Chapter I

Projects and Research

1.1 Thesis

1.1.1 Thesis Title

My Final year research was ”Inventory Demand Forecasting using E-commerce Big Data” is a forecasting based reseacrch on historical data using Map Reduce framework to forecast demand effectively.
The research focues on providing an easy and reliable platform to minimize the delivery time and stock cost.

1.1.2 Tools and Technology

For research we have used Appache Hadoop because it can efficiently store and process large dataset.It has reliable and low cost HDFS and High level data processing implementation of Map Reduce algorithm. Also we used traditional time series model as traditional machine learning algorithm is not compitatable with time series data.

1.1.3 Role in the Research

My role in the research was to build up a ”Data Preprocessing Algoritm” using Map Reduce framework to make sure finding a small size of dataset for the time series model.

1.1.4 Description

Situation: We thought that delivery time and stocking cost is a key factor of e-commerce. Also e-commerce producing huge amount of data.So it is a difficult task to processing huge amount data. We aimed to process the huge amount of data in less possible time and minimize the delivery time and stocking cost by forecasting demand effectively.

Task: I started to set up hadoop on windows but windows is not compitable with hadoop. So, I moved to Ubuntu. Then I desinged an algorithm for preprocessing the data for Map Reduce. As we did not get huge amount data, we worked only 100k rows UK based online retailer data.After performing MapReduce the 100k rows of data became down to 700+ rows which are appropriate for time series model. Then I used ARIMA followed by SARIMA as the dataset contains seasonality. SARIMA model perform better than ARIMA in term of error rate.

Action: Finally Me and My teammate built up a Hybrid Model combination of Map Reduce Framework and time series model which can forecast the demand of a particular product in a particular zone.

Result: Finally we can say that our proposed method will be reduce the deliervery time and stocking cost by forecasting demand.We want to build up DARIMA model as it is less time consuming.
The abstract of the paper is Accepted in International Conference on STEM and the Fourth Industrial Revolution 2022.

1.2 DataBase Lab (DB)

1.2.1 Project Title

My 1st major project was related to database management , an automated shop management and it is a desktop based application.
The project focuses on providing an easy and reliable platform to maintain a shop.

1.2.2 Tools and Technology

For the project, we used a simple CRUD based database management using C#. We used C# as it is the most practical language for writing desktop application.

1.2.3 Role in Project

My role in the project was to design Database for our project.

1.2.4 Description

Situation: It is a difficult task for a shopkeeper to keep track of products availability and the balance sheet. We aimed to reduce this difficult task for a shopkeeper.

Task: I started to design the ER diagram. Sometimes my teacher helped me to designed the diagram. After getting the diagram I had having a hard time to find out the database table. But I found out product table, customer table, employee table. With help of C# I implemented my part.

Action: Me and my teammate finally built a desktop application for a shop which can trace stock of the product, sales records and employee information in the database.

Result: We provided an easy and user friendly application. Now the users can operate a shop using less hard labour. But we thought that the area of improvement of this project is to providing digital billing system.
How did you overcome the difficulties and challenges during the projects.

1.3 Software Development Project (SDP)

1.3.1 Project Title

"KU CSE Offline Judge" was an offline programming judge application. It was my 3rd year software development project.
The main theme of the project was to make lab test evaluation automatic.

1.3.2 Tools and Technology

For the purpose of this project we used Java Socket Programming for the server and GNU compilation(GCC) module for judging.

1.3.3 Role in Project

This project had two part one for server part and other one is Judging and Ranking part.My role in the project was Judging and Ranking part.

1.3.4 Description

Situation: We realized that it is a time consuming and not an efficient task for a teacher to take lab test with his own problem set. Because he needs to go every student and evaluate it.

Task: I started to develop judging part first. I worked only C and C++. I used GNU module for checking compilation error.If the program compiled successfully then I took the input as a file and generate output as a file. Now I checked TLE using the equation execution start time - execution end time. After that getting the output file I checked it with actual output file. By this I was checked WA. Except all these scenario I considered the problem is AC.
Then I built Users ranked list according to the highest sum of the ACCEPTED problems and minimum time penalty.

Action: Finally our team effort was sort of turned into a Normal Judge. After judging a problem the contestant can get one of 4 responses AC, CE, WA, TLE.

Result: We provided an application where a teacher can easily take lab test with his own problem set. We thought the area of improvement is the judge will be available for more language like Python, Java. Also make it special Judge.

java socket = tcp/udp = communication protocol. server c/c++ = gnu, java = java jdk time limit = execution start - execution end gnu = code + input

1.4 Web Programming Lab (WPL)

1.4.1 Project Title

My 3rd year web programming lab ”COMMUNICATION MODULE DEVELOPMENT” was a chat application.
This is a simple group chat application to demonstrate the idea of the one you see in WhatsApp messenger with the localhost server.

1.4.2 Tools and Technology

To implement this application successfully, we have to build the CSS and JavaScript for styling the UI, HTML part to render it, PHP code for storing and retrieving from the database.

1.4.3 Role in the Project

My role in the project was to build up database creation portion and storing data in the database.

1.4.4 Description

Situation: University automation is a huge task. It contains many module like registration, course plan, transport and so on. We thought that we can a new module that is chat module. Because it helped people to communicate each other.

Task: For this application I created a database named chat_app. I also created a table named chats with the fields “username”, “msg”, “date”.

Action: Finally Me and My teammate built up a chat application where user can make a group and share message each other.

Result: We provide an application which could be added on University automation project. And people can share their message each other. The area of improvement of our project that as we only work for group chat, we should work on personal chat system.