ARUSHI GOEL

https://goelarushi.github.io

Email : goel.arushi@gmail.com
Mobile : +65-82337404

EDUCATION

- **Indian Institute of Information Technology, IIIT** — Allahabad, India
  Bachelor of Engineering in Electronics and Communication — *Aug. 2013 – July. 2017*
  GPA: 9.03/10; First Class Honours

RESEARCH INTERESTS

Computer Vision (Representation & Learning), Machine Learning & Deep Learning.

RESEARCH EXPERIENCE

- **Institute of High Performance Computing, A*STAR** — Singapore
  Research Engineer, Human–Centric AI (CHEEM) — *Jan 2018 - Present*
  Advisors: Dr. Cheston Tan and Dr. Ma Keng Teck

  Social-Cultural Visual Intelligence

  - Research in building deep learning algorithms for social relationship and attribute recognition using knowledge – graph based approaches.
  - Developed a model that generates a novel social relationship graph by extracting semantic attribute features from humans along with contextual features using pre-trained deep net architectures and predicts a coherent social relationship graph by message passing between nodes and edges using Gated Recurrent Units *(Implemented using Tensorflow in Python).*

  Advisor: Dr. Desmond Ong

  Multi–Modal Emotion Recognition and Empathy Prediction

  - Developing integrated deep learning and statistical models with audio, visual and textual inputs for the tasks of emotion recognition and empathy prediction.
  - Building a sequence model using LSTMs as cell units for recognizing emotions from facial expressions, audio and text features using state-of-the art approaches for each modality *(Implemented using PyTorch in Python).*

- **Nanyang Technological University** — Singapore
  Research Assistant, School of Computer Science and Engineering — *Jan 2017 - July 2017*
  Advisor: Prof. Siew-Kei Lam

  Vehicle Detection Techniques for Illegal Parking and Traffic Surveillance

  - Developed an integrated model by using Aggregated Channel Features (ACF) for candidate region detection followed by CNNs for final vehicle detection.
  - Using KITTI as the benchmark dataset, we first extract region proposals using ACF at a higher threshold of Non-Maximal Suppression (NMS) to reject as many simple negative proposals and then train a CNN network to further remove the hard negative candidates while keeping the proposed detected cars.
  - Extended the problem for robust traffic surveillance from detection of cars in KITTI dataset to heavier vehicles (trucks, buses, lorries etc.) by collecting a video dataset using the VATIC Annotation tool *(Implemented using CAFFE in Python and ACF MATLAB Toolbox).*

- **University of Edinburgh** — Edinburgh, Scotland
  Research Intern, Institute of Perception, Action and Behaviour (IPAB) — *May 2016 - August 2016*
  Advisor: Prof. Robert Fisher

  Extend a database of cutlery and kitchen tools with a Visual Recognition Algorithm

  - Created a dataset of 1000 images for 20 classes of kitchen utensils. [Dataset]
  - Developed a baseline Naive Bayes' Classifier with 17 hand-crafted features using various image morphological operations.
  - Improved the classification accuracy by using a Hierarchical classifier with forward sequential feature selection and support vector machines *(Implemented using MATLAB).*

SELECTED PROJECTS

- **Avito Demand Prediction Challenge** ***(March-June, 2018)***
  Implemented a BiDirectional–LSTM Model for predicting demand on Avito's data of image descriptions, text embeddings, context information and historical demand data in the *Kaggle* Challenge.

- **Natural Language Interaction with robots** ***Dr. Pooja Mishra (Fall 2017)***
  Created a grammar and semantics for robot commands using a Recursive Descent Parser using Raspberry Pi to communicate commands to the robot by speech to text processing.

- **Image Scene Classification of MODIS Data using Deep Networks** ***Dr. Pooja Mishra (Spring 2017)***
  Implemented a Deep Convolutional Neural Network for classifying scenes into vegetation, urban and water cover using MODIS (Optical Image) data with satellite image processing.

- **Land Cover Classification of SAR images using Knowledge Based Decision Classifier** ***Dr. Pooja Mishra (Spring 2016)***
  Extracted intrinsic information from SAR observables using image decomposition techniques and backscattering coefficients and trained these features using a decision–tree classifier for multi-class land cover classification.

- **Classification of object classes by parts using Caltech-101 Dataset** ***Dr. Rahul Kala (Summer 2015)***
  Implemented a Bag-of-Features model with relevant gradient features from object parts to classify the object into 101 categories using representation of objects by parts of objects.

PUBLICATIONS

- Basura Fernando, **Arushi Goel**, Nguyen Thanh-Son, **"Video Emotion Recognition using Multi-Modal Hybrid Fusion"** *(submitted to HBU Workshop, co-organized with ICCV 2019).*

- **Arushi Goel**, Keng Teck Ma, Cheston Tan, **"An End-to-End Network for Generating Social Relationship Graphs"**, in IEEE Conference on Computer Vision and Pattern Recognition, *CVPR* 2019 [*Link*].

- Zong Xuan Tan, **Arushi Goel**, Nguyen Thanh-Son, Desmond C. Ong, **"A multimodal LSTM for predicting a listener's empathic response over time"**, in IEEE International Conference on Automatic Face and Gesture Recognition Workshop, 2019 [*Link*].

- Aliaksandr Huminski, Fiona Liausvia, **Arushi Goel**, **"Semantic Roles in VerbNet and FrameNet: Statistical Analysis and Evaluation"**, in CICLing: International Conference on Computational Linguistics and Intelligent Text Processing 2019.

TECHNICAL SKILLS

- **Languages**: Python, C, C++, GNU Octave, R Stats, LaTeX, MATLAB.
- **Platforms**: Linux, Windows, AWS.
- **Other Tools & Libraries**: Tensorflow, Caffe, PyTorch, OpenCV, Keras, NumPy-SciPy-Sklearn, Scikit-image, NLTK and Gensim, TKinter (GUI Library or Python), Git.

RELEVANT COURSEWORK

- **Vision**: Computer Vision, Fundamentals of Digital Image Processing, Video Processing.
- **Machine Learning**: Statistical Machine Learning, Artificial Neural Networks *(Coursera)*, Convolutional Neural Networks for Visual Recognition *(Stanford)*.
- **Fundamentals**: Artificial Intelligence, Calculus, Linear Algebra, Probability & Statistics, Numerical Analysis, Signals & Systems, Information Theory & Coding, Controls & Communications, Data Structures & Algorithms.

MISCELLANEOUS ACHIEVEMENTS

- Guest Lecture in National University of Singapore (NUS Business School) on *Graph Neural Networks: Methods and Applications*. *March 2019*
- Selected to attend the **Machine Learning Summer School'18** in Buenos Aires, Argentina. *June 2018*
- Lead Event Organizer at **LeanIn Singapore** Chapter. *From May 2018*
- **Head Finance** at the national cultural fest organized at IIIT Allahabad. *May-Dec 2016*
- **Gold Medal** Awarded for achieving the highest marks in Physics in the batch. *2013-2014*
- **Institute Merit Scholarship** for being among the top 5 students in year 2014-2015. *2014-2015*