Jivat Neet **Kaur**

Research Fellow, Microsoft Research

jivatneet.github.io | jivatneet@gmail.com | github.com/jivatneet | Google Scholar | jivat-neet

Education

Jul 2021 | **Birla Institute of Technology and Science (BITS) Pilani** — **Pilani, India**
Aug 2017 | Bachelor of Engineering in Computer Science, *GPA: 9.23/10.00*, *Distinction*

Experience

Present | **Microsoft Research** [🌐] — **Bangalore, India**
Sep 2021 | *Pre-Doctoral Research Fellow | Advisors: Dr. Amit Sharma, Dr. Emre Kiciman*
Working on causal representation learning for language tasks to increase robustness of language models.

Aug 2021 | **Adobe | Media and Data Science Research (MDSR) Lab** — **Remote**
May 2021 | *Research Intern | Advisor: Balaji Krishnamurthy*
Worked on knowledge enhancement of language models to make reliable factual and commonsense reasoning aware predictions. Awarded **full-time position** position offer based on internship performance.

May 2021 | **Carnegie Mellon University | MultiComp Lab, Language Technologies Institute** [🌐] — **Remote**
Dec 2020 | *Research Assistant (Bachelor Thesis) | Advisors: Prof. Louis-Philippe Morency, PhD student Paul Pu Liang*
Worked on accelerating exploration of agents in the absence of dense rewards by improving intrinsic reward signals to be more structured and grounded in the environment.

May 2021 | **Universität Hamburg | Language Technology Lab** [🌐] — **Remote**
Oct 2020 | *Research Intern | Advisors: Prof. Dr. Chris Biemann*
Designed a Pointer Generator based SPARQL semantic parser using Knowledge Graph embeddings.

Dec 2020 | **BITS Pilani | Web Intelligence and Social Computing Lab** [🌐] — **Pilani, India**
Aug 2020 | *Research Assistant | Advisor: Dr. Yashvardhan Sharma*
Developed a closed-domain Question Answering and frequently asked questions (FAQ) retrieval system for BITSAT university-wide examination.

Jul 2020 | **Microsoft** — **Bangalore, India**
May 2020 | *Software Engineering Intern*
Implemented active monitoring for Outlook Calendar REST API operations to decrease the Mean Time to Detect (MTTD) failure. Received **return offer** based on project review and interview performance.

Publications and Patents

S=In Submission, C=Conference, W=Workshop, P=Patent

[S.3] **PGQB: Pointer Generator Query Builder using Knowledge Graph Embeddings** [PDF]
Debayan Banerjee, Jivat Neet Kaur, Mohnish Dubey, Chris Biemann
[Working Paper]

[W.3/S.2] **No Need to Know Everything! Efficiently Augmenting Language Models With External Knowledge** [PDF | Talk]
Jivat Neet Kaur, Sumit Bhatia, Milan Aggarwal, Rachit Bansal, Balaji Krishnamurthy
Workshop on Commonsense Reasoning and Knowledge Bases, AKBC (Virtual) [**CSKB@AKBC'21**]
2022 Conference of the Association for Computational Linguistics (ACL) (under review)

[W.2/S.1] **CoSe-Co: Sentence Conditioned Generative CommonSense Contextualizer for Language Models** [PDF]
Rachit Bansal, Milan Aggarwal, Sumit Bhatia, Jivat Neet Kaur, Balaji Krishnamurthy
Workshop on Commonsense Reasoning and Knowledge Bases, AKBC (Virtual) [**CSKB@AKBC'21**]
2022 Conference of North American Chapter of the Association for Computational Linguistics (NAACL) (under review)

[W.1] **Ask & Explore: Grounded Question Answering for Curiosity-driven exploration** [PDF | Talk]
Jivat Neet Kaur, Yiding Jiang, Paul Pu Liang
Workshop on Embodied Multimodal Learning, ICLR (Virtual) [**EML@ICLR'21**]

[C.1] **Simulation and Selection of Detumbling Algorithms for a 3U CubeSat** [PDF]
Vishnu P Katkoori, Jivat Neet Kaur, Tushar Goyal
70th International Astronautical Congress, Washington, D.C. **[Oral]** [**IAC'19**]

[P.1] **Generating commonsense context for text using knowledge graphs**
Rachit Bansal, Milan Aggarwal, Sumit Bhatia, Jivat Neet Kaur, Balaji Krishnamurthy
US Patent Application | Adobe Inc. Under Filing

Select Research Projects

Efficiently Augmenting Language Models with External Knowledge May'21 - Aug'21

Advisors: Dr. Sumit Bhatia, Milan Aggarwal, Balaji Krishnamurthy

- Worked on knowledge enhancement of language models (LMs) by augmenting structured knowledge externally.
- Created a new masked pre-training corpus using Wikipedia hyperlinks to identify entity spans; trained LMs to retrieve contextually relevant knowledge via masked language modeling on this modified corpus. [**CSKB@AKBC'21**]
- Obtained improved performance over pre-trained LMs measured by popular knowledge probes. Demonstrated robust predictions and reduced sensitivity to contextual variations by evaluation on harder data subsets. [**In Submission**]

