

Manas Jain

☎ +91 8233672125 | ✉ manasjain26@gmail.com | 🌐 [manasjain26](https://github.com/manasjain26) | 🌐 manasjain26.github.io | in [Manas Jain](#)

RESEARCH INTERESTS

Text Generation, Conversational AI, Abstractive Summarization, Multilingual NLP, Medical NLP, Natural Language Processing, Computer Vision, Deep Learning, Machine Learning

EDUCATION

Indian Institute of Technology Bombay

Bachelor of Technology, in Civil Engineering

Mumbai, MH, India

July 2017-May 2021

- Dual Minor in i) Computer Science and ii) Machine Intelligence & Data Science (CMInDS)
- Major GPA : 8.7/10, CMInDS Minor GPA: 8.75/10

PREPRINT

- **Natural Answer Generation: From Factoid Answer to Full-length Answer using Grammar Correction**[\[Paper\]](#)

Manas Jain, Sriparna Saha, Pushpak Bhattacharyya, Gladvin Chinnadurai, Manish Kumar Vatsa

Work under review at ARR December 2022 cycle, targeting ACL 2023

- **Converting Factoid Question-Answer into Full-Length Paraphrased Answer**

Dharmendra Thakur, Manas Jain, Sriparna Saha, Pushpak Bhattacharyya, Gladvin Chinnadurai, Manish Kumar Vatsa

Work in process

RESEARCH WORK

Natural Answer Generation: Factoid to full-length answer generation ([Bachelor Thesis](#)) Aug'20-Aug'21

Guide: *Prof. Pushpak Bhattacharyya (CSE dept)*, collaboration with LG-Soft,India *CFILT Lab, IIT Bombay*

- Worked on generating full length answer based on factoid using pointer generator network and attention
- Developed a Neural Natural Answering model by fine-tuning DialoGPT2 model on 13000 examples
- Proposed an unsupervised rule based approach based on syntactic parse tree of question with transformer based Grammar Error Correction model as a post processing step. Released improved dataset for further research

Multilingual Relation Classification [\[Code\]](#)

Spring '21

Guide: *Prof. Soumen Chakrabarti* | R & D project

Info Lab, IIT Bombay

- Fine-tuned MuRIL model on custom made english RE dataset having 35 labels; 16784 in train set and 175 in test
- Achieved an accuracy of **91.43%** & **86.29%** when fine-tuned BERT & RoBERTa models respectively

WORK EXPERIENCES

Associate Machine Learning Scientist | Wadhvani Institute of Artificial Intelligence

Dec '22 - Present

Wadhvani AI is an independent nonprofit institute developing AI-based solutions for underserved communities in developing countries

- ML Lead of the project on Integrated Agriculture News Monitoring, an AI/ML - based surveillance system for the Indian Ministry of Agriculture to track incidences of interest
- Implementing a conversational AI agent on Farmer Call Centre Management - AI/ML enabled scalable response system to make the existing scheme more efficient and use the digitized call data for building a better solution.

Research Engineer | Hilabs

Jul '21 - Dec '22

US based healthcare-focused artificial Intelligence solution for reducing financial losses caused by data errors

1) Medical Code Prediction from physician notes

- Developed a pipeline to find evidence for ICD10 procedure and diagnosis codes within physician notes at scale
- Utilized and improved a variety of models and techniques such as scispacy, biobert, and TFIDF for above task
- Leveraged domain knowledge from the UMLS medical ontology to make informed predictions
- Currently part of our product suite and is being used to find DRG upcoding in claims data and improve the HEDIS ratings of health plans

2) Provider Network Analysis

- Pioneered a strategy to increase the training size by context matching to extract entities from documents
- Fine-tuned BERT for the NER task to tag network names within provider contracts
- Improved OCR accuracy by implementing line & text segmentation algorithm using OpenCV and Tesseract
- Deployed the code and trained models on a cluster to perform distributed NER on hundreds of thousands of documents

Research and Development AI Intern | Daikin Industries, Japan

Summer '20

Worked in the team **DigiNavi, ICT group at Technology and Innovation Centre, Osaka**

