TED UNIVERSITY

Faculty of Engineering

Department of Computer Engineering

CMPE 491 (Senior Project 1) – High Level Design Report

by

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1 Introduction

1.1 Purpose of The System

As one of the most hyped terms in the market, Big Data also took the interest as senior projects. On the other hand, there is one more topic that is as popular as Big Data which is social media. This situation leads us to do a project that combines both these important and popular topics. Nowadays most of the software companies It is a very exciting area to work in because big data has lots of demands on the software market and social media has lots of users. Thus, we thought that it would be a very important thing in a couple of years. So, creating a big data system that predicts communities through social media data will change the eCommerce world and advertising work. The main reason for this change is, advertisement companies will know what kind of advertisement will be better for specific groups, and eCommerce companies can easily define their possible customer's thanks to these kinds of systems.

As we know that commercials are very important for e-commerce and companies that work for commerce. Nowadays lots of companies prefer advanced, faster communication platforms like social media to advertise their products and reach out to more customers. We figure out if we can create a system which finds the communities in the social media and gives information to companies about these communities. For this purpose, the best thing to do is creating a system that helps these kinds of companies with big data systems. That’s why as a project group we decided to create a system for eCommerce and advertising companies. This system will search through hashtags, keywords, and comments through social media and it will find user’s communities by their social media sharing. This will help companies who want to advertise their products. By using this application company can easily find their communities that are related to their product. Additionally, these popular communities can be a great way to advertise their products through social media. The latter feature will be for companies who want to see their competitors' results so that they can build their marketing strategy by investigating their competitors' strategy.

1.2 Design Goals

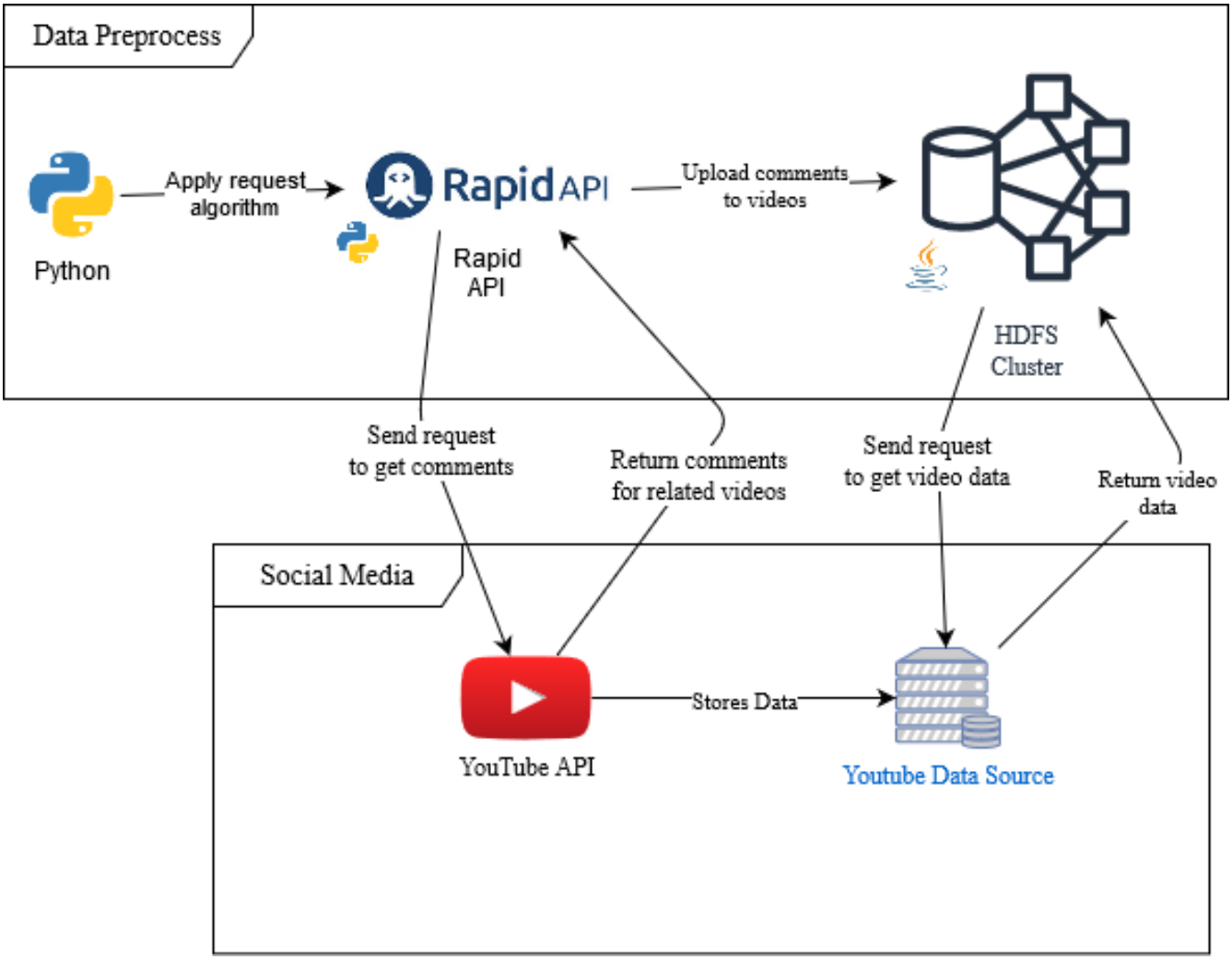
In order to have the desired design we must consider some requirements. For example, we should work with the most efficient tools to make our analyses like Apache Spark and Pycaret. This will reduce the time for displaying results. On the other hand, to decrease process time we should divide our CPU power to group members. And apply same things in each computer. This was the reason why we use Hadoop Distributed File System. It allows us to divide the work into the pieces quite easily. Our goal as a good design to have updated data in a time period. For example, we should be able to refresh our data once a week or more. The search engines for data must implement requirements efficiently to save time and cost less.

