

# PRATANU MANDAL

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## CAREER INTEREST

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My research interest lies in machine learning, artificial intelligence, and data science. I am interested in pursuing research in these fields. I am also interested in the development and analysis of algorithms.

## EDUCATION

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**GRE**                    **327 / 340**  
Quantitative    164 / 170  
Verbal                163 / 170  
AWA                    5 / 6

**TOEFL**                **111 / 120**  
Reading            28 / 30  
Listening          28 / 30  
Speaking           27 / 30  
Writing              28 / 30

**JIS College of Engineering, Kalyani**  
B.Tech. in Computer Science & Engineering

**2014 - 2018**  
*Overall GPA: 9.36 / 10*

**Don Bosco School, Bandel**  
Higher Secondary

*Year of completion: 2014*  
*Overall percentage: 89.25 %*

**Don Bosco School, Bandel**  
Secondary

*Year of completion: 2012*  
*Overall percentage: 94.4 %*

## TECHNICAL STRENGTHS

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|------------------------------------|---|
| <b>Programming Languages</b>       | Java, Python, C/C++, SQL, Shell Script (basic)  |
| <b>Operating Systems</b>           | Linux, Windows                                  |
| <b>Machine Learning Frameworks</b> | Keras, Tensorflow                               |
| <b>Database</b>                    | MongoDB, Oracle, MySQL                          |
| <b>Application Software</b>        | IntelliJ IDE, Eclipse IDE, Netbeans IDE, MATLAB |
| <b>Containerization</b>            | Docker  |
| <b>Source Control</b>              | Git   |

## WORK EXPERIENCE

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### **Capgemini Technology Services India Limited**

*August 2018 – present*

*Software Engineer, Java, Bangalore, India*

- My responsibility is to design and implement software applications for managing large scale client data as per scope
- Leading a team of two junior software developers
- Developed a complete end to end solution for large scale employee attendance data management for all client employees globally
- Developed a complete end to end solution for large scale business inventory management and audit in a centralized manner globally
- Developed a highly scalable data validation framework in Java with extensible design

## KEY ACADEMIC PROJECTS

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### **Automatic Music Genre Detection using Artificial Neural Networks**

**Advisor:** Dr. Ira Nath, JIS College of Engineering, Kalyani

**Technology used:** Python, Keras, Tensorflow

The project aimed to explore the use of Artificial Neural Networks to detect the genre of music, then tune the features and model to improve detection accuracy. We also compared this approach with other machine learning models.

In this project, I prepared a novel dataset that reflects the current trends in music, consisting of 6 genres of music – Metal, Rock, Pop, Rap, Electronic, and Jazz. I then split each audio track into segments of 5 seconds each and performed Fast Fourier Transform to extract the Mel-Frequency Cepstral Coefficients of the audio signal which formed the basis of the features for training our models.

My responsibility then was to train the models, modify the algorithm by introducing certain constraints, and then improve it. We tested our algorithm on novel audio tracks and the results in most of the cases achieved better accuracy than previous work in the field.

## OTHER PROJECTS

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### **Rough Set Analysis Tool**

**Advisor:** Prof. Apurba Paul, JIS College of Engineering, Kalyani

**Technology used:** Python, wxWidgets

The project aimed to design a cross-platform GUI based tool to analyze uncertain systems using rough set theory. The tool can be used for feature reduction and data clustering problems. The tool initially takes as input an XLS or XLSX file containing the dataset, for instance, the Iris dataset. It can then display the rough set and the set approximations for the dataset based on the chosen classification attributes and decision attribute in a color-coded format. The tool can then be used to find the possible minimal reducts for the dataset.

I was responsible for designing the algorithm to find minimal reducts efficiently and for designing the user interface of the application.

## **Lattice Graph Representation of Parts-of-Speech using NLP**

**Advisor:** Prof. Sainik Kumar Mahata, JIS College of Engineering, Kalyani

**Technology used:** Python, Matplotlib

The project aimed to extract parts-of-speech from text using Natural Language Processing (NLP) followed by representing the extracted data using lattice graphs. The lattice graphs could then be used to generate strings of text with similar meanings.

I was responsible for extracting the parts-of-speech from the text and forming the lattice graph representation using the extracted information.

## **FileGuard – File Encryption Utility**

**Technology used:** Java, JavaFX

**Website:** <https://fileguard.pratanumandal.in/>

Developing and maintaining a utility for file and folder encryption using up-to-date encryption algorithms since 2015. The latest version uses AES-GCM-256 for file encryption and Argon2 for password hashing. It also supports file compression and is designed to run on Windows, Linux, and OSX.

## **XenBolt Password Manager**

**Technology used:** HTML, CSS, PHP

**Website:** <https://xenbolt.pratanumandal.in/>

Developing and maintaining an online service for password management using up-to-date encryption algorithms since 2019. It currently uses AES-GCM-256 for data encryption and BCrypt for password hashing. It supports user accounts, email account verification, and password export to the registered email address.

## **Expr4j – Expression Evaluation Library**

**Technology used:** Java

**Website:** <https://github.com/prat-man/expr4j>

Developed a Java library to evaluate mathematical expressions using Dijkstra's Shunting Yard algorithm. I am currently rewriting this library using generics to allow it to be extended for any type of operands. It is available as a dependency on Maven Central.

## **File Transfer System**

**Technology used:** Java, Javascript, CSS

**Website:** <https://github.com/prat-man/File-Transfer-System>

Developed a Java based file-sharing web application to share files efficiently over LAN. It is cross-platform and can be deployed on any platform that supports Java. It serves a secure location on the host computer over a port, and other devices on the same network can access the endpoint to upload or download files and folders. Access to the endpoint can be restricted with credentials, which can be configured through a configuration file.

## PUBLICATIONS

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- **Pratanu Mandal**, Ira Nath, Nihal Gupta, Madhav Kumar Jha, Dev Gobind Ganguly, Souvik Pal: *Automatic Music Genre Detection using Artificial Neural Networks*: Fourth International Conference on Research in Intelligent and Computing in Engineering (RICE 2019), Hanoi University of Industry, Hanoi, Vietnam, August 2019

## CO-CURRICULAR

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- Assisted Dr. Amit Ghosh, Texas A&M International University, to significantly extend a dataset in his field of work by designing Python based tool with multi-threading support.
- Attended *AIT Education Camp & Study Tour 2017*, held at the Asian Institute of Technology, Bangkok, Thailand (sponsored by JIS College of Engineering, on basis of merit across all disciplines)
- Completed course *Introduction to Machine Learning* as a top 5% scorer, from NPTEL, organized by IIT Kharagpur
- Completed Summer Industrial Training on *Big Data – Hadoop* from Ardent Computech Pvt. Ltd.

## EXTRA-CURRICULAR

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- Maintaining and contributed to multiple open-source projects
- Received Rashtrapati Award (President's Award) for Scouting (Highest award in India for the Boy Scouts Movement; awarded by the President of India)
- Coordinator of Tech Team for Bosco XpreZns 2013, Don Bosco School, Bandel (Annual inter-school competition organized by Don Bosco School, Bandel)
- Amateur guitarist