- Implemented a robust **TF-IDF and vocabulary based entity count** algorithm to extract **tags** from a video
- Developed **video captioning & extractive summarization** model using state of the art **BERT** language model
- Applied **unsupervised techniques** like **LDA Topic Modelling & S-BERT** for sentence **clustering** in transcripts
- Implemented the **end to end pipeline** using **GCP speech to text API** to get transcripts from video data

Data Science Research Intern | Prodigal Technologies (Y-Combinator backed)

Summer'20

Developed a **sentiment scoring model** on **collection call conversation** having agent and borrower transcripts

- Performed extensive **EDA** and cross validation of scores with pre-existing data available like **call scores (FICO score)**, **Promise to pay** Achieved **0.6 and 0.7** correlation value respectively with sentiment scores
- Created a small dataset having sentiment scores for **100** calls, obtained **0.52** F1 score on this dataset using VADER

AI Programmer | Samespace (Novanet Inc.), Mumbai (Conversational AI startup)

Summer'19

Developed **Deep Learning models** in python using **Keras and NLTK**, Worked on call data transcripts

- Created a model of **Toxic comment classification** and Profanity Detection trained on **1.6 lakhs** online comments using pre-trained word embeddings of **GloVe** as input of the **Bidirectional-LSTM** which achieved **96%** accuracy
- Pioneered a model of **Sales Call Classifier** to predict the customer on call is interested achieving **92%** accuracy

Driverless Car | Team SeDriCa, Innovation Cell, IIT Bombay

Oct'18 - Sept'19

Currently one of the **11 finalists** among 259 teams of the **Mahindra RISE Driverless Car Challenge**

- Part of a team of 20 students of various departments to develop a **self driving** car, which is a **fully autonomous** car customized for the **Indian road conditions** that obeys the Indian traffic rules
- Implemented a **Bidirectional RRT Star** algorithm for **path planning** between two points in a **2D-Grid** having multiple obstacles of random shape using the concept of **Costmap** in **ROS C++**

KEY TECHNICAL PROJECTS

Speech-Driven Facial Animation using Temporal GANs [Slides]

Spring '21

Guide: Prof. Preethi Jyothi | Course Project (CS 753 - Automatic Speech Recognition)

IIT Bombay

- Modified **ImaGINator** generator to take speech signal as input to create a continuous frame of images as a video
- Implemented 3 Discriminator and achieved **23.16** average PSNR value after few epochs of training on **GRID** dataset

Hyperparameter Optimization of Machine Learning Algorithms [Slides] [Report]

Spring '21

Guide: Prof. Ganesh Ramakrishnan | Course Project (CS 769 - Optimization in Machine Learning)

IIT Bombay

- Studied Grid search, random search, hyperband, Bayesian Optimization, genetic algorithms to perform HPO
- Experimented the above HPO algorithms for regression, classification task on 4 ML models - RF, SVM, KNN, ANN

Music Genre Classification using ML and DL techniques [Slides][Code]

Spring '21

Guide: Prof. Biplab Banerjee | Course Project (DS 303 - Introduction to Machine Learning)

IIT Bombay

- Trained KNN, SVM and FFNN on GTZAN dataset having 58 features; achieved 89% accuracy using FFNN
- Implemented a CNN architecture and trained it on Mel-Spectrograms extracted from raw audio using Librosa

Neural cross-lingual Summarization: English Paragraph to Hindi Summary [Slides][Code]

Fall '20

Guide: Prof. Pushpak Bhattacharyya | Course project (CS 626 - NLP, Speech and Web)

IIT Bombay

- Created a dataset having **90000** training data using **google translate API** from Daily News summarization dataset
- Implemented **Multi task transformer** architecture based approach having 1 encoder and 2 decoders for the task of Machine Translation and cross-lingual summarization jointly trained on HindiEnCorp MT dataset and CLS dataset

Sentiment Analysis with Deep Learning using BERT (Self Project)

June '20

- **Fine-tuned** the **BERT** language model for **emotion classification** task using hugging face **transformer**
- Used **PyTorch** for training the last layer on **SMILE twitter** dataset using cross entropy loss on google GPU
- Achieved an accuracy of **95%** on the 'happy' emotion class having maximum data in training

Semantic nuclei Segmentation

Spring '20

Guide: Prof. Suyash Awate | Course project (CS 736 - Medical Image Computing)

