Debanjan Das | **173050069**
Computer Science & Engineering | **M.Tech.**
Indian Institute of Technology Bombay | **Male**
Specialization: Object Detection | **DOB: 20/03/1995**

Examination	University	Institute	Year	CPI / %
Post Graduation	IIT Bombay	IIT Bombay	2019	9.18
Undergraduate Specialization : Computer Science & Engineering				
Graduation	Jadavpur University	Jadavpur University	2017	7.06
Intermediate/+2	WBCHSE	Ballygunge Govt. High School	2012	82.80
Matriculation	WBBSE	Ballygunge Govt. High School	2010	82.75

FIELDS OF INTEREST

- Object Detection, Computer Vision, Deep Learning, Data Structures

MAJOR PROJECTS AND SEMINAR

- **Well Detection in Satellite Images using Deep Learning Techniques**
  *(M.Tech Project, Guide: **Prof. Om P. Damani**)* *(Jul'18-till date)*
  - The **objective** was to develop a software for detection of wells in a satellite image of a region
  - Deployed the **pre-trained CNN model** as a server with some API calls using **Flask micro web framework**
  - Created a dataset of satellite images of villages using **Google Maps API** and labeled it with **BBox-Label-Tool**
  - Experimenting with different object detection model architectures like **YOLO, YOLOv2, GoogLeNet** etc. to improve the current test accuracy on our satellite image dataset
  - **Future work** involves developing a novel approach to detect **multiple objects** in the satellite images

- **Object Detection in Satellite Images**
  *(M.Tech Seminar, Guide: **Prof. Om P. Damani**)* *(Jan'18-May'18)*
  - Conducted literature survey on various **deep neural networks** like **CNN, YOLO** and **GoogLeNet**
  - Developed a **deep convolutional neural network model** to recognize wells in a satellite image
  - Created a dataset of nearly **1500** well images of Maharashtra using **Google Map static API**
  - Achieved **92.75%** accuracy on the test dataset containing 269 well images and 200 non-well images

RESEARCH PROJECTS

- **Smartphone Camera based Citizen Reporting**
  *(R&D Project, Guide: **Prof. Bhaskaran Raman**)* *(Jan'18-May'18)*
  - Developed an Android application to record **past video of 25 seconds** of any traffic rule violation event
  - Implemented a **circular encoder buffer linked list** to store the video frames of the event in the Android app
  - Developed a **number plate detection** module using **connected component analysis** to detect number plates
  - Trained a **support vector machine with RBF kernel** to recognize the digits from the localized number plate
  - Achieved a **test accuracy** of **75%** for localization, with a processing speed of **1.3 seconds per frame**

- **Consumer Health Information Search**
  *(B.Tech Major Project, Guide: **Prof. Kamal Sarkar**)* *(Aug'16-Mar'17)*
  - Developed a method for **relevancy checking** between two sentences using feature extraction
  - Used **kernelized SVM** for classification between relevant and irrelevant sentences w.r.t. a given sentence
  - Implemented a **sentiment classification model** to determine the emotion of a sentence
  - Achieved **73.39%** test accuracy in the relevancy checking task
  - Tools/Languages used : NLTK, scikit-learn

PUBLICATIONS

- **Kamal Sarkar**, **Debanjan Das**, et. al, **"JU_KS_Group@FIRE 2016: Consumer Health Information Search"**. In **Forum for Information Retrieval Evaluation, ISI Kolkata**. *(Guide: **Prof. Kamal Sarkar**, Dec'16)*
  This paper describes a methodology for detection of relevancy between a pair of sentences with the help of **feature engineering** and **support vector machines**. It also investigates about the sentimental relationship between two sentences i.e, whether they are supporting, opposing or neutral with each other.

