

# Apoorva V. Singh

DEPARTMENT OF ELECTRICAL ENGINEERING · NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR

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## Education

### National Institute of Technology Silchar, India

BACHELOR OF TECHNOLOGY IN ELECTRICAL ENGINEERING

Overall GPA: 7.85

Aug. 2017 - June. 2021 (Expected)

### City Montessori School, Lucknow, India

INTERMEDIATE SCIENCE (PHYSICS, CHEMISTRY, MATHEMATICS)

Percentage: 91.6%

May. 2014 - June. 2016

## Experience

### Brown University

RESEARCH INTERN

Rhode Island, United States

Dec. 2020 - Present

- Working under Prof. George Em Karniadakis and Dr. Mengjia Xu
- Working on dynamic functional brain network analysis for Alzheimer's disease prediction using "dynamic graph embedding" method

### Max Planck Institute for Dynamics of Complex Technical Systems

GUEST RESEARCHER

Magdeburg, Germany

Jun. 2020 - Present

- Working under Prof. Peter Benner and Dr. Pawan Goyal in the research group Computational Methods in Systems and Control Theory.
- Working on methods of inverse imaging problems using deep learning.

### University of Hyderabad

UNDERGRADUATE RESEARCH INTERN

Hyderabad, India

May. 2019 - July. 2019

- Worked in Artificial Intelligence (AI) Laboratory, UoH, under Prof. Atul Negi, School of Computer and Information Sciences.
- Worked on developing efficient drug repositioning techniques by using ontological medical data and medical text corpus

### Roghaari

MACHINE LEARNING ENGINEER

Silchar, India

Dec. 2017 - Aug. 2018

- Worked to develop a deep learning based engine that analysed the client's monthly health data to anticipate any health risks.
- The data was collected through wearables and uploaded on monthly basis to a cloud server.

## Key Projects

### Towards Better Drug Repositioning Using Joint Learning

GUIDE: PROF. ATUL NEGI

May. 2019 - Jun. 2019

[Link to the Paper](#)

- Devised a novel technique to harvest a semantic biological knowledge graph constructed using multiple biological ontologies.
- Utilized semantics from aforementioned knowledge graph to complement medical literature Medline corpus (PubTator project) for improved drug repositioning.

### CredCheck: Debunking Fake News by Leveraging Speaker Credibility and BERT

GUIDE: DR. THOUDAM DOREN SINGH

May. 2019 - Aug. 2019

[Link to Project](#)

- Re-engineered Google's BERT embeddings on LIAR dataset for multi-class classification task of Fake news detection.
- Used multimodal data to leverage speaker's personal specifics and his/her credibility to rate the legitimacy of the statement.
- Used refocusing mechanisms to further refine the results to achieve state-of-the-art results.

## A Hybrid Classification Approach using Topic Modeling and Graph Convolution Networks

July, 2019

GUIDE: DR. THOUDAM DOREN SINGH

[Link to Project](#)

- Constructed a structured heterogeneous text corpus graph to transform text classification problem into a node classification problem.
- Created semantic rich features by using Text GCN and topic modeling based approach-LDA which are then fed into a novel classification model.

## Electronic Health Record (EHR) based Patient Case Similarity

Mar, 2019

PROBLEM STATEMENT BY EZDI, INC.

[Link to Project](#)

PRESENTED IN GRAND FINALE OF SMART INDIA HACKATHON ORGANIZED BY MHRD INDIA

- Calculation of Patient Similarity based on Patient Demographic and Case Details extracted from XML annotations in Electronic Health Records (EHR).
- XSLT used for transforming and extracting annotated data into CSV.
- An ensemble model consisting of both Word Mover's Distance (WMD) and General Feature Extraction based on curated list of important sections weighted in the ratio 3:1.

## Predictive Approaches for the UNIX Command Line

Sep. 2018 - Dec. 2018

GUIDE: DR. THOUDAM DOREN SINGH

[Link to Project](#)

- Developed a self-curated knowledge base for all the commands presents in UNIX.
- Integrated information from the knowledge graph with UNIX data considering contextual knowledge they possess.
- Used a Seq2Seq architecture to harvest sequential intelligence of data to achieve a state-of-the-art results in predicting next command for given 'n' previous commmands.

## Publication

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**Apoorva Vikram Singh**, Atul Negi. "Towards better Drug Repositioning using Joint Learning". *2019 IEEE 16th India Council International Conference (INDICON)*

**Apoorva Vikram Singh**, Thoudam Doren Singh, Divyansha, Abdullah Khilji. "A Hybrid Classification Approach using Topic Modeling and Graph Convolution Networks" *International Conference on Computational Performance Evaluation (ComPE). IEEE, 2020.*

**Apoorva Vikram Singh**, Thoudam Doren Singh, Divyansha, Anubhav Sachan, Abdullah Khilji. "Debunking Fake News by Leveraging Speaker Credibility and BERT" *Accepted at IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT'20)*

**Apoorva Vikram Singh**, Thoudam Doren Singh, Abdullah Khilji, Divyansha, Surmila Thokchom, Sivaji Bandyopadhyay. "Predictive Approaches for the UNIX Command Line: Curating and Exploiting Domain Knowledge in Semantics Deficit Data" *Multimedia Tools and Applications, Springer*

## Key Courses Undertaken

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**Computer Science:** Deep learning (5 course specialization by deeplearning.ai on Coursera) , Machine Learning (Course by Stanford on Coursera), Data Structures and Algorithms (NPTEL), Introduction to Machine Learning (NPTEL), Signals and Systems.

**Mathematics and Statistics:** Calculus, Linear Algebra, Differential Equations, Probability and Statistics.

## Academic Achievements

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| 2020 | <b>Runner up at the Crystal Ball 2020 Hackathon</b> for the problem statement Demonstrate that a Distributed Supply Chain Problem can be Managed by Co-Operating AI Agents | <i>Blue Yonder</i>                       |
| 2020 | <b>Accepted as a scholar Qubit by Qubit's Introduction to Quantum Computing</b>  | <i>The Coding School and IBM Quantum</i> |
| 2019 | <b>Finalist in Smart India Hackathon organized by Ministry of Human Resource Development</b>   | <i>NIT Warangal</i>                      |
| 2020 | <b>Innovation and Entrepreneurship Development Centre (IEDC) Grant Winner</b> for the project "Deep Reinforcement Learning (DRL) Based Liquid Lens Auto-Focus system"      | <i>NIT Silchar</i>                       |
| 2020 | <b>Undergraduate Research Council (UGRC) Grant Winner</b> for the project "AssistiveMRI: A deep learning approach to Medical Image Processing"                             | <i>NIT Silchar</i>                       |
| 2020 | <b>Winner of Data Strata, Tecnoesis' 20</b> for the problem statement "Analysis of Global Terrorism Events"  | <i>NIT Silchar</i>                       |
| 2019 | <b>Winner of Data Strata, Tecnoesis' 19</b> for the problem statement "What is the best approach to become a Data Scientist"   | <i>NIT Silchar</i>                       |

## Technical Strengths

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|------------------------------|--|
| <b>Computer Languages</b>    | Python, MATLAB, C/C++                      |
| <b>Software and Tools</b>    | Latex, Git, Vim                            |
| <b>Data Analysis, ML, DL</b> | Pytorch, Keras, scikit-learn, NLTK, OpenCV |