Jivat Neet Kaur

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Education

Birla Institute of Technology and Science (BITS), Pilani, Pilani, India *2017 - 2021 (Expected)*
Bachelor of Engineering in Computer Science, ***CGPA:*** *9.15/10*

Relevant Courses: Neural Networks and Fuzzy Logic, Data Mining, NLP and Vision with Deep Learning, Linear Algebra, Probability and Statistics, Calculus, Differential Equations, Data Structures and Algorithms, Object Oriented Programming, Database Systems, Operating Systems, Image Processing, Number Theory

Experience

Multimodal Communication and Machine Learning (MultiComp) Lab, Carnegie Mellon University
Thesis advised by: Prof. Louis-Philippe Morency and PhD student Paul Pu Liang *Dec 2020 - Present*

- Studying **curiosity-based exploration** in reinforcement learning driven via intrinsic reward signal
- Exploring **language grounding** to accelerate learning of autonomous agents in **sparse reward setting**

Language Technology Lab, Universität Hamburg, Germany
Research Assistant, Guide: Prof. Dr. Chris Biemann *Oct 2020 - Present*

- Working on question answering over **Hyper-Relational Knowledge Graphs** using LC-QuAD 2.0
- Experimenting with Seq2Seq architectures for semantic parsing of complex questions into SPARQL queries

Web Intelligence and Social Computing (WISoC) Lab, BITS Pilani, India
Research Assistant, Guide: Dr. Yashvardhan Sharma *Aug 2020 - Dec 2020*

- Developed a closed-domain **Question Answering** and **FAQ retrieval** system for BITSAT examination
- Evaluated non-contextual (**TF-IDF, GloVe**) and bi-directional contextual representations (**BERT, RoBERTa, Siamese Network** with **BERT**) for semantic textual similarity using **Quora Question Pairs** dataset
- Performed **Machine Reading Comprehension** using BERT model post document retrieval from database

Microsoft, Bangalore, India
Software Engineering Intern *May 2020 - Jul 2020*

- Implemented **Active Monitoring** and developed **Python** probes for **Outlook Calendar REST API** operations in **Cloud Cache** in order to decrease the **Mean Time to Detect** (MTTD) failure
- Reduced manual testing hours by **9%** by solving issues faced by engineers in reproducing errors

MapmyIndia, Delhi, India
Computer Vision Intern *May 2019 - Jul 2019*

- Developed an **Object Detection Model** for detection and recognition of sign boards from photographs
- Adapted the **RetinaNet** one-stage detector architecture and improved the pre-processing steps to reduce false positives significantly and achieve mAP of **0.42**
- Adopted **U-Net** with pre-trained **VGG-16 encoder** for building segmentation in 3-channel satellite images

Publications

- **Jivat Neet Kaur**, Yiding Jiang and Paul Pu Liang, **"Ask & Explore: Grounded Question Answering for Curiosity-driven exploration"**, *ICLR 2021 Workshop on Embodied Multimodal Learning* (under review)
- Vishnu Katkoori, **Jivat Neet Kaur** and Tushar Goyal, **"Simulation and Selection of Detumbling Algorithms for a 3U CubeSat"**, presented in *International Astronautical Congress, Washington, D.C., Oct. 2019*

Projects

Health and Personalized Fitness Recommender System
Guide: Prof. Surekha Bhanot, EEE, BITS Pilani *Aug 2020 - Dec 2020*

- Worked on personalized fitness recommendation based on data from wearable devices and user input
- Developed a **context-aware sequential model** to capture temporal dynamics of users' health patterns
- Performed workout profile forecasting using an **LSTM-based** model employing **attention mechanism**

Named-entity recognition (NER) *Course: NLP and Vision with Deep Learning*
Guide: Dr. Poonam Goyal, CS, BITS Pilani *May 2020- Jul 2020*

- Built a **multilayer feedforward neural network** to learn named entities from CoNLL 2003 dataset
- Trained word embeddings in **Python** using Word2Vec's **Skip-Gram model** and **GloVe**

