

# HARSHVEER SINGH

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## EDUCATION

**Thapar Institute of Engineering and Technology (TIET)**

July'17 - Present

Bachelor of Engineering(B.E.) in Electronics and Computer Engineering

## EXPERIENCE AND TECHNICAL PROJECTS

**NLP Engineer Intern, AI Team, Mercer-Mettl**

Jan'21 - Jun'21

Worked on improving NLI models, improved cohesion detection accuracy on English text by ~26%

**Deep Learning Research Intern, CMS Experiment, CERN**

Jan'21 - May'21

Worked on building hierarchical trigger systems to isolate 'interesting' events from the background, for better offline representation.

**Research Intern, Deptt. of Mathematics, IIT-Mandi**

Dec'19 - Jan'20

Provided an analytical study on the success of Batch Normalisation

**Hackathons**

2017 - 2018

SATURNALIA Hackathon '17 ranked 1<sup>st</sup>

PEC-FEST Hackathon '17 ranked 2<sup>nd</sup>

PEC-FEST Hackathon '18 ranked 1<sup>st</sup>

## RESEARCH EXPERIENCE

**Adversarial Training for Facebook's Blender**

Oct'20 - Nov'20

Created a self-play regime for conversational agents, and extending that to a competitive conversation where an agent discriminates the output distribution of the other agent against human dialogue distribution.

**Adversarial Training for Facebook's Blender**

June'20 - Aug'20

Created a self-play regime for conversational agents, and extending that to a competitive conversation where an agent discriminates the output distribution of the other agent against human dialogue distribution.

**Poly encoder regime for fine-tuning decoder-only model (GPT-2)**

May' 20

Showed that a decoder model fine-tuned like such on language modeling apparently is more robust to inductive bias than encoder model even though encoder reached better recall@k/C score.

**Analytical study of the success of Batch Norm**

Nov'19 - Dec'19

Showed that batch normalization smooths the loss surface and how it brings that effect, through the study of eigenvalues of the hessian of input matrix.

**Beta2 variation regime for Adam Optimizer**

May'18 - Jul'18

Developed a regime for varying beta2 hyper-parameter of Adam, preventing Adam from getting stuck in sub-optimal minima. A similar result was also shown in a subsection of [Sashank J. Reddi et al.](#)

## SKILLS

Data structures and algorithms, C, C++, Python, PyTorch, NLTK, ScikitLearn, HuggingFace, NumPy, TensorFlow, Keras, Pandas, Matplotlib, Shell scripting.

## TALKS AND PRESENTATIONS

Causality and its importance in variational inference and EM, TIET

Jan '20

Inductive bias in machine learning models, TIET

Oct '19

Effect of constraining the posterior to Gaussian in VAEs, PEC-FEST

Nov '17