1.3 Overview

The “AdAppt” project is a combination of different areas. Such as; marketing, bid data, social media, social media marketing, machine learning and data analysis. Thanks to this combination it may work in any area that consist of data. Our project’s aim is creating the system that finds communities from social media sharing’s and the tags of the sharing. After that project's specifications can change with the customers' wishes. Since our system is working with social media data that means our customers will be the companies that want to sell their products or companies that want to analyze their market through social media. Thanks to this system our customers can also check the demand for their products. For example, since we will take our data frequently, we can see the new comments, also we can check changing demands. This was a simple example of telling what “AdAppt” project will work on.

Since currently we are working on YouTube data, we decided that checking video tags is the best way for the community analysis. For example, the “AdAppt” system will check the videoID’s tag and it will show predict the community/category of the video. After that we will look at the comments that is related with the tag and we will report the author_id of this comment, which will help for putting the YouTube user to the according community. The other important question is “what will be our costs?”. Since we will do all the work as software and we won’t need any hardware most probably our cost will be 0$. However, since we are collecting our data from RapidAPI which is free for 500 data per day maybe we will need to buy access to collect more data per day, but it is not a case for now.

2 Current Software



3 Proposed Software Architecture

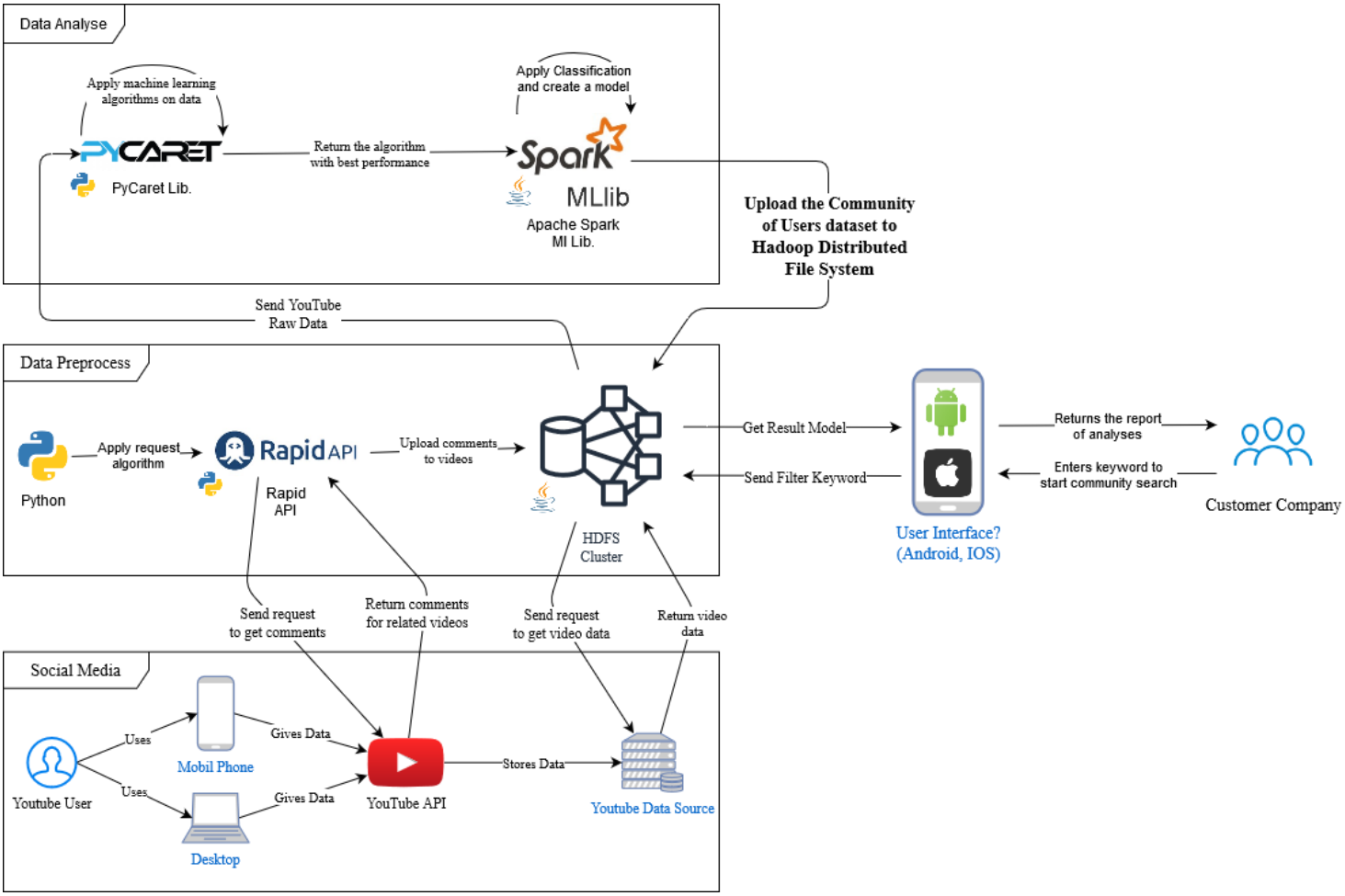
3.1 Overview

For our Project, there are two main requirement groups to be considered. For the first phase, we have functional requirements that include software technologies and other hardware components to run stable and correct analysis over big data. Analyzing big data cannot be done by traditional techs. There must be

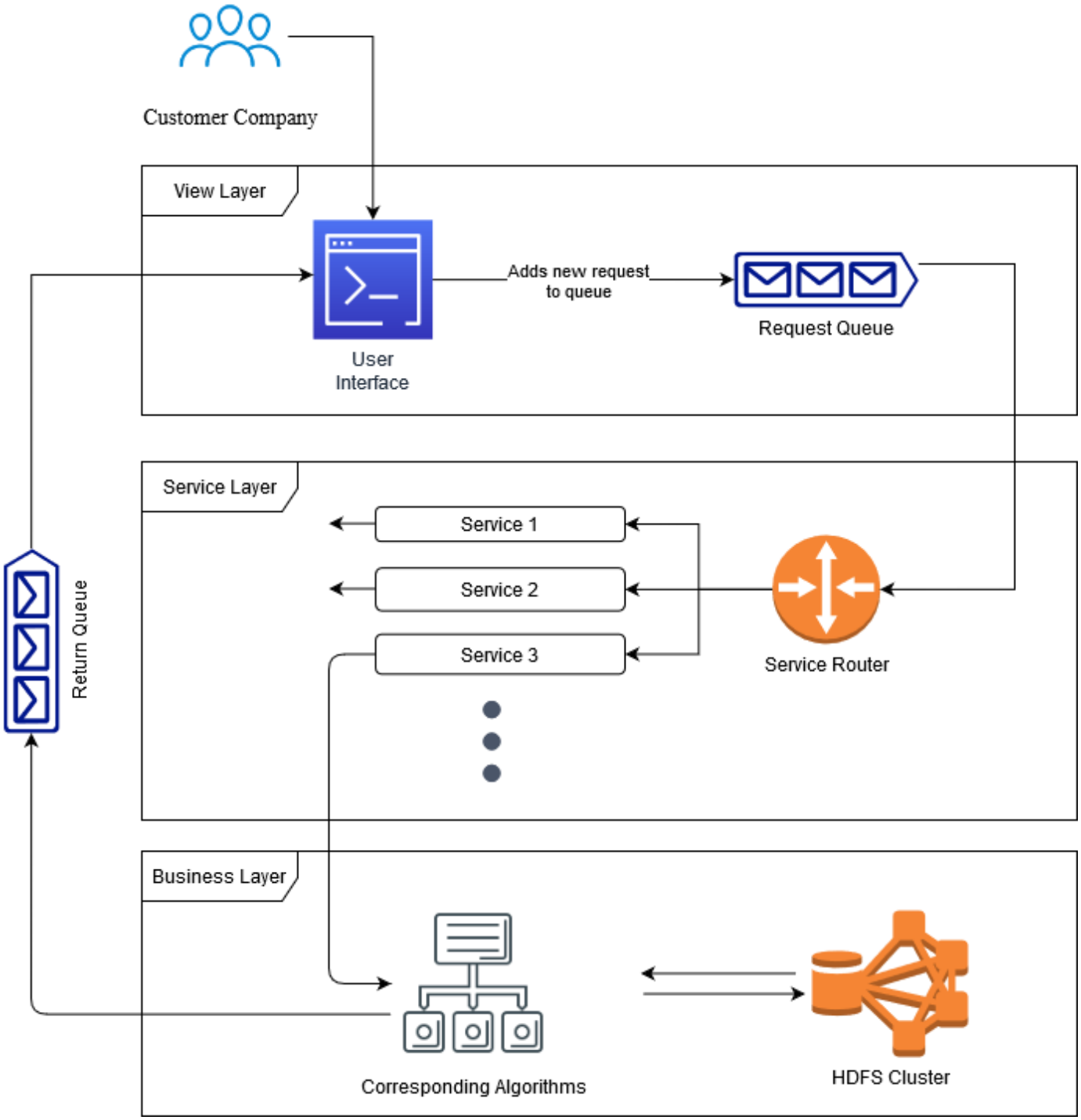
specific tools to compete in the process like the Hadoop environment etc. Analyzing big data requires some hardware specifications with it, like powerful computers and processors. In addition, the plan for