- Incorporated **casing feature vector** and handled class imbalance in the dataset using **weighted cross-entropy loss**, leading to **16% improvement** in the baseline **F1 score**

Compiler Design for a Custom Language *Course: Compiler Construction*
Guide: Dr. Vandana Agarwal, CS, BITS Pilani [Code] *Jan 2020 - Apr 2020*

- Developed a **fully functional compiler** from scratch (in C) capable of lexical analysis, syntax tree creation, semantic analysis, static and dynamic type checking and **generating executable assembly code**
- The artificial language supported constructs like dynamic memory allocation, loops, if-else ladders, switch statements, nested scopes and function calls

COVINFO Application
IBM Crack the Covid-19 Crisis Hackathon [Code] *Jun 2020 - Jul 2020*

- Developed a web application for **real-time hospital resource monitoring** (beds, ICUs, ventilators)
- Integrated a **mask detection model** to provide real-time information (stored in a NoSQL database on **IBM Cloudant**) regarding the percentage of people wearing masks at any location using live video feed

Activity Recognition in Video Images
Guide: Dr. Vandana Agarwal, CS, BITS Pilani *Aug 2019 - Dec 2019*

- Developed a model for labelling clippings of 51 action classes of **HMDB51** - a large human motion database
- Performed feature extraction using **Histogram of Oriented Gradients** (HOG) feature descriptor followed by activity classification using **Multiclass Support Vector Machine** (SVM) to achieve **65%** accuracy

Deep Learning EEG Response Representation for BCI *Course: Neural Networks and Fuzzy Logic*
Guide: Prof. Surekha Bhanot, EEE, BITS Pilani *Oct 2019 - Nov 2019*

- Built a **multi-scale** deep CNN architecture using **Keras** to learn Deep Motor Features for brain computer interface with imagined motor tasks
- Achieved **96%** accuracy for EEG signals classification of motor tasks in **BCI - EEG motor activity** dataset

Achievements and Awards

- **1** of **30 Google's Explore ML** with Crowdsource facilitators selected globally to train others in ML skills
- **1** of **250** Indian women students from computing backgrounds to be awarded **GHCI 2020** Scholarship
- **1** of **30** teams out of **1500** participants to reach grand finals of **Bengalathon** - a national hackathon
- Won the **3rd** place in Student Satellite Project Competition at **International Conference on Small Satellites**
- **1** of **20** (Top 2%) students to receive **Institute Merit Scholarship** for exceptional academic excellence
- **1** of **1500** students out of 1 lakh applicants to receive **KVPY Fellowship** 2016 for scientific research aptittude

Technical Skills

Programming Languages - Python, C, C++, Java, MATLAB, HTML, JavaScript, Prolog, Verilog
Libraries and Frameworks - Keras, scikit-learn, OpenCV, NLTK, Requests, Tensorflow, PyTorch

Mentorship Experience

Teaching Assistant *CS F415: Data Mining*
Dr. Poonam Goyal *First Semester, 2020-21*

Conducted lab sessions and created learning resources in Python and IBM SPSS Modeler for the course

Teaching Assistant *BITS F312: Neural Network and Fuzzy Logic*
Prof. Surekha Bhanot *Second Semester, 2019-20*

Designed coding assignments for over 150 students and took workshops on Python Deep Learning Frameworks such as Tensorflow and PyTorch. Also guided them in their research paper implementations.

Leadership and Volunteering

- **Executive Committee Member, Team Anant**
  Team Anant is developing BITS Pilani's **first Nanosatellite** under **ISRO's** Student Satellite Programme. Designed the **BDot law** to control the high angular velocity of the satellite after deployment.
- **Election Commissioner, BITS Pilani**
  Selected in the **3 member body** out of 1000 students for conducting elections to the BITS Students' Union.
- **Vice Captain, Basketball Team**
  Led the Girls' Basketball Team for Bits Open Sports Meet'18 (BOSM)- annual sports fest of BITS Pilani.
- **Volunteer, Child Rights and You (CRY)**
  Actively involved in conducting online classes and awareness sessions for underprivileged children.