DIGITIZATION OF POLICE SYSTEM USING LBS AND CLOUD BASED ANALYTICS

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Abstract

A large amount of criminal activities take place in cities, and due to untimely reporting the criminals get away with the crime. In this paper we present a system that will enable the police officials to get crime reports faster and in an efficient manner. And we have also proposed a module which will help the police in the license confiscation and revoking, and also get stolen vehicle alert. The nearest police officials, to whom the users complain will be reported, will be identified using LBS. And the license and vehicle registrations will be stored in mongo DB database. This project is an attempt towards the smart city project.

Keywords –

Android, Cellular Id, Clustering, GPS, LBS.

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1. Introduction

In this digital world, the current police system has very few digitized features. With the increase in crime and corruption, bringing smartness in police workforce has become a necessity. Digitizing these systems will improve the efficiency of the systems .Digitizing can also give various advantages like reducing old file work, detailed description of crimes, ease of communication between common people and police, efficient access of criminal details, ease of police work etc. With this application the civilians can easily and immediately report a crime taking place or has taken place. With faster or earlier reporting of the crime, the police can also attend to the crime faster, thus making a city much safer. To modernize the legacy systems, Give the police system a better and an efficient interface for convenient working, Give the user ease of lodging complaints and an efficient crime reporting to the police. The current system is quite slow and takes a lot of time for different processes. There are many human errors that also occur during these processes. Reporting crime via traditional telephone system is very hectic. Basically we are considering two modules that are police official module and the user module, further more the police official module are divided into three modules that are Complained module, license module and vehicle module. And the user module are divided into two modules that are GPS module and complain module. As we are living in a developing country and it's an era of high-tech so from our side it's a small contribution to the police system to become more smart and digitized. With this system we are trying to aware those criminals that the system has become strong enough to catch you all

2. Description

In this 21st century the mobile and information technology have become an integral part of our lives. A new area where mobile integrated with technology is useful for crime reporting since readily accessible information is not available at any point in investigation this is a key drawback for communication in police department. Thus, using cloud, we will try to make all the information related to the criminals available on the Android Application to the police during their investigation which would speed-up the entire process of tracking down the criminals.

A. Project Scope

In this paper we intend to implement a Cloud-android base police system. This system will have User module, Police module, Cloud server and a database managed by mongo DB. The system will be used by both the civil bodies and the governing bodies. This system aims to bring down the crime rate, and give much faster response to crimes reported.

B. User Classes and Characteristics

The civilian user class:

These users will comprise of all the age groups. This user class will require basic understanding and operation of how to use an android based phone. This class need not have very good technical knowledge about the OS or phone they're using. The main security or Authenticity of the complaints given by the user is determined while the user is downloading the app. The app before starting up will ask for valid credentials, and a certain valid ID-proofs like adhaar card or drivers license. After the credentials are verified the users will be allowed to access the app and its features.

The police user class:

These users will primarily be only the police officials. The police officials will need basic knowledge of how to handle an android based phone. Based on the number of complains in the vicinity of a police official, the frequency of use of the app is recorded. And also depending whether the cop has caught hold of anyone for breaking road rules. The main difference between the civilian users and police users is that the police officials will be given a unique server provided credentials to log-in to their UI.