deployment is to convert to a mobile application in which companies and regular users can access and run algorithms better. For that purpose, we need to have an application that can work on many operating systems like IOS and Android. Production should be available 7/24, manage risks like information security, back-up, etc.

On the other hand, we need to clarify the nonfunctional requirements. We should have satisfied users. To achieve that goal, we are going to plan our requirements to reach maximum customer happiness. We aim to achieve a user-friendly application, with all the risk management and legal issues.



3.2 Software Mapping



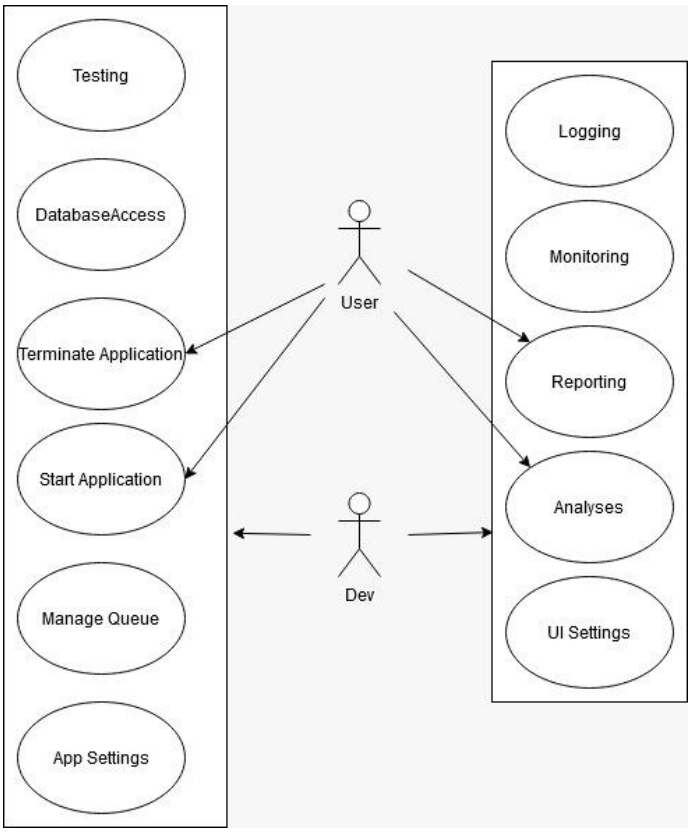
3.3 Persistent Data Management

In our application there won't be any persistent data about our project because data will change all the time in real life application. However, since the problem of the access to the social media datasets we have a YouTube dataset which is consists of Video_ID, comment_ID, Author_ID, … To store these data, we are using apache spark which is very useful for big data applications. On the other hand, we have done some data preproccesing with python which helps us to getting used to data.

