My interest in Data Science was piqued when I happened to watch a video titled "Build an AI Composer - Machine Learning for Hackers" about two years ago. This was when I learnt about automation and how most industrial processes are slowly getting automised. Coincidentally, I happened to do an internship in this field during this time where I learnt a lot from my research project, my colleagues, and my mentor about data science. By the end of my internship, I was able to solve basic problems using R programming. As I started exploring more about this field, I identified the applications of machine learning in music which has been my passion since childhood. I was fascinated by how machine learning concepts could be used to instruct a computer to generate music. At this point, I took several online courses and tried to apply my theoretical concepts for real world applications. Some of the problems I worked on were the Titanic Survival Prediction problem and the Boston House Price Prediction problem using different machine learning algorithms. I soon realized that building machine learning models was simpler than working with data, and so I began concentrating on data cleansing to perfect my techniques. My hunger for knowledge and my desire to contribute to the field of research kept growing, and in order to become an expert in my field, I now wish to pursue my postgraduate education in Data Science.

Since high school, I have been deeply interested in Computer Science and have always been curious about the myriad applications of computers in the real world. In order to learn more about computers and their applications, I decided to pursue my undergraduate education in Information Technology. During this period, the subject that I enjoyed the most was Machine Learning and eventually, I became capable of writing algorithms from single layer perceptrons to deep neural networks. When I started writing algorithms, I realized the importance of calculus and its applications in the field of machine learning, and started paying more attention to this course. Another subject that I enjoyed deeply was statistics as it was directly associated with data science, and I was able to apply statistical concepts on data analysis problems.

As my interest in machine learning and data science grew, I wanted to acquire practical experience and learn about the various techniques in these fields. I took the initiative to work on several projects such as Emotion Recognition using Deep Learning, MNIST Digit Classification, Employee Promotion Predictive Analysis, and Uber Data Analysis. These projects gave me a tremendous amount of knowledge and experience, and I learnt several tools such as Pandas, TensorFlow, Keras, and Numpy.

After gaining considerable experience and confidence in handling data, I decided to use my skills to work on a more advanced project. I developed an Automatic No Ball Prediction System where I built a classifier that predicted if a ball was illegal or not using a customized dataset. The results would instantly be sent to the umpire who could then make an informed decision. My prototype model was capable of achieving an accuracy of 85% and through this work, I was able to see how data could be used to increase accuracy of error prone tasks.

Having seen the applications of data science in sports, I wanted to explore a bigger and more risk-prone industry – healthcare. This was also the time that I had completed several MOOCs from Coursera and I wanted to test the applications of different convolutional neural network models on a

dataset. Hence, I worked on Knee Osteoarthritis Deformity Classification where I trained a model to predict the deformity levels of the knee. For this, I used a publicly available OAI image dataset and Google Colab for training the model. I was able to achieve an accuracy of 72% in classifying the X-ray images into categories. One of the problems I faced while executing this project was that the radiographic images had a lot of noise that was affecting the performance of the model. Another problem was that the data available was significantly low causing a lot of images to be misclassified. Hence, I had to perform extensive cleansing and reorganization of the data, greatly boosting my data handling abilities. Later, when I performed a comparative analysis, I was able to understand the architecture of popular CNN models and appreciate their differences. Eventually, I acquired expertise in hyperparameter tuning and optimization.

Venturing into a different industry, I was eager to use the concepts of artificial intelligence for the benefit of farmers. Hence, I undertook a project on Automated Crop Growth Monitoring System to accurately predict the growth stage of rice and compare the accuracy obtained by different CNN models. What made this project challenging was that the dataset used wasn't available publicly, and I collected and preprocessed the data manually. Cameras were placed around the farmland to continually feed images to the predictive model. If any image was found to show an improper growth in the rice crop, the farmer would be notified immediately. The tools I used for building the model were TensorFlow, Keras, and OpenCV, and I used transfer learning to further increase the accuracy of the model. The novelty of this project was that it did not use any sensors or artificial intelligence systems for monitoring crop growth, only a predictive model that was trained using convolutional neural networks.

Eager to acquire real world experience in the fields of machine learning and data science, I worked as a Data Analyst Intern at Allsec Technologies. During this period, I extensively used R studios to explore, visualize, and build a model using machine learning algorithms to derive meaningful insights from the given data. In the true sense, this internship was where my journey in data science began and I learnt several machine learning algorithms that I could use to address real world problems.

In order to delve deeper in the fields of machine learning and artificial intelligence, I attended a training program conducted by Expertshub in JSSATE, Bangalore. During this time, we were familiarized with various machine learning algorithms and encouraged to apply these in various scenarios. I used my knowledge acquired during this program to build a model that could compress an image of any dimensions to a lower resolution image without appreciable loss of quality using the SVD algorithm in Python. This training program helped me deepen my knowledge and skills in using machine learning algorithms for different purposes.

Currently, I have been selected for a research internship at IIT Madras, where I intend to use my knowledge of machine learning algorithms for enhancing hardware security to prevent Trojan attacks. All my projects so far have helped me understand the applications of my knowledge in different industries, and I now look forward to using my skills in preventing security threats as well. Despite my experiences in using machine learning algorithms for various purposes, I want to gain more advanced knowledge in this field for building higher level models for automating industrial processes. To achieve

this, I intend to pursue a postgraduate education in Data Science. After completing my higher studies, I wish to work as a machine learning engineer in the research and development department of a renowned company where I can contribute my efforts in the development of innovative products. After acquiring some work experience, I wish to pursue my doctoral studies on deep learning models. Eventually, I wish to work for the benefit of the society through my research and contribute to ongoing artificial intelligence projects for the conservation of the environment.

In order to make use of machine learning algorithms and data science models for real world applications, I wish to take up a postgraduate program in Data Science at _____ University. The numerous research projects that I have worked on during my undergraduate period have given me a strong command over the concepts. I now wish to deepen my understanding of the field and become up-to-date with the most recent trends in machine learning and data science. I intend to acquire a strong skill set by pursuing several exciting and challenging projects at your state-of-the-art research facilities. Being guided by accomplished faculty such as _____ and _____ at your premises will help me take my projects to the next level and acquire a more comprehensive understanding of the field.

My experiences in implementing concepts of machine learning and data science for various real world applications have given me a strong knowledge of my subjects, and I am confident that my aptitude and passion for data science will help me stand out at your campus.