IIT Bombay

- Implemented the state of the art image segmentation **U-Net** architecture with Batch Normalization layers in PyTorch
- Trained the model on **670** images using data augmentation which achieved max IoU of **0.72** on validation set

Generative Adversarial Approach for text based Zero-Shot Learning

Autumn '19

Guide: Prof. Biplab Banerjee | Course project (GNR 638 - Machine Learning II)

IIT Bombay

- Implemented the **CVPR'18** paper titled 'Generative Adversarial Approach for Zero-Shot Learning from Noisy Texts'
- Given the text descriptions of a type of bird species, we have to recognize the novel classes of birds with no examples
- Formulated ZSL problem as a **supervised classification problem** by training the **Generator** to produce synthetic visual features given an input semantic embedding extracted from text which achieved **43%** accuracy on CUB dataset

Face Recognition using Siamese network

Autumn '19

Guide: Prof. J. Indu | Course project (CE 712 - Digital Image Processing)

IIT Bombay

- Pioneered a model to identify faculty name in a image using **few shot learning** having just **2-3** images per faculty
- Used pre-trained **Facenet** named siamese neural network architecture to extract image feature vector and embeddings

FAQ Chatbot for Freshmen [Code]

Summer '18

Seasons of Code, Web and Coding Club

IIT Bombay

- Designed a **chatbot** using **Rasa NLU** model to perform intent classification into **18** different classes
- Explored **web scraping** to train our bot on different **QnA** present on **FAQ page** of different department websites

TECHNICAL SKILLS

Programming

C++, Python, Scala, Julia, MATLAB, R, Git

Tools/Framework

Tensorflow, PyTorch, Keras, Spark, Hadoop, MySQL, OpenCV, librosa, scikit-learn

Web Development

React-Admin, React-Native, HTML/CSS, Bootstrap

KEY COURSES UNDERTAKEN

Artificial Intelligence

Automatic Speech Recognition; Optimization in Machine Learning; Advance Machine Learning; Speech, NLP & Web; Machine Learning of Remotely Sensed Data II; Medical Image Computing; Introduction to Machine Learning; Digital Image Processing

Computer Science

Operating Systems; Data Structures & Algorithms; Computer Networks; Computer & Network Security; Computer Programming in C++

Mathematics

Probabilistic & Statistical Methods; Linear Algebra; Calculus; Differential Equations

SCHOLASTIC ACHIEVEMENTS

- Selected in the **NLU** track of [Research week with Google](#) 2022. Was amongst the 50 people selected in APAC region.
- Secured **AIR 2096** out of the 0.22 million candidates who appeared for **JEE Advanced** in 2017
- Secured 99.37 percentile among 1.3 Million candidates who appeared for JEE Mains exam in 2017
- Recipient of the prestigious **KVPY Fellowship** with an **AIR 1110** among **136,804** candidates in 2017
- Awarded certificate of merit for being placed in **Top 1%** in Rajasthan out of **6575** candidates in NSEC 2016-17

TEACHING, MENTORING AND LEADERSHIP ROLES

Teaching Assistant | MA 106, Linear Algebra

Mar 2021 - May 2021

Mathematics Department

IIT Bombay

- Organized weekly tutorial (problem solving) sessions for a batch of 50 students
- Involved in setting and evaluating examinations, helped in handling logistics for an online mode of the course

Coordinator, Techfest 2018

Autumn 2018

Robowars, Events Department

IIT Bombay

- Assisted in ideation and on ground execution of Student Solar Ambassador Program, a Guinness World record
- Responsible for conceptualization and management of International Robowars Competition (100+ teams)
- Organised and moderated a Facebook live event (212k views) interacting with international participants

EXTRA-CURRICULARS

Sports

- Represented Udaipur district in **Rajasthan State Level Table Tennis** competitions
- Lead the team Winning the **Gold** medal in the Institute Table Tennis League (ITTL) among the 7 teams participating

Entrepreneurship

- **Mentored** 3 freshmen teams, guided them in creating a **BMC**, **pitch deck** and preparing a pitch among which 1 team was ranked **1st** in the EnB Buzz competition among 100+ teams
- Authored an article titled '**Cryptocurrency: The future of money**' published in **EnSpace'18** (Ecell newsletter)