ABHAY JAIN

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EDUCATION

Indian Institute of Technology (BHU), Varanasi *2020 - 2025*

Integrated Dual Degree - B.Tech + M.Tech in Electrical Engineering and **Minors in Computer Science and Engineering**
CGPA: 9.79/10.0

Key courses: Computer Programming(**A**), Engineering Mathematics-I Calculus(**A***), Numerical Techniques(**A**), Probability and Statistics(**A**), Mathematical Methods(**A**), Data Structures and Algorithms(******), Machine Learning offered by Stanford University-Coursera(******), Natural Language Processing(******)
(A, A* → 10), ***online courses*

RESEARCH INTERESTS

Broadly interested in Deep Learning, Computer Vision and Natural Language Processing.

RESEARCH EXPERIENCE AND INTERNSHIPS

Optical Flow Estimation using Graph Convolutional Networks *Summer 2022*
Guide: Prof. Dr. Shanmuga Raman, Dept. of Computer Science, IIT Gandhinagar, India | **Research Intern**
Computer Vision Imaging and Graphics (CVIG) Lab, IIT Gandhinagar, India [**Project Report** 📄] [**Certificate**📄]

- Implemented an encoder-decoder based Graph Convolutional Network (GCN) framework for the task of Optical Flow estimation.
- Performed experiments using various GCN models like GCNII and DeepGCNs(ResGCN and DenseGCN) on the MPI Sintel and KITTI datasets.
- Validated the effectiveness of the GCN learned representation model on frame order prediction by taking temporally shuffled frames (i.e., in non-chronological order) as inputs.

CoviBioBERT : A pre-trained Named Entity Recognition Model in Biomedical Domain *Jan 2022 - April 2022*
based on BioBERT and COVID-19 data
Guide: Prof. Dr. Raksha Sharma, Dept. of Computer Science, IIT Roorkee, India | **Research Intern**

- Worked on the implementation the CoviBioBERT model, where the COVID-19 open research dataset was used for pretraining using weights of the BERT model.
- Trained the model for 100K steps for a maximum sequence length of 128 and further trained it for additional 25K steps for a maximum sequence length of 256.
- Concluded that the CoviBioBERT model can be very useful for NER specific task in COVID-19 domain in future as the accuracy obtained from this model was close to that of the BioBERT model.
- Work is currently under review at the COLING'2022 conference.

Few-Shot Learning for Visual Question Answering *July 2022 - Present*
Guide: Prof. Venkatesh Babu, Dept. of Computational and Data Sciences, Indian Institute of Science (IISc), Bangalore, India | **Research Intern**
Video Analytics Lab (VAL), IISc Bangalore, India

- Analysed various few-shot learning algorithms like Matching networks, Model-Agnostic Meta-learning and Prototypical networks for the task of Visual Question Answering (VQA).
- Currently working on applying Open Long-Tailed Recognition (OLTR) algorithm for few-shot learning VQA.

OTHER PROJECTS

Gesture to Text using CNNs [**GitHub Repository** 🐙]

- Built a convolutional neural network classifier using the data set on Kaggle and then used it to predict gestures on new images.
- Verified the model by taking the input from the Webcam to predict the gesture and output text using the model trained.
- Achieved an accuracy of 98.23% on the training set and 96.19% on the test set.

Fast Semantic Segmentation Network (Fast-SCNN) implementation for real time scene understanding [GitHub Repository ⌗]

- Worked on building the Fast-SCNN semantic segmentation model, which is a real-time semantic segmentation algorithm for high resolution images and can process inputs in real time.
- Implemented the Fast-SCNN architecture in Pytorch and made evaluations on the CityScapes dataset.

Neural Machine Translation [GitHub Repository ⌗]

- Implemented a simple English to French translator on the ANKI flashcards dataset in Keras.
- Used bidirectional RNN's and trained the model for 17 epochs with a learning rate of 0.005.
- Achieved an accuracy of 98.47% on the training set and 97.76% on the test set.

Email Parser [GitHub Repository ⌗]

- Devised an email parser to extract data of seminars, talks and workshops using NLP.
- Employed the Gmail API, Stanford NLP API and regular expressions in Python to extract relevant information

TECHNICAL SKILLS

Programming Languages	C, C++, Python, LaTeX
Machine Learning Libraries	TensorFlow, PyTorch, NumPy, Keras, Pandas, Scikit-Learn, OpenCV

ACADEMIC ACHIEVEMENTS & AWARDS

- Awarded branch change to Electrical Engineering for exceptional academic performance in first year. *2021*
- Secured the highest SPI (Semester Performance Index) – 10.0/10.0 among 1st year batch of B.Tech and IDD students in Semester I of the AY 2020-21. *2021*
- Qualified the highly competitive JEE Advanced'20 and JEE Mains'20 out of 1 million+ candidates for admission at the prestigious engineering institutions of India, IITs. *2020*
- Awarded bronze medal for exceptional performance and research in the field of Science, Dr Homi Bhabha Balvaidyanik Competition conducted by Mumbai Science Teacher's Association. *2017*
- Secured International Rank 2 (throughout Asia) among 0.5 million candidates at the International Mathematics Olympiad (IMO) conducted by the Science Olympiad Foundation (SOF). *2016*

EXTRACURRICULAR ACTIVITIES

- **Academic Mentor** for the courses CSO 101 - Computer Programming and MA 101 - Advanced Calculus. *2021-2022*
- Member of the organizing team and core problem setter of **Mathegon**, an annual math event at IIT (BHU), Varanasi. *2020-2021*
- Represented the **Table Tennis** team at IIT (BHU), Varanasi for 2 years. *2020-2022*