Neeraja Kirtane

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Website ◇ LinkedIn ◇ GitHub ◇ Google Scholar

RESEARCH INTERESTS

Natural Language Processing specifically for low resource languages, Bias studies in NLP, Graph Deep Learning, Class Imbalance handling in Machine Learning.

EDUCATION

Manipal Institute of Technology, Manipal, India   2018 – 2022
B.Tech in Computer Science and Engineering (Computational Intelligence Minor GPA: 10.0)   *CGPA: 9.14/10*

EXPERIENCE

Indian Institute of Technology Madras, Chennai, India   Jul 2022- Present
Post Baccalaureate Fellow   *Advisors – Dr Balaraman Ravindran and Dr Rajashree Bhaskaran*
- Working on the Project Hidden Voices
- This aims to reduce the gender gap in wikipedia data

Indian Institute of Technology Madras, Chennai, India   Jan 2022- Jun 2022
Research Intern   *Advisors – Dr Balaraman Ravindran and Dr Ashish Tendulkar*
- Working on Handling class imbalance in Graph neural networks.
- Using implicit ways at the algorithmic level to handle this imbalance.
- Additional Links: *Report* | *Slides* | *Github*

Centre for development of advanced computing, CDAC Pune   Jun 2020 – Aug 2020
ML Intern   *Advisor – Rahul Dangi*
- Extracted keywords and named entities from a document to make the text more readable.
- Used word embeddings of the Glove dataset for the predictions. Major libraries used in python were nltk (text processing), gensim (to use the LDA algorithm), Flask(to create the front end of the project).
- Named entities classified as person, location, organization.
- Additional Links: *Github* | *Report*

PUBLICATIONS

ReGrAt: Regularization in graphs using attention mechanism to handle class imbalance
Under Review at AAAI Student Abstract   Sept 2022
- Authors: **Neeraja Kirtane**, Jeshuren Chelladurai, Balaraman Ravindran, Ashish Tendulkar
- Used attention mechanism to tackle imbalance.
- Used a custom loss function by adding a regularizer that handles imbalance.
- Got better results than already existing methods.

Efficient Gender Debiasing of Pre-trained Indic Language Models
Under Review Paper   Aug 2022
- Authors: **Neeraja Kirtane**, V Manushree, Aditya Kane
- Quantified bias in Hindi Language model- Muril.
- Efficiently finetuned by unfreezing less than 1 percent of the parameters.
- Results showed that debiasing reduced the bias.

Mitigating gender stereotypes in Hindi and Marathi
*Accepted at the gender bias in NLP workshop at **NAACL 2022** Paper*   May 2022
- Authors: **Neeraja Kirtane**, Tanvi Anand
- Additional Links: *Slides* | *Poster*
- Created a dataset of occupations and emotion in Hindi and Marathi
- Proposed methods to quantify the bias in the word embeddings

- Used existing methods to debias the embeddings

Transformer based ensemble for emotion detection

Accepted at WASSA workshop at **ACL 2022** *GitHub | Paper*   Mar 2022

- Authors: *Aditya Kane, Shantanu Patankar, Sahil Khose,* **Neeraja Kirtane**
- Additional Links: *Experiments | Slides | Poster | Video*
- Developed ensemble based solution consisting of multiple *ELECTRA* and *BERT* models.
- Proposed methods for *synthetically generating datasets* to mitigate class imbalance.
- Studied the behaviour of our models on various raw and synthetically generated datasets.

Occupational Gender Stereotypes in Indian Languages

Accepted at WiNLP workshop at **EMNLP 2021** *Paper*   Nov 2021

- Authors: **Neeraja Kirtane**, *Tanvi Anand*
- Additional Links: *Slides | Poster | Video*
- Devised a metric to calculate bias in gendered languages like Hindi and Marathi
- Used this metric on ULMFiT language model and quantified the bias present.

PROJECTS

Smart Document Explorer *GitHub*   Summer 2021
- Created a program to make a document more readable. Used NCERT history and geography textbooks as the data.
- Extracted named entities, keywords. Summarized the text, found similar sentences given a sentence.
- Used relationship extraction to map dates with events in history textbooks.

Sentiment Analysis of movie reviews *GitHub*
- Found out the sentiment of movie reviews(Good or Bad) using ML algorithms(Naive Bayes) and deep learning algorithms(LSTMs)
- Did a comparison of these two techniques by comparing the accuracy of the results obtained.

Pneumonia Detection using X-rays *GitHub*   Sep 2020
- Used CNN(Convolutional Neural networks) to train X-rays and detect if the patient has Pneumonia or not.
- Major frameworks that were used were tensorflow and keras. Achieved the accuracy of more than 80 percent.

RELEVANT COURSEWORK

- Soft Computing Paradigms, Deep Learning, Machine Learning, Social Network Analysis

- Discrete Mathematics, Vector Calculus, Data structures, OOP

TECHNICAL SKILLS

Languages: Python, C++, Java, C
Tools and Libraries: PyTorch, NumPy, Tensorflow

MOOCS

- CS224W Machine Learning with Graphs by Stanford University

- CS224d Deep Learning for NLP by Stanford University

- CS229 Machine Learning course by Stanford University

- Deeplearning.ai module

EXTRACURRICULAR

- Regional Maths Olympiad(RMO) Finalist.

- Volunteer at NAACL 2022

- College level Finalist at Smart India Hackathon

- Part of IEEE Student Branch Manipal which organised multiple technical events at college level.