Text Conditioned Commonsense Generation May'21 - Aug'21

Advisors: Milan Aggarwal, Dr. Sumit Bhatia, Balaji Krishnamurthy

- Developed a task-agnostic sentence-conditioned CommonSense Contextualizer (CoSe-Co) by training a generative LM (T5) to produce contextually relevant commonsense inferences given a natural language input.
- Devised a method to create semantically related sentence-commonsense path pairs by reverse mapping from structured knowledge paths in ConceptNet to Wikipedia sentences. Used this dataset to train the T5 model. [**CSKB@AKBC'21**]
- Achieved state-of-the-art results across multi-choice QA and OpenCSR tasks, especially in lower training data regimes demonstrating better robustness and generalization capabilities. [**In Submission**]

Language Models for curiosity-driven exploration Dec'20 - May'21

Advisors: Prof. Louis-Philippe Morency, Yiding Jiang, Paul Pu Liang

- Worked on improving agent exploration in sparse reward environments by formulating structured intrinsic rewards.
- Devised a novel form of curiosity leveraging *grounded question answering* to encourage the agent to ask questions about the environment and be curious when the answers to these questions change.
- Demonstrated our reward to outperform recent exploration bonus formulations in sparse settings. [**EML@ICLR'21**]

Semantic Parsing using Knowledge Graph Embeddings Oct'20 - May'21

Advisor: Prof. Dr. Chris Biemann

- Worked on optimizing formal query generation for Knowledge Graph Question Answering (KGQA) by developing a knowledge-enhanced SPARQL semantic parser. Employed Pointer-Generator Network (PGN) to design the parser.
- Demonstrated gains (∼30%) achieved by using KG embeddings for linked entities and relations. Additionally, compared LSTM and Transformer-based PGNs over 4 datasets based on 3 different KGs which resulted in interesting findings.

Select Software Projects

Compiler Design for a Custom Language Jan'20 - Apr'20

Advisor: Dr. Vandana Agarwal

- 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. [**code**]

COVINFO Application Jun'20 - Jul'20

IBM Crack the Covid-19 Crisis Hackathon

- 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. [**code**]

Honours and Awards

Prof. V S Rao Foundation Best All-Rounder Award 2021 For excellence in academic, leadership and sports activites.

Grace Hopper Celebration India (GHCI) Scholarship, 2020 [🌐] Awarded travel grant and scholarship to attend the GHCI conference.

Google Explore ML with Crowdsource, 2020 1 of 30 facilitators selected globally to train participants in ML skills.

International Conference on Small Satellites, 2019 | Third Position [🌐] Student Satellite Project Competition.

Bengalathon, 2019 | Finalist Devised solution for quick accident response to reach grand finals of a national hackathon.

Institute Merit Scholarship, 2018 Awarded by Dean, BITS Pilani to top 2% students for exceptional academic excellence.

Kishore Vaigyanik Protsahan Yojna (KVPY) Fellowship, 2016 Awarded to 2500 (top 2.5%) students out of 1 lakh+ applicants by Dept of Science and Technology, Govt. of India for scientific research aptitude.

Teaching Experience

Data Mining (CS F415) *Teaching and Lab Assistant* Aug'20 - Dec'20

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

Neural Network and Fuzzy Logic (BITS F312) *Teaching Assistant* Jan'20 - May'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; projects I mentored: [🔗] [🔗]

Academic Service

Facilitator WiML Un-Workshop @ ICML 2021
Volunteer NeurIPS '21, EMNLP '21, ACL'21, ICML '21

Skills

Languages Python, C, C++, Java, HTML, MATLAB
Libraries and Frameworks Keras, scikit-learn, OpenCV, NLTK, Requests, PyTorch, Tensorflow
Tools Git, Visual Studio, Elasticsearch
Relevant Coursework 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, Image Processing, Number Theory

Leadership and Volunteering Roles

Causal ML and NLP Reading Group, MSR India *Founding Member* Oct'21 - Present

› Started a weekly reading group to discuss research in causal machine learning, NLP and related areas.

Child Rights and You (CRY) [🌐] *Volunteer* Jan'21 - Present

› Actively involved in conducting online classes and awareness sessions for underprivileged children.

Scholarship Track [🌐] *India Chapter Head and Global Lead Ambassador* Jun'20 - Present

› Lead initiatives to make education and opportunities accessible by increasing awareness of scholarships and resources.

Team Anant (student satellite team) [🌐] *Executive Committee Member* Aug'19 - Jul'20

› Team Anant is developing BITS Pilani's first nanosatellite. Designed the BDot law to control the high angular velocity of the satellite after deployment; also worked on code optimization for On-board Computer system of the satellite.

Election Commissioner, BITS Pilani Jan'19 - Jul'21

› Selected in the 3 member body out of 1000 students for conducting elections to the BITS Students' Union.

Basketball Team *Vice Captain* Aug'18 - Dec'18

› Led the Girls' Basketball Team for Bits Open Sports Meet'18 (BOSM) - annual sports fest of BITS Pilani.