

# Preksha Nema

## Indian Institute of Technology Madras

445, Tunga Hostel, IIT Madras

+91-9890283245 • [preksha.nema9@gmail.com](mailto:preksha.nema9@gmail.com)



## Education

Program	Institution	%/CGPA	Year
Ph.D.	IIT Madras		2017 onwards
M.Tech.	IIT Madras	<b>9.37</b>	2015 - 2017
B.Tech. (CSE)	Visvesvaraya National Institute of Technology, Nagpur	<b>8.39</b>	2008 - 2012
XII - MP Board	St. Paul Higher Secondary School, Jabalpur (M.P.)	<b>86.2</b>	2007 - 2008
X - CBSE	Christ Church Girls' Senior Secondary School, Jabalpur (M.P.)	<b>93.8</b>	2005 - 2006

## Publication:

- Preksha Nema, Mitesh M. Khapra, Balaraman Ravindran, Anirban Laha "Diversity driven attention model for query-based abstractive summarization". *Proceedings of the Fifty-Fifth Annual Meeting of the Association of Computational Linguistics (ACL 2017)*, Vancouver, Canada, July 2017.

## Awards:

- Google India Ph.D. Fellowship, 2017

## Technical Skills

- Languages:** C, Java, C++, Python, Matlab

## Course Work

- Machine Learning:** Pattern Recognition, Kernel Methods for Pattern Analysis, Natural Language Processing, Data Mining
- Miscellaneous:** Memory Based Reasoning in AI, Linear Algebra and Random Processes, Advanced Data Structures and Algorithms

## M.Tech. Project

### Query-based Abstractive Summarization using Deep Neural Network

June 2016 - Present

Python, Tensorflow

Abstractive summarization aims to generate a shorter version of the document covering all the salient points in a compact and coherent fashion. On the other hand, query-based summarization highlights those points that are relevant in the context of a given query. The encode-attend-decode paradigm has achieved notable success in machine translation, extractive summarization, dialog systems, etc. But it suffers from the drawback of generation of repeated phrases. In this work we propose a model for the query-based summarization task based on the encode-attend-decode paradigm with two key additions (i) a query attention model (in addition to document attention model) which learns to focus on different portions of the query at different time steps (instead of using a static representation for the query) and (ii) a new diversity based attention model which aims to alleviate the problem of repeating phrases in the summary. In order to enable the testing of this model we introduce a new query-based summarization dataset building on debatepedia. Our experiments show that with these two additions the proposed model clearly outperforms vanilla encode-attend-decode models with a gain of 24% (absolute) in ROUGE-L scores.

## M.Tech. Course Projects

### 1. Conceptual Clustering : Cobweb Algorithm

January 2016 - April 2016

Course: Memory Based Reasoning, Team size: 2

Java

Implemented Cobweb algorithm, where the clustering is done in an hierarchical manner. Here not only the similarity measures induce the clustering but also the prior knowledge about the domain in the form of category utility induces

the clustering.

## 2. Anomaly Detection and Data Classification using SVMs

January 2016 - April 2016

Course: *Kernel Methods and Pattern Analysis*, Team size: 1

Matlab

- 1-Class SVM was used as a model to detect the anomalies on Hepatitis Dataset. The final model gave an F-score of 0.77.
- Performances of different kernels (Gaussian, polynomial and linear) were compared for various characteristics of dataset (linearly-separable, non-linearly separable and overlapping).

## 3. Image Classification using GMMs

August 2015 - December 2015

Course: *Pattern Recognition*, Team size: 2

Matlab

Gaussian mixture models were trained using Expectation-Maximization algorithm to model class-conditional density for the three classes (highway, coast, forest), the trained model gave an accuracy of 86%.

## 4. Handwritten Data Classification using HMMs

August 2015 - December 2015

Course: *Pattern Recognition*, Team size: 2

Matlab

Feature extraction was done to encode sequential information using Freeman-chain codes, which was then used to train Hidden Markov Model for class-conditional density. The trained model gave an accuracy of 84%.

## Professional Experience

---

### System Software Engineer

June 2012 - June 2015

Nvidia Graphics Pvt. Ltd., Pune

- Resource Manager:
  - Only Representative from India for Resource Manager (Kernel Mode Driver) – Professional Solutions Group.
  - The RM is the kernel mode driver owning the GPU, managing its resources and providing a mechanism to other driver components to access the GPU.
  - Added support to enable 24 displays with 8 GPUs.
  - Bug Fixing and enhancements for issues related to Displayport 1.2 displays across different operating systems.
  - General enhancements and bug fixing.
- Implemented new features for Quadro Sync cards for NVIDIA Kepler and newer family of GPUs.
  - The Quadro Sync card is used to achieve frame synchronization on displays connected to GPUs across different systems.
  - Using a single Quadro Sync card, it is possible to achieve frame synchronization on 16 displays.
  - Worked on providing a software solution to increase the scalability further to make a cluster of 16 systems work.
- Added multi monitor support to NMOS (NVIDIA Multi OS)
  - The dedicated cards for virtualization had support for only one virtualized display. Added support to enable four displays which can drive the same resolution as any equivalent Workstation card.

## Positions of Responsibility

---

- Teaching Assistant, Deep Learning, IIT Madras (January 2017 - April 2017).
- Teaching Assistant, Introduction to Machine Learning, IIT Madras (August 2016 - November 2016).

## Extra-Curricular Activities

---

- Awarded 2nd prize in the Cricket tournament in Institute Gathering, VNIT (2009).
- Awarded 3rd prize in Group Dance event in Institute Gathering, VNIT (2010).

## Achievements

---

- Secured All India Rank 119 among 1.15 lacs students, GATE CSE 2015.
- Secured 1st rank in Cypher event in AXIS 2010 (Technical Event), VNIT.
- Secured All India Rank 4069 among 8 lacs (approx.) students, AIEEE 2008.
- Secured 1st rank at school level, X-CBSE, 2006.