COURSE PROJECTS

- **Tensorflow Speech Recognition Challenge**
  (*EE769: Introduction to Machine Learning, Instructor:* ***Prof. Amit Sethi****)* *(Mar'18-May'18)*
  - Developed an **end-to-end speech recognition model** using a four-layered **convolutional neural network** and three-layered **gated recurrent unit** followed by a fully-connected neural network
  - Extracted **spectrograms** of the audio files, which has been used as input to the speech recognition model
  - Achieved a test accuracy of **78.23%** on the **Speech Commands Data Set v0.01** containing **17,000** soundwaves of **10 different classes**
- **E-commerce System**
  (CS744: Design & Engineering of Computing Systems, Instructor: ***Prof. Mythili Vutukuru****)* *(Aug'17-Nov'17)*
  - Created an e-commerce system using a **multi-tier client server model**
  - Implemented the **multi-threaded front-end server** for handling **multiple requests** simultaneously
  - Developed a **custom load generator** for testing the performance of the system and to detect the **bottleneck component** of the system
  - Increased the throughput of the system from **22 to 3200 requests/second** by replacing the SQLite database with **Redis in-memory database**
- **Live Location Tracking and Accident Detection**
  (*CS653: Mobile Computing, Instructor:* ***Prof. Vinayak Naik****)* *(Mar'18-May'18)*
  - Developed an Android app to detect falling events using **AndroidLibSVM** library on **accelerometer** data
  - Implemented a module for **getting the location (latitude and longitude)** of a target device using its **GPS** given it's phone number as input
- **Devanagari Character Recognition using TensorFlow**
  (CS621: Artificial Intelligence, Instructor: ***Prof. G. Sivakumar****)* *(Oct'17-Nov'17)*
  - Developed a **fully connected neural network** model using TensorFlow to recognize Devanagari characters
  - Trained the model with **70000 images** and tested on **20000 images**
- **Term Rewriting System**
  (CS621: Artificial Intelligence, Instructor: ***Prof. G. Sivakumar*** *(Sep'17-Oct'17)*
  - Implemented a system which can **solve a set of logical query** given any set of rules
  - Developed an **equation solver** as an extension of the above system given a set of rules as input

MAJOR COURSES TAKEN

Artificial Intelligence	Introduction to Machine Learning	Software Lab
Algorithms and Complexity	Design & Engineering of Computing Systems	

POSITION OF RESPONSIBILITIES

- **Senior Teaching Assistant**
  (CS 101: Computer Programming and Utilization) *(Jul'18-till date)*
  - Managed labs with a group of **six junior teaching assistants** for lab sessions, handled Bodhitree activities and assisted **Prof. Om P. Damani** in the whole course
- **Junior Teaching Assistant**
  (CS 101: Computer Programming and Utilization) *(Jul'17-Nov'17)*
  - Mentored a **group of 14 students** and cleared their doubts. Invigilated and evaluated graded labs and exams

TECHNICAL SKILLS

- **Programming Languages**: C, C++, Python
- **Tools & Libraries**: Android Studio, Git, LaTeX, Flask, Django, Keras, TensorFlow, scikit-learn, NumPy, Pandas
- **Basic Knowledge**: Java, Android, HTML, CSS, JavaScript, Shell Scripting

ACHIEVEMENTS AND EXTRA CURRICULAR ACTIVITES

- Secured **2nd position** in Task A of Consumer Health Information Search at **Forum for Information Retrieval Evaluation 2016** organized by **Xerox Research Center India**
- Secured **98.84** percentile in **GATE 2017** out of **96,878** candidates
- Attended **NVIDIA DLI Workshop** on **image classification, segmentation and, neural network deployment** using **DIGITS** and **TensorRT** framework respectively *(Nov'17)*
- Trekked to **Hampta Pass, Himalaya** at the height of **4,297 meters** under the guidance of Renok India Group*(Jun'18)*
- Awarded **First Division Certificate of Chitra Bhushan Part-I** for painting by Pracheen Kala Kendra *(Sep'06)*
- **Hobbies:** Trekking, Painting, Reading books, Swimming, Football