1. INTRODUCTION

1.1 REVELANCE OF THE PROJECT

A research project on development of continuous Jaggery production was initiated by IITB and has installed at Warananagar in premises of TKIET. And was introduced to students by IITB Team. In the first meeting Mr. Vishwambhar put forth the proposal of the project with the details. According to him there is requirements of application that will provide an interface between farmers and the jaggery plant so that they can get the finest quality of sugarcane within their range. Until now they were individually meeting the farmers to get the crops or had to attain the product by references. They needed their own application which will reduce their manual work and allow them to know the farmers that are interested to provide their crops. In this application, they also needed the schedules for visiting the farmers that had been registered to verify the dates of cultivation of crops, another one for analyzing the crops for confirmation of the purchase and one for the dates for harvesting of the crops for each farmer by analyzing the details gained by the farmers and the visits. After this on the second meeting, we presented a basic idea about project considering his requirements and got a confirmation to further proceed with the work. Apart from his requirements mentioned we added a stock facility where they can get the stock updates about their production as well as purchase according to their storage capacity so that they can determine their rate of production without any loss. This application will not only help them to get updates from the farmers without any manual work but will also help to maintain a record about all the purchases that will occur which will be helpful for their future needs.

2. SYSTEM STUDY

2.1. EXISTING SYSTEM

The actual process for purchasing good quality sugarcane for jaggery production is done manually where the jaggery team has to personally visit the farmers to purchase the sugarcane or need to get it by known references. Later on, many applications were developed that allowed the farmers to interact with the factories and get products such as Kisaan.net and IFFCO Kisan.

- **Kisaan.net**

Kisaan.net is a generic application used by the farmers which provides all the information related to their sugarcane supply. The farmers can receive information about the sugarcane mills around India so as to determine their buyer. The mills are put up on the basis of their location and are given specific code. The farmers can register into it and see all the information on the application by entering village code and their own code which will be available on their sugarcane passbook. With the help of this, the farmers can communicate with the specific mill and sell their product. Even the sugarcane mills can register into it. This application also provides more features like change language, view information, change season, delete farmer and update information.

- **IFFCO Kisan**

It is an Indian agriculture farmer suvidha App that provides the latest mandi (market) prices, weather forecast, agricultural advisory, best practices tips related to agriculture, Animal Husbandry, horticulture; a buyer and seller platform and all agriculture related news and govt. schemes.

2.2. DRAWBACKS OF EXISTING SYSTEM

- Does not provide any specific information regarding sugarcane farmers.
- No scheduling for visiting the farmers and harvesting of the crops.
- No stock updates for jaggery production as well as sugarcane purchased.

2.3. PROBLEM STATEMENT

Unavailability of an interface between the farmers and the jaggery plant leads to manual process of finding the good quality of the sugarcane which consumes a lot of time and have a lack of promising deal.

Hence, an interface is needed between the farmers and the jaggery plant.

2.4. RELEVANT OBJECTIVES

- To get good quality sugarcane from the farmers for jaggery production from available resources.
- To have stock updates on sugarcane as well as jaggery so as to determine the production.

2.5. PROPOSED SYSTEM

The proposed system will provide an interface between farmers and jaggery plant which will reduce manual work to find the sugarcane from available resources. The farmers will register into the application and give the details about sugarcane. According to this information the verification and confirmation visiting dates will be scheduled. Then the gathered information will be analyzed to provide a final schedule for harvesting the crops. The IITB team can also get the updates about stock so as to determine the production. Fig. 1 shows the simple block structures for the proposed system.

