# Sajal Goyal

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## Educational Qualifications

| Year | Degree/Certificate | Institute | CGPA/% |
|---|---|---|---|
| 2018 - Present | B.Tech | Indian Institute of Technology Kanpur | 8.2/10 |
| 2018 | CBSE – XII | Kautilya Sr. Sec. School, Kota | 89.8% |
| 2016 | ICSE – X | St. Peter's College, Agra | 95.3% |

## Honors and Achievements

- Secured **1st** position in **FinFest Pan IIT Equity Portfolio Management** competition, with **1000+** participants
- Secured **1st** position in **Stock the Stock** competition by Entrepreneurship Cell, IIT Kanpur with **150+** participants
- Secured **27th** position in **Data Science Hackathon**, organised by **Trell** with **2000+** participants
- Secured **All India Rank 1981**, JEE Advanced 2018 amongst 160,000 candidates

## Professional Experience

**KPIT Technologies | Data Science Intern** (*Mentor: Mohammad Shadan*) *May'21 - Jul'21*

| | |
|---|---|
| **Objective** | • Detect cycles in **engine oil change** data of vehicles using unsupervised **Anomaly Detection** techniques |
| **Strategy** | • Applied LOWESS smoothing on various sensor data to remove outliers and increase efficiency of algorithms<br>• Performed unsupervised **feature selection** using **Deep Neural Network** and bountiful visualizations<br>• Developed **Autoencoder** model to reconstruct features and get **MAE** which was further processed using sliding window of **EWM** average, **Three-Sigma** Limits and sliding window sum to detect anomalies |
| **Impact** | • Achieved **85% recall** on predicting anomalies in engine oil cycle and **<5% reconstruction error** mean |

## Key Projects

**Tweet Sentiment Extraction** (*Science and Technology Council, IIT Kanpur*) *May'20 - Jul'20*
- Built **NLP model** which takes tweet and sentiment as input and outputs part of tweet which represents that sentiment
- Performed **Exploratory Data Analysis** and stacked some layers on top of **RoBERTa** to increase robustness of the model
- Integrated a **5-fold cross validation** using **Stratified** sampling to reduce overfitting and accomplished **0.715 jaccard score**

**Autonomous Underwater Vehicle** (*Mentor: Prof. Mangal Kothari*) *May'19 - Mar'20*
- Designed **Detection** and **Tracking** algorithm to detect complex objects and their centre under water using **OpenCV**
- Created **multi-class labelled underwater dataset** for training the State-of-the-Art real time object detection system
- Tweaked the vision layer in the codebase to complete **image processing** tasks meticulously while improving its robustness

**Self-Driving Vehicle Simulation** (*Mentor: Prof. Venkatesan Kanagaraj*) *Jan'20 - May'20*
- Pre-processed the **Point cloud** data, collected by Velodyne's Puck lidar sensor(VLP-16), in MATLAB to remove invalid points
- Implemented code to differentiate ground points while getting bounding boxes of different objects by **DBSCAN** algorithm

**Playing Atari with Reinforcement Learning** (*Science and Technology Council, IIT Kanpur*) *May'20 - Jul'20*
- Implemented **Reinforcement Learning** algorithm for **Markov Decision Process** with raw pixels of current state as input
- Incorporated **Experience replay** to reduce overfitting and reached human level accuracy with **10+ hours** of training

## Research Experience

**Changing the Game: The Rise of Sports Analytics** (*Mentor: Prof. Faiz Hamid*) *Jan'21 - May'21*
*Research paper going to be published in* ***Journal of Sports Sciences***
- Reviewed **Sports analytics** work for **Decision making** with **16** critically analyzed papers selected using **PageRank** algorithm
- Employed **Network Analysis** on bibliometric data of **127 research papers** to investigate the emerging areas of interest
- Explored **State-of-the-Art** techniques in Football analytics and studied its trends over the years with **Stacked Histogram**

## Positions of Responsibility

**Software Team Head** (*Team AUV*) *Apr'20 - Mar'21*
- Spearheaded a group of **7 people** working on Autonomous Vehicle's software, planning and implementing technical changes
- Represented team at various exhibitions to share our experience with others and handled administrative and managerial tasks

## Skills

**Data Science**: SQL, Tensorflow, Keras, Pandas, Scikit-learn, Numpy, Matplotlib
**Programming Languages**: Python, C, C++ | **Robotics**: ROS, OpenCV | **Utilities**: Git, LaTeX, MATLAB, Excel

## Relevant Coursework

Introduction to Machine Learning
Applied Probability & Statistics
Data Mining & Knowledge Discovery
Computational Methods in Engineering
Fundamentals of Programming
Operations Management