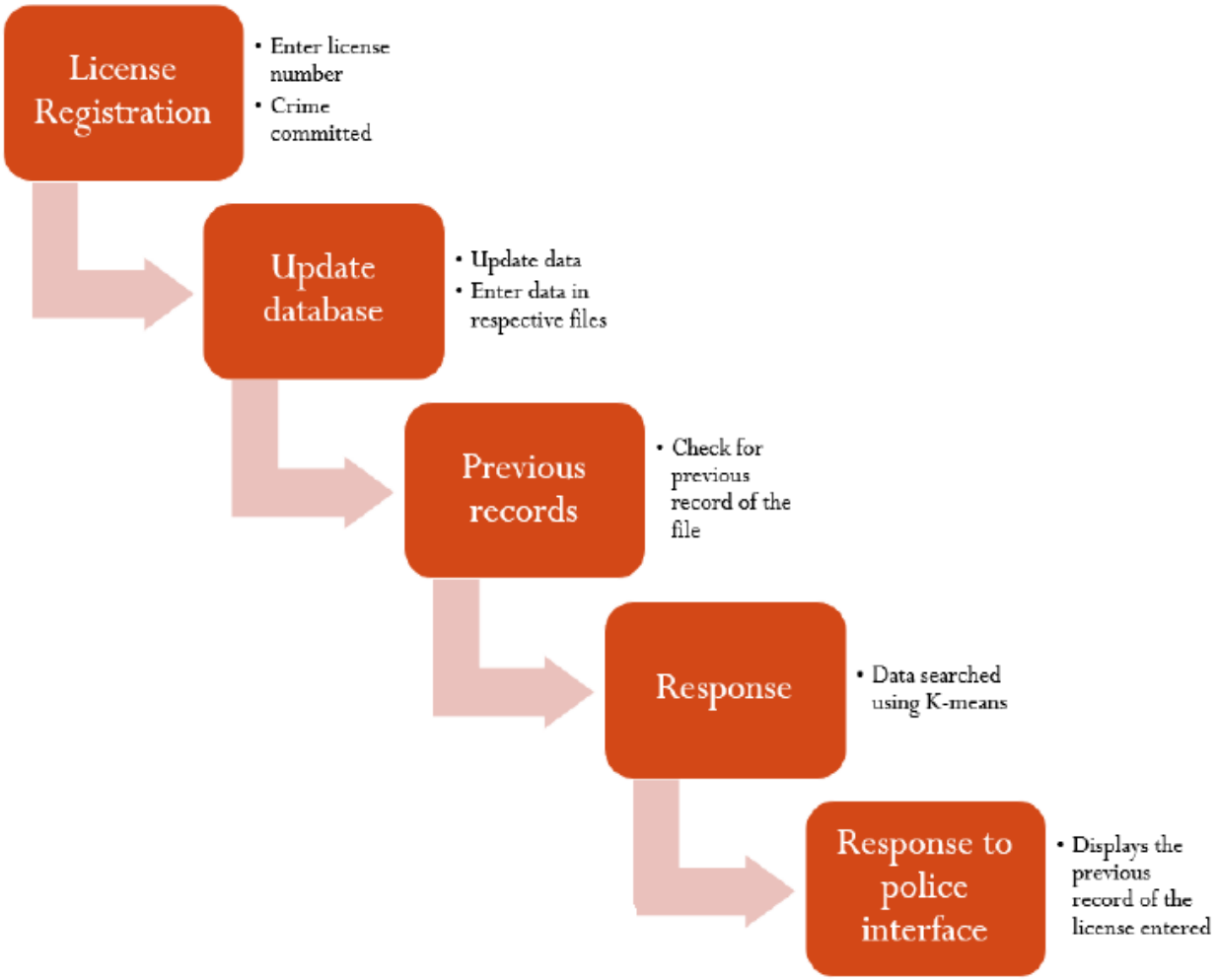

Figure 1: Police module 1 detail

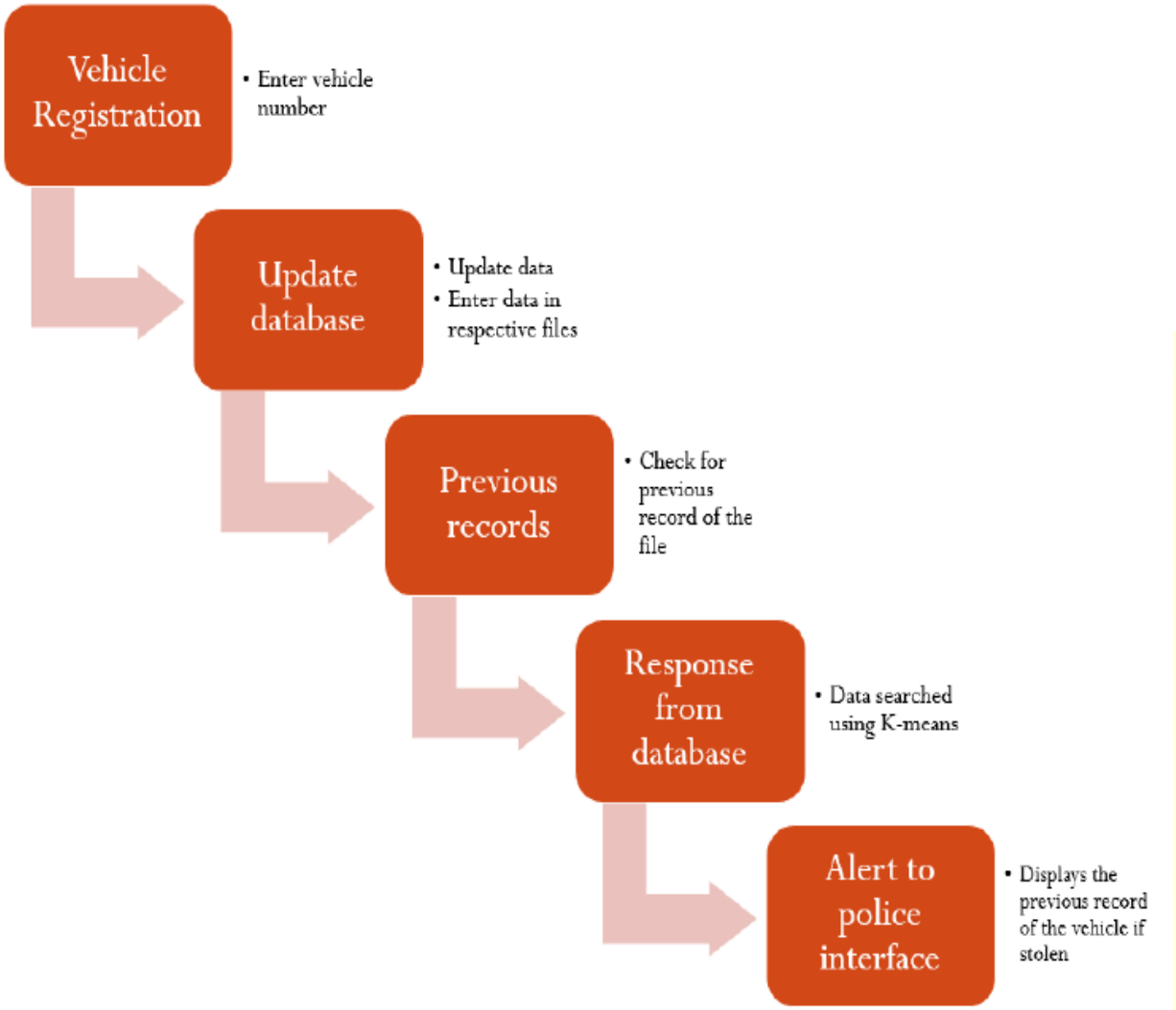

Figure 2: Police module 2 details

C. Operating Environment

This application will run on an android platform phone, the phone should have a decent internet connection or a good Wi-Fi connection. The application will also be using the phone's GPS hardware.

