Shreya Shukla

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Education

Indian Institute of Technology Jodhpur — Dec 2020 – May 2024
Bachelor of Technology in Electrical Engineering — *CGPA: 7.5/10*

City Montessori School, Lucknow — May 2018 – Mar 2020
Class XII — *Grade: 98.5%*

Christ Church College, Lucknow — Mar 2008 – Mar 2018
Class X — *Grade: 96.2%*

Publications

- **Shreya Shukla**, Prajwal Gatti, Yogesh Kumar, Vikash Yadav, and Anand Mishra. *Towards Making Flowchart Images Machine Interpretable* [View Paper], **ICDAR 2023**.

Research

Decoder-Encoder Alignment — May 2023 – Present
Self-Exploratory Research Project

- Exploring ways to align encoder embeddings with decoder inputs using techniques like vector-quantization and adaptive layers, to improve machine translation for low-resource languages.

Patent Figure Captioning — Feb 2023 – Present
Supervisors: Dr. Anand Mishra, IIT Jodhpur & Dr. Manish Gupta, Microsoft

- Developing novel dataset and methodology for specialized multi-modal description-generation for patent figures.

Code Generation from Flowchart Images — Mar 2022 – Jan 2023
Supervisor: Dr. Anand Mishra, VL2G Lab, IIT Jodhpur | Project Website

- Proposed *FloCo* dataset for the task of generating executable python codes from flowchart images.
- Developed the novel *FloCo-T5* framework which 1) leveraged OCR and OpenCV shape-detection to parse the flowcharts to create intermediate encoding, 2) employed masked modeling on augmented codes as a pre-training paradigm for encoding-to-code translation.
- Proposed methodology beats the baselines *Vanilla Transformer, BART, PLBART, and CodeT5* on code generation and gives a 3% boost in the CodeBLEU metric.

Internships

University of Regina — May 2023 – Aug 2023
Mitacs Globalink Research Intern | Mentor: Dr. Kin Choong Yow

- Created a software fault prediction dataset in C++, and implemented PLBART baseline for fault classification.
- Explored the potential directions of research on visual grounding using 3-D LiDAR point-clouds and 2D images.

Reliance Jio — Dec 2022 – Jan 2023
Research Intern

- Explored different audio representation methods viz. log-mel spectrograms and chromagrams.
- Implemented CNN-Transformer, and transformer encoder-decoder baselines for audio captioning.

Bosch Global Software Technologies — May 2022 – Aug 2022
Computer Vision Research Intern | Mentors: Sonam Singh & Yasaswi Bharadwaj Katta

- Explored self-supervised methods to leverage Bosch's internal unlabelled datasets for traffic-sign recognition.
- Implemented and compared performance from *MoCo and DINO* SSL frameworks using ResNet18 and ResNet50 backbones. Performed image retrieval to evaluate the features obtained without supervision during training.

Achievements

- Awarded the prestigious ACM-W Scholarship for traveling to ICDAR 2023.
- Received the best poster presentation award at Prometeo, TechFest IIT Jodhpur for my Flowchart-to-Code work.
- Selected for the competitive Mitacs Globalink Research Internship'2023 to pursue a research internship in Canada.
- 100/100 Score in ABU Robocon 2020 Stage-I as part of the IIT Jodhpur Contingent.

Relevant Projects

Lightweight Keyword Spotting April 2023

Course Project | Mentor: Dr. Binod Kumar

- Compared features from raw audio, mel spectrograms, MFCCs and chromagrams to obtain best audio representation for keyword spotting.
- Optimized ResNet-18 using techniques like knowledge distillation and quantization to reduce model size and inference time while maintaining high accuracy.

DevRev: Improving domain-specific QA Dec 2022 – Jan 2023

Inter-IIT Tech Meet 11.0

- Fine-tuned LLMs RoBERTa and BART for theme-based question-answering.
- Synthesized data using the BERT roundtrip consistency model technique to improve QA performance.

Personality prediction April 2022

Course Project | Mentor: Dr. Richa Singh

- Implemented and compared performance across Logistic Regression, Random Forest, RNN, and LSTM models to identify individual personalities based on social media posts.

Bosch: Age and gender prediction March 2022

Inter-IIT Tech Meet 10.0

- Implemented SOTA architectures for age and gender prediction of humans from low-resolution surveillance videos, using both face and body images.
- Employed special weighted loss function for collaborative learning of the two models.

Myocardium Viability Analysis Aug 2021 - Nov 2021

Course Project | Mentor: Dr. Anil Kumar Tiwari

- Implemented UNet-base to segment concentric myocardium masks from cardiac magnetic resonance images.
- Identified and extracted features to perform myocardium viability analysis.

ML-DL Implementation | GitHub Jan 2021 – Mar 2021

Open-source | Winter-Of-Code

- Implemented polynomial regression, decision tree, and random forest classifier algorithms from scratch.

Technical Skills

- **Languages :** Python, C/C++, R, Java, MATLAB, Latex
- **Frameworks & Libraries :** PyTorch, HuggingFace, NumPy, pandas, scikit-learn, OpenCV, Tensorflow
- **Development :** Django, HTML/CSS, Git
- **General Skills :** Machine Learning, Deep Learning, Natural Language Processing, Computer Vision

Relevant Coursework

- **Institute Courses :** Calculus, Linear Algebra and Differential Equations, Probability, Statistics and Stochastic Processes, Introduction to Computer Science, Data Structures and Algorithms, Signals and Systems, Pattern Recognition and Machine Learning, Control Systems, Machine Learning for Economics, Deep Learning
- **MOOCs :** Neural Networks and Deep Learning, Improving Deep Neural Networks, Convolutional Neural Networks, Sequence Models [Courses from the Deep Learning Specialization, Coursera]
- **Online Courses :** Deep Learning for Computer Vision (CS231n, Stanford)

Positions Of Responsibility

RAID(AI Society), IIT Jodhpur May 2022 – May 2023

Coordinator

NEXUS(Astronomy Society), IIT Jodhpur Dec 2021 – Jan 2023

Coordinator

Google Developer Student Club, IIT Jodhpur Sep 2022 – May 2023

AI Core Member