3.4 Access Control and Security

In our project we wanted to create an application and a website. The users can access the application by creating account. For this purpose, we will use Google's Firebase tool which stores user data into database paths. For storing and accessing these paths, Firebase Security Rules work by matching a pattern against database paths and applying some conditions to allow access to data at those paths. In Firebase Products there is a path-matching component and a conditional statement that allows reading and writing access. To access to those paths, we should define some rules for each Firebase product which are in the app. About security, Firebase services governed by the Goggle Cloud Platform which is one of the most secure platforms about clouding that's why we don't have any concern about it.

3.5 Global Software Control



3.6 Boundary Conditions

The boundary conditions that exist in our project are:

-Starting the application

-Terminating the application

-Failure of the application

Starting Application: The main way to initialize the application is to have a browser. To open the mobile version of the system, our application must be downloaded to the smartphone. In order to use the application users must be registered and logged in. In a failure in this process will lead user back to the login page. In addition, an active internet connection is required.

Termination: Logout button will be used to terminate the application. Also closing the application will also terminate it.

Failure: The application will fail without an active internet connection. The application will go into offline state. No actions can be performed in that state.

4 Subsystem Services

4.1 Functional Services

4.1.1 Performance

For efficiency all the algorithms and analyses must be done in great performance. We don't want unhappy customers so process should be fast and effective. Also, there should not be any bugs at the end of the project.

4.1.2 Reporting

Customers can display variance of reports in order to better understand the results of their analyses. Our program will print out the results in lots of formats like texts or tables. There will be different displays types for different social media platforms.

4.1.3 Traceability

We should trace the events and their effect to our project in order to make it more efficient. We must know the work principles of each system and algorithm to design better products.

4.1.4 Operating Systems

Our system must work on both ios and android operating systems. In future we can develop our project as a desktop application. In this case we should make it compellability to windows Linux and mac operating systems.

4.1.5 Maintenance

Our team should run performance and correctness check in a plan in order to balance the maintenance of our project. As a requirement we begin to plan our test dates for project.

4.1.6 Security

Information security is the most important thing for our project. Because we are working on bigdata and real world datas. For that reason, we cannot allow anyone to use our private data for another reasons. For both mobile and desktop applications we should run security checks on each operating system to have a secure application.

4.1.7 Real Time Estimation

Another important thing to be consider is to have an application that can real time estimations. As new datas arrive to our system we should analyze and update the system eventually without storing them for future progress.

4.1.8 Accessibility

Product must be accessible from everywhere. We cannot foresee the future. There might be customers with different equipment's. So as a requirement we need to add an accessibility from everywhere feature to our project.

4.1.9 Back-up and Restore

Backing-up and restoring big data is not an easy goal to achieve. But working on big data comes with responsibilities. We should arrange a storing system and restoring system to decrease customer unhappiness. Not just satisfaction but losing data can cause more problems for analysis.

4.2 Nonfunctional Services

4.2.1 User Friendly

Applying a user-friendly project can lead us to better performance. User friendly interfaces can decrease the distraction for customers and make them easy to develop filters to search communities.

4.2.2 Legal and Compliance

As our team explained before in Ethical issues part, as a requirement we should consider the rules of legality to develop right project. We don’t want any of our customers to complain about the features of our project

4.2.3 Project Risk Analysis

Risk analysis can occur in every phase of project. Testing implementing. Reporting… In each part we should consider the risks and report them as documents. As a requirement applying Risk analysis simultaneously while developing the project is quite important to have bug-free applications.

5 Glossary

API: A tool, or library, that assists developers in writing code that interfaces with other software.

Big Data: Big data refers to the large, diverse sets of information that grow at ever-increasing rates. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered. Big data often comes from data mining and arrives in multiple formats.

Communities: A community is a group of people with shared values, behaviors, and artifacts.

Machine Learning: Machine learning is the concept that a computer program can learn and adapt to new data without human intervention. Machine learning is a field of artificial intelligence (AI) that keeps a computer's built-in algorithms current regardless of changes in the worldwide economy.

Triple Constraints: The Triple constraint theory tells us that every project that is being developed or has been developed in the past, operates within the boundaries set by the three constraints of project management (time, scope, cost).

Data Preprocess: Data preprocessing is a data mining technique that involves transforming raw data into an understandable format. Real-world data is often incomplete, inconsistent, lacking in certain behaviors or trends, and is likely to contain many errors.

Ecommerce: Also known as, electronic commerce or internet commerce refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions. Ecommerce is often used to refer to the sale of physical products online, but it can also describe any kind of commercial transaction that is facilitated through the internet.

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