Abhishek Kumar

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Education

Year	Degree/Certificate	Institute	CPI/%
2018-Present	M.Tech/Computer Science & Engg.	Indian Institute of Technology, Kanpur	10/10
2013-17	B.Tech/Mechanical Engg.	Indian Institute of Technology, Bhubaneswar	8.75/10
2012-13	CBSE(XII)	Sri Chaitanya Techno School, Visakhapatnam	92.4%
2010-11	CBSE(X)	DAV Public School, Dalli-Rajhara	9.4/10

Research Experience

- **Deep Selfsupervised Representations**, Guide : Prof. Piyush Rai (*Jul'19-present*)
  - Implemented facebook's deepcluster and noise as target (NAT) models to learn features for classification task.
  - Exploring some paradigms for self supervised learning and instance based feature learning for possibilities.
- **Lifelong/Continual Learning** - Thesis, Guide : Prof. Piyush Rai (*Apr'19-present*)
  - Implemented some and studied many existing Continual Learning approaches and compared their pros and cons.
  - Implemented Variational Russian Roulette for inferencing Non Parametric Bayesian Models in PyTorch.
  - Implemented a dynamic version of ADAM optimizer for Stochastic Gumbel-Softmax reparameterized layers.
  - Exploring Non-Parametric Bayesian methods for new possibilities to solve the challenges of existing models.
- **Unsupervised Temporal Segmentation**, Guide : Prof. Vinay P. Namboodiri (*Mar'19-Apr'19*)
  - Designed a model that combined optical gradient based pseudo labels and graph cut based loss function.
  - Implemented recent models SLIC with back propagation and W-Net for comparison on IITK traffic dataset.
- **Deep Cascaded Exponential Networks**, Guide : Prof. Piyush Rai (*Jan'19-Apr'19*)
  - Conceptualized combination of Cascaded IBP over Deep Exponential Families to learn the deep structure.
  - Implemented Black Box Variational Inferencing method for our model using TensorFlow Probability.
  - Implemented Cascaded Indian Buffet Process by Gibbs sampling based on BBVI approximation of posterior.
- **Dynamic Memory LSTM Networks**, - Self Project (*Dec'18-Jan'19*)
  - Implemented Dynamic Memory Neural Networks to answer a question based on wikipedia search.
  - Achieved MRR score of 0.61 with Attention based LSTM networks and GloVe Embeddings in TensorFlow.
- **Resource Efficient Non-Linear Models**, Guide : Prof. Piyush Rai (*Aug'18-Nov'18*)
  - Remodeled microsoft's bonsai tree to incorporate convolution operation to exploit local structure.
  - Achieved at least 2 times more compression of bonsai tree by replacing projection operation to convolution.
  - Achieved the super classification effect and reduction in model size on multiple benchmark datasets.

Projects

- **Image Recognition with Object Detection**, Guide : Prof. Vinay P. Namboodiri (*Jan'19-Mar'19*)
  - Implemented Object Detection using sliding window approach for generating SIFT based window features.
  - Implemented image recognition by scoring clustered histogram for all windows of a image to query image.
- **Deep Reinforcement Learning**, - Self Project (*Nov'18-Dec'18*)
  - Built an Atari Game player agent using visual information and rewards from OpenAI gym environment.
  - Implemented Actor Critic based Policy model with Deep Convolutional Neural Networks in TensorFlow.
- **Agriculture Data Analysis**, Guide : Prof. Arnab Bhattacharya (*Aug'18-Nov'18*)
  - Prepossessed and Analyzed multiple databases for discovering factors affecting Indian Agriculture using sklearn.

Scholastic Achievements

- Competed till Final phase of **Microsoft AI Challenge 2018** which was NLP based question answer ranking.
- Received the **Academic Excellence Award** for exceptional academic performance in 2018-19 academic session.
- Received a research grant for a 2 months long project in **(SURGE'16)** programme at IIT Kanpur in Aerospace Engineering.
- Received **Prime Minister Trophy Scholarship** from SAIL for excellent performance in academics for 4 years (2013-17).

Positions of Responsibility

- **Teaching Assistant :** Intro to Computing, Data Structure and Algorithms, Software Architecture (*Aug'18-Dec'19*)

Relevant Courses

Intro to Machine Learning	Probabilistic Modelling	Partial Differential Equation	Soft Computing
Visual Recognition	Data Mining	Computational Cognitive Science	Game Theory

Extra-Curricular Activities

- Secured **3rd** position in Rangmanch stage play event at IIT Kharagpur **Spring Fest 2015**.
- Participated in Kick Off (robo soccer) event in **Wissenaire-2014**, Tech fest of IIT Bhubaneswar.
- Member of the **Dramatics club** for four years, IIT Bhubaneswar.