Abhranil Chandra

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Education

Indian Institute of Technology, Kharagpur Kharagpur, India

Bachelor of Technology in Mechanical Engineering: CGPA-8.39/10 *July 2019 – May 2023*

- Relevant Courses: Programming and Data Structure, Mathematics-I and II, Transform Calculus, Image Processing, Dynamics, Probability & Statistics*, Discrete Maths* (*-Ongoing)

Research Project Experience

Structural Health Management using Deep Learning Dec. 2020 – Present

under Prof. Raktim Bhattacharya, Texas A&M University and Prof. Pabitra Mitra, IIT Kharagpur *Remote*

- Doing extensive literature survey of existing systems to automate SHM systems
- Exploring CNN architecture for analyzing traffic videos and RNN architecture for analyzing sequential sensory data
- Exploring a novel video magnification technique to monitor humanly imperceptible movements and tremors

Weld Defect Characterization using Computer Vision for Tata Steel Ltd Aug. 2020 – Dec. 2020

under Prof.Pabitra Mitra,CSE,IIT Kharagpur *Kharagpur, India*

- Analyzed the A, B, C Scan data, did necessary Data Preprocessing on the input data
- Found image moments (especially Zernike Moments) to analyse the weld defect types
- Applied different Machine Learning & Deep Learning techniques to predict the magnitude of the weld defects and thus guide for acceptance or rejection of that weld

Application Projects

Kinship & relationship compatibility prediction between two people from their images Jan 2021-Present

- Collection data of famous people and their relatives and partners
- Similarity Model: Given two faces - this model will help to know how much similar the faces are
- Will work on deducing kinship prediction and relationship compatibility in future

Sentiment Analysis Using BERT Dec 2020

- BERT is state-of-the-art natural language processing model from Google. Using its latent space, it can be repurpossed for various NLP tasks, such as sentiment analysis.Studied the BERT paper to gain theoretical knowledge of its working
- Achieved 91% accuracy in predicting positive/negative sentiments on the IMDB reviews dataset
- Used BERT from the Hugging Face transformers library and Pytorch for preprocessing and finetuning the model

RL and its applications in Atari Games Oct 2020

- Studied basics of Reinforcement Learning through David Silver Lectures and few portions of Sutton and Barto's book on Reinforcement Learning
- Studied Dynamic Programming, Monte-Carlo Learning , Temporal Difference Learning , Value Function Approximation , SARSA , Q-Learning and Policy Gradient methods
- Implemented DQN and A3C reinforcement learning algorithms on Breakout and Pong Atari Games and trained the models to a descent level and then compared the results

COVID-19 Detector Flask App based on Chest X-rays and CT Scans using Computer Vision Nov 2020

- Did a lot of literature survey of the latest research papers describing methods being used to reliably use Deep Learning to predict Covid-19
- COVID-19 Detection based on Chest X-rays and CT Scans using four CNN models by Transfer learning-VGG16, ResNet50, InceptionV3, Xception. Also trained a CNN from scratch giving comparable accuracy of about 96%
- Built a simple Flask-App where the user can upload Chest X-rays or CT Scans and get the result
- Working on model interpretability by implementing Grad-CAM to visualise the class activation maps

Image Captioning Jul 2020

- Studied the research paper "Show and Tell: A Neural Image Caption Generator"

- Implemented my own version using CNN model Inception-v3 for image analysis followed by a LSTM based sentence generator
- Trying to improve the model by using Attention based methods

Detection of Mask to resist Covid 19 May 2020

- Wrote the VGG-16 model from scratch in TensorFlow and Keras
- Used OpenCV to process images or videos
- The model tags faces with, without and improperly wearing masks in real-time video feed

Winter Workshop Project Dec 2019

- Winter School of Artificial Intelligence and Robotics organized by the Centre of Excellence in Artificial Intelligence, IIT Kharagpur in association of IEEE conducted a workshop on Image Processing (IP)
- I learned the theoretical concepts of Image Processing
- Implemented the algorithms from scratch in C++ using OpenCV library

Technical Skills

Languages: Python, C++/C, Matlab, HTML/CSS
Frameworks:Scikit-learn, NLTK, TensorFlow, Keras, PyTorch, Flask
Developer Tools: Git, Sublime, VS Code, PyCharm
Operating System: Linux(Ubuntu), Windows

MOOCs and Online Courses

- Statistics110: Probability(HarvardX)
- CS229: Machine Learning(Stanford)
- CS230: Deep Learning (Stanford)
- CS231n: Convolutional Neural Networks for Visual Recognition (Stanford)
- CS224n: Deep Learning for NLP (Stanford)
- Reinforcement Learning (DeepMind) by Prof. David Silver
- Machine Learning(Stanford Online)- Coursera
- Mathematics for Machine Learning Specialization- Coursera
- Deep Learning Specialization(deeplearning.ai)- Coursera
- DeepLearning.AI TensorFlow Developer- Coursera
- Natural Language Processing Specialization(deeplearning.ai)- Coursera
- Advanced Machine Learning Specialization(National Research University Higher School of Economics)- Coursera

Positions of Responsibility & Volunteer Experience

Sub-Head, Business Club IIT Kharagpur Aug 2019 - Present

- Teach freshmen about machine learning and deep learning
- We conduct Indian Case Challenge every year- it is India's largest case competition(3000+ student participation) with participation from international teams as well
- Conduct multiple workshops in collaboration with Intel, NOMURA, ZS Associates related to Business Strategy and Analytics

Core Member, Kharagpur Data Analytics Group Oct 2020 - Present

- IIT Kharagpur's official society on Machine Learning related things
- We discuss research papers, conduct reading sessions, conduct workshops on ML related topics
- Participate in competitions and do independent research work

National Service Scheme(NSS) Volunteer Jul 2019 - Present

- Teach underprivileged students in nearby villages of IIT Kharagpur the basics of English, Maths and Computing