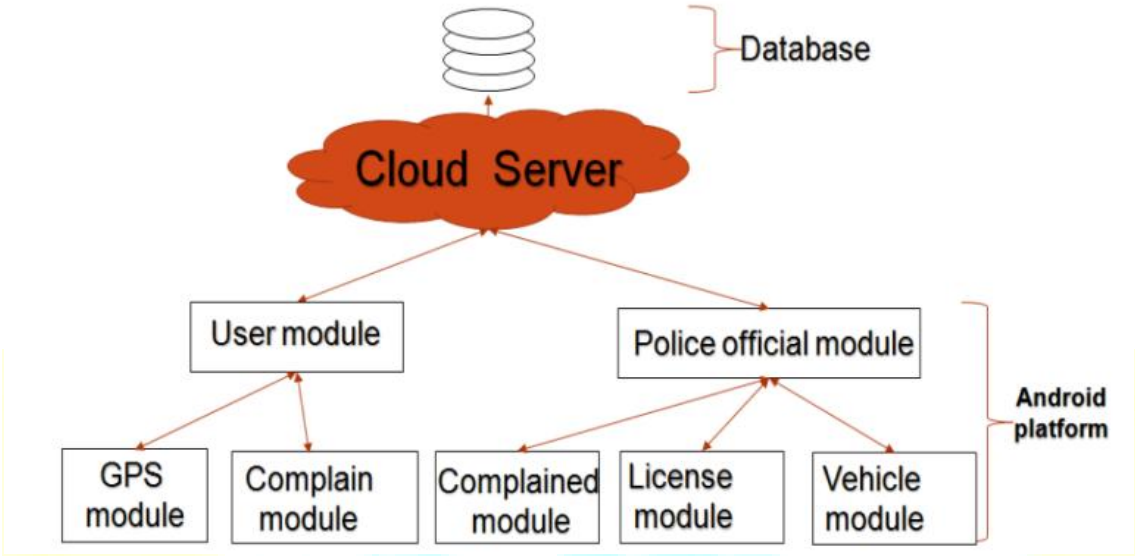

Figure 3: This fig shows the module wise details

3. System features

A. Crime registration

In our system, the user is given multiple features. One of the feature is, to register an ongoing crime and to send or tag their location with the description of ongoing crime.

B. Description and Priority

To register an ongoing crime and to send or tag their location with the description of ongoing crime. Now, the crime registered will be sent to all the nearby police officials, or the nearest police station's officials. This feature will be provided using LBS. This feature holds maximum priority for a civilian user.

C. Functional Requirements

For this feature to work perfectly we need good internet access, and a working GPS component in the phone. And for the user to be able to lodge a complaint he must be authorized to download the app. The authorization is done by checking the validity of the authenticity of the user's ID proofs.

4. Overview

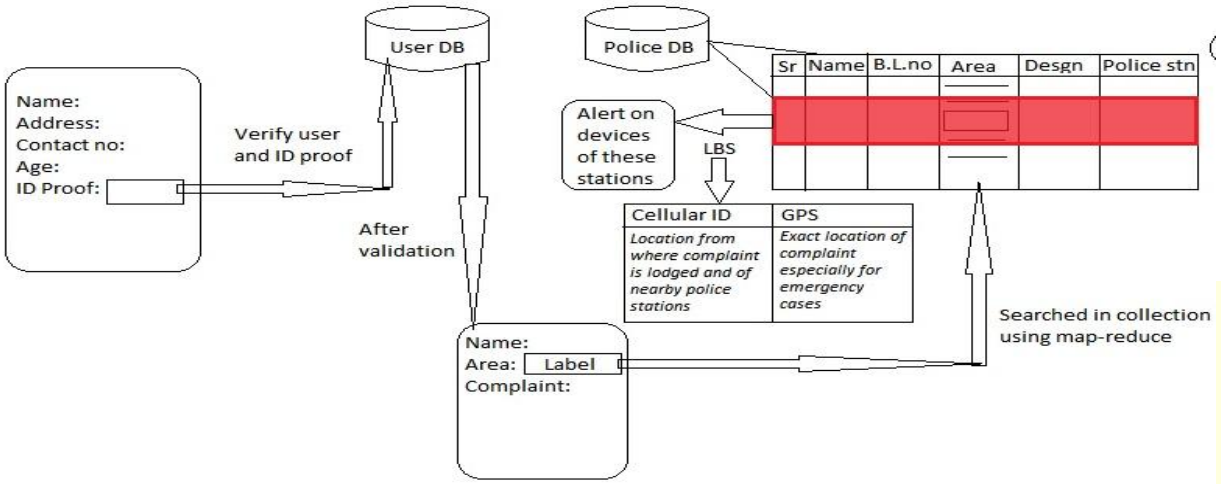

Figure 4: This fig shows the interaction of user and database.

A. Location based service

Most of Location Based Services require several components. This paper proposes the model of "5+1" components of LBS – five technological and 1 human related:

Positioning systems – allow geographically localizing the mobile device both outdoor and indoor using: satellite-based systems, Cell-ID, RFID, Bluetooth and Wireless LANs.

Communication Network – the wireless network that allows for transfer of data between user (thought mobile device) and server (service provider). Nowadays it is in most cases wireless internet (e.g. GPRS, 3G and 4G)

Service and Application Provider – the LBS provider, including the software (e.g. GIS) and other distributed services and components that are used to resolve the query and provide the tailored response to the user.

Data and Content Provider – service providers will usually not store and maintain all the information, which can be requested by users. Therefore geographic base data and location information data will be usually requested from the maintaining authority (e.g. mapping agencies) or business and industry partners (e.g. yellow pages, traffic companies).

