Google's Android Neural Networks (ANN) API to Qualcomm's chipsets. Implemented and tested a wide range of deep neural networks on the device, meeting key performance indicators such as timing, accuracy, power and memory consumption.

**Modem Software Engineer** — **Qualcomm**
Oct 2016 - Feb 2018 — Hyderabad, India
Developed modem software on Qualcomm's Snapdragon 430 range of chipsets.

**Applications Developer** — **Oracle**
July 2016 - Oct 2016 — Hyderabad, India
Developed a J2EE-based product for interfacing between hotels and booking sites, as part of the Hospitality Global Business Unit (HGBU).

**Teaching Experience**

- Head Teaching Assistant - Deep Learning, Fall 2020, Georgia Tech.
- Teaching Assistant - Deep Learning, Spring 2020, Georgia Tech.
- Teaching Assistant - Cryptography, Spring 2016, BITS Pilani.

**Selected Coursework**

- Deep Learning  • Machine Learning  • Natural Language Processing
- Linear Algebra  • Probability and Statistics  • Data Mining
- Graduate Algorithms  • Data and Visual Analytics

**Technical Skills**

**Languages**: Python, Java, C, C++, R, SQL, LaTeX, HTML, CSS, Javascript.
**Deep Learning Frameworks**: PyTorch, Tensorflow.

**Awards and Recognition**

- Finalist (Top 5 among 350) : Qualcomm India Maker Challenge 2018.
- Finalist (Top 15 among 350) : Qualcomm India Maker Challenge 2017.
- Winner/Finalist : Multiple open and inter-college quizzing competitions in India.

**Extra Curricular**

- Professional Quiz Master - conducted ~50 quizzes from 2010 to 2019.
- President of K-Circle, India's oldest quiz club, from 2017 to 2019.

**References**

- Prof. Dhruv Batra, Associate Professor, Georgia Tech - dbatra@gatech.edu.
- Prof. Devi Parikh, Associate Professor, Georgia Tech - parikh@gatech.edu.
- Dr. Ramprasaath Selvaraju, Sr Research Scientist, Salesforce - rselvaraju@salesforce.com.