# Abhay Shukla

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## RESEARCH INTEREST

Natural Language Processing, Reinforcement Learning, Human-Computer interaction

## ACADEMICS

**Indian Institute of Technology, Kharagpur (Gold Medallist)** **2018 - 2022**
*B.Tech in Industrial and Systems Engineering* *(Department Rank 4) CGPA - 9.17/10*
*Minor in Computer Science and Engineering* *ACGPA - 9.11/10*

## PUBLICATIONS

- **Abhay Shukla**, Paheli Bhattacharya, Soham Poddar, Rajdeep Mukherjee, Kripabandhu Ghosh, Pawan Goyal and Saptarshi Ghosh *"Legal Case Document Summarization: Extractive and Abstractive Methods and their Evaluation"* in The 2nd Conference of the Asia-Pacific Chapter of the Association for Computational Linguistics and the 12th International Joint Conference on Natural Language Processing **AACL-IJCNLP (2022)**
- Adarsh Patnaik, Vibhakar Mohta, Shivam Kumar Panda, Siva Vignesh Krishnan, Abhinav Gupta, **Abhay Shukla**, Gauri Wadhwa, Shrey Verma and Aditya Bandopadhyay *"Design of an All-Purpose Terrace Farming Robot"* in the IEEE/ASME MESA 2022 – 18th Int. Conference on Mechatronic, Embedded Systems and Applications

## PROJECTS

**Legal Role Identification** *February 2022 – May 2022*
Guide: Prof. Pawan Goyal, Prof. Saptarshi Ghosh (link)

Research Areas: Named Entity Recognition - Natural language processing

- Worked on identifying the roles of specific actors in a legal case, such as counsel, witness, from a court case document
- Developed a novel two step classifier using transformer models such as BERT to identify and classify named entities
- Modelled long-range dependencies, multiple contexts and references for a named entity in the court case document

**Abstractive Long Legal Document Summarization** *May 2021 – May 2022*
B.Tech Project, Guide: Prof. Saptarshi Ghosh (link)

Research Areas: Summarization - Natural language processing

- Worked on abstractive and hybrid summarization of long legal documents containing more than 20 thousand words
- Developed novel methods to summarize long documents using best short document abstractive summarization techniques
- Incorporated Legal domain knowledge using a rhetorical role classifier in the long document summarization process

**Detection of Language Bias in Wikipedia** *January 2021 – April 2021*
Course Term Project - Guide: Prof. Animesh Mukherjee (link)

Research Areas: Classification - Natural language processing

- Worked on lingual bias detection in sentences for maintaining Neutral Point of View policy in Wikipedia articles
- Utilized a pre-existing dataset with 16 lakh sentences from Wikipedia along with its revision history
- Devised a novel ensemble approach using genetic algorithm on the outputs generated by five classification models

**Evolutionary Neural Networks for Sequential Problem Optimization** *December 2020 – December 2021*
Guide - Prof. Nirupam Chakraborti (link)

Research Areas: Genetic Algorithms, Optimization, Neural Networks

- Developed Evolutionary Neural Networks (NN) to heuristically solve large-scale Travelling Salesman Problem
- Achieved rapid convergence by implementing genetic operators like mutation and crossover for NN architecture
- Implemented island based genetic model to use multiple evolutionary optimization algorithms concurrently

**Optimizing Bank Lending Decisions using Metaheuristics** *December 2020 – December 2021*
Guide - Prof. Nirupam Chakraborti (link)

Research Areas: Optimizations and Heuristics Methods

- Developed Evolutionary Neural Networks (NN) to heuristically solve large-scale Travelling Salesman Problem
- Achieved rapid convergence by implementing genetic operators like mutation and crossover for NN architecture
- Implemented island based genetic model to use multiple evolutionary optimization algorithms concurrently

## WORK EXPERIENCE

**Walmart Global Tech** *June 2022 – Present*
Software Development Engineer II
*Walmart's technology division focused on driving innovation and enhancing its retail operations through advanced technological solutions*
Domain: Supply Chain Automation

- Developing an application responsible for handling global documents to facilitate interaction between multiple
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**Akaike Technologies** *November 2021 – April 2022*
Machine Learning Engineer Intern (Certificate)
*Deep learning (AI) services company helping businesses add intelligence to their existing processes*
Domain: Question Answer Generation - Natural Language Processing

- Designed a multi-layered approach to generate question-answer pairs from a large piece of text using transformer models
- Reduced hallucinations made by the abstractive transformer-based sequence generating model using entailment technique

**Walmart Global Tech** *May 2021 – July 2021*
Software Developer Intern (Certificate)
*A program for an 8-week summer internship that offers real stakes, access to industry leaders, and the chance to revolutionize the way the world shops*
Domain: Optimization

- Worked on the team responsible for generating pick lists by solving multi-layered travelling salesman problem
- Implemented a robust,adaptable, and fast automation architecture with a tech stack comprising of Golang, SQL, and Kafka

**Autonomous Ground Vehicle (Autonomy and Intelligence) (AGV.AI)** *February 2019 – September 2020*
Undergraduate Researcher (Certificate)
*multi-disciplinary research group aimed at building a fully operational self-driving car*
Domain: Controls - Autonomous Vehicles

- Deployed geometric steering methods Stanley and Pure-pursuit along with PID for path tracking for Mahindra E2O
- Implemented the Model Predictive Control (MPC) in python using two python based optimization frameworks

## MENTORSHIP AND OUTREACH

**Head, Technology Robotix Society, IIT Kharagpur**

- Leading a 3-tier team to execute the annual Robotix fest & conducting workshops, hackathons and competitions
- In charge of Makerspace lab - an open source lab for robotics enthusiasts seeking guidance, resources and components
- Developed and conceptualized the autonomous robotics competition 'Tesseract' in India's largest tech-fest Kshitij 2020

**IEEE Mentor and Organizer, Winter School of AI & Robotics, IIT Kharagpur**

- Organized the Winter School of AI & Robotics in collaboration with Centre for Excellence in AI for 500+ students
- Mentored 112 students on autonomous robotics tools/concepts like robot operating system, electronics, controls, etc
- Guided mentees to make a drive-by-wire radar navigated robot capable of autonomous traversal and obstacle avoidance

## AWARDS AND ACHIEVEMENTS

**Institute Gold Medal** *IIT Kharagpur*

- Awarded **Institute Gold Medal** for being the **best All-Rounder** among all graduating students with bachelor's degree

**Institute Order of Merit** *IIT Kharagpur*

- Awarded **Institute Order of Merit** for outstanding performance in discipline of **technology** during the bachelor's degree

**Medury Bhanumurthy Memorial Prize** *IIT Kharagpur*

- Awarded **Medury Bhanumurthy Memorial Prize** - best in **extra curricular activities** among all the B.Tech.(Hons.) students

**Smart India Hackathon 2020** *Government of India*

- Secured First Position at All India Level in Smart India Hackathon by making an AI enabled robotic trash boat

**DIC Terrace Farming Robot, 8th Inter-IIT Tech Meet** *IIT - Roorkee*

- Among the top 50 students to represent IIT Kharagpur. Secured 1$^{st}$ position in my event and stood 2$^{nd}$ among 20 other IITs

**27th Intelligent Ground Vehicle Competition** *Oakland University, USA*

- Part of the team (support) which secured 2$^{nd}$ position in the AutoNav challenge among a total of 43 teams worldwide