Mobile Devices – any portable device that has capabilities to utilize stated above components of LBS, for example: mobile phones (including smart phones), tablets, palmtops, personal navigation devices, laptops etc.

User – operator of the mobile device and the person that is utilizing potential of modern mobile device and infrastructures in order to get value added information or entertainment.

B. Global positioning system

LBS uses a Smartphone's GPS technology to track a person's location ,if that person has opted-in to allow the service to do that .The service can identify his or her location down to street address without the need for manual data entry

C. Cellular ID

Cell ID is the ID of the cell phone tower your phone is connected to. The moment you move a bit or the signal of another tower nearby is better than the current one, your phone will switch over to that tower and your Cell ID now reflects the ID of that tower

D. MongoDB

The database used here is the leading big data database MongoDB. It has the following advantages

Document Oriented Storage

Index on any attribute

Replication & High Availability

Rich Queries

Fast In-Place Updates

Professional Support by MongoDB

5. K-means clustering

K-Means is the cluster analysis method we use to look at geo similarity /overlap. In order to take advantage of this method, we use the inherit MongoDB geo-indexing mechanism to quickly spatially access data by geographic region .Segregation of this data allows us to quickly perform K-means clustering on this data alone without having to jam the data alongside other event. This clustering technique helps the police to analyze the criminal data in detail based on a particular geographic area. Fig 2 below gives a rough idea about the working of k-means algorithm

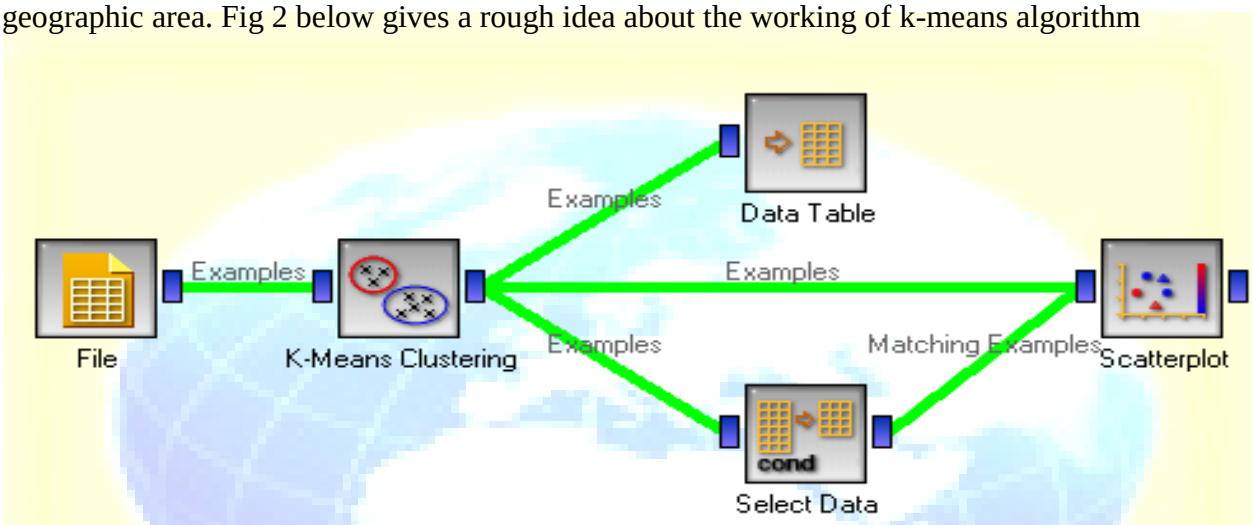

Figure 5: This fig shows the overview of k-means clustering working.

6. Non functional requirements

A. Performance Requirements

In a certain scenario, when there are multiple user's logged-in and registering multiple complaints, then the system might take some time to upload the complaint. Now since the police may not be able to attend to the complaints immediately, they might take some time to attend the complaint and respond to the ongoing matter. And for the GPS module to work flawlessly, the mobile GPS should get GPS connectivity.

B. Security Requirements

As our paper has certain modules such as Customer log-in and police log-in, it should be ensured that that the customer and police User name and Password or any such credentials should be confidential and should not be shared with anybody. The customer and police credentials, the

complaints lodged by the customers, etc should be stored securely into the database. Thus the security requirements for storage of data should be taken care of by incorporating a robust and proven Database into the system, reliable performance and integrity of data is ensured. There must be a power backup for server system. Since the product is of 24 x 7 availability there should be power backup for server which provides the information. Every day the data should be backup even when the operation of a user is not successful i.e., while performing the operation power failure occurs then data should be backup.

7. Data Analytics

Police forces across the globe are constantly under pressure to respond swiftly to critical incidents while working with increasingly limited resources. Law enforcement organizations are turning to technology to help solve this conundrum by finding ways to not just fight crime, but prevent it. At the forefront of this adoption is predictive policing—a technique that has acquired newfound importance with the advancement of big data analytics. In an attempt to harness the power of big data, organizations are using advanced analytics programs to assimilate vast quantities of information to predict, identify, and prevent crime. From social media information to traffic reports, and public records to informant tips, the law enforcement industry has access to a substantial amount of data. Spread over disparate and legacy systems, this information can be hard to organize, but can generate invaluable information. Key to utilizing this intelligence are easy-to-operate data capture tools and clear, standardized information security policies. Collection and analysis of Big Data are crucial to business and government in order to be sustainable and competitive in industry. As criminals are becoming smarter and more creative using the Web, law enforcement agencies are in need of technology to allow them to stay one step ahead. With the amount of knowledge Big Data can provide, public safety officials have an obligation to protect the wider community. Data analytics helps forces to predict crime as well as investigate it. Fig 3 shows a rough idea about the working of cloud based analytics

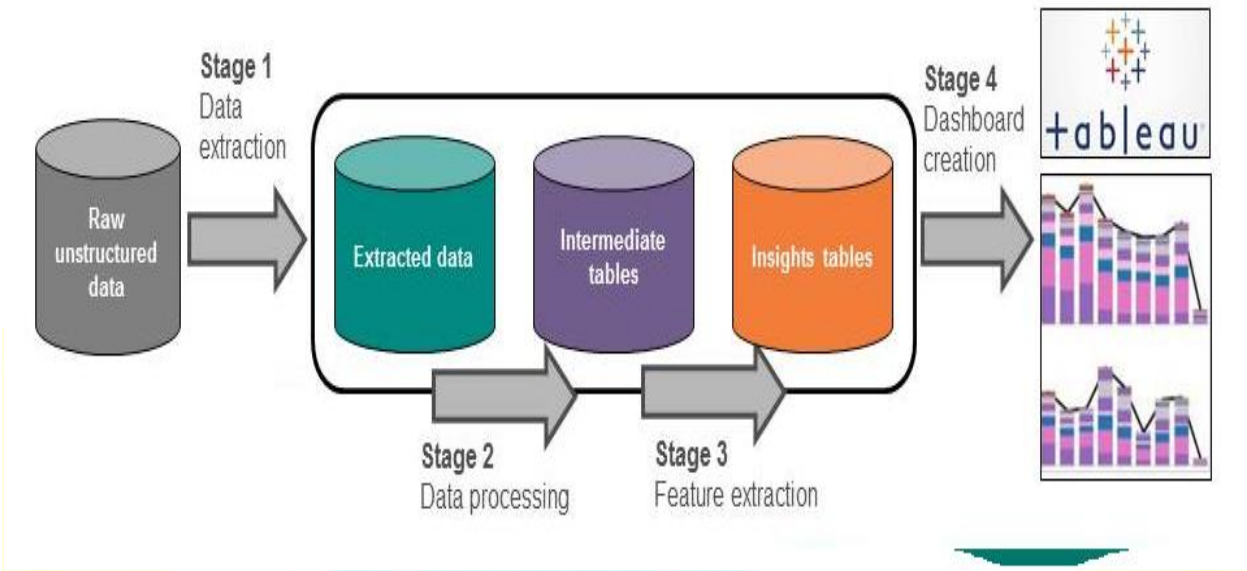

Figure 6: This fig shows the overview of data analytics**.**

8. Acknowledgment

We would like to express our gratitude to all those who helped us to complete this work. We want to thank our guide Prof. S. Chaudhari for his continuous help and generous assistance. He helped in a broad range of issues from giving us direction, helping to find the solutions, outlining the requirements and always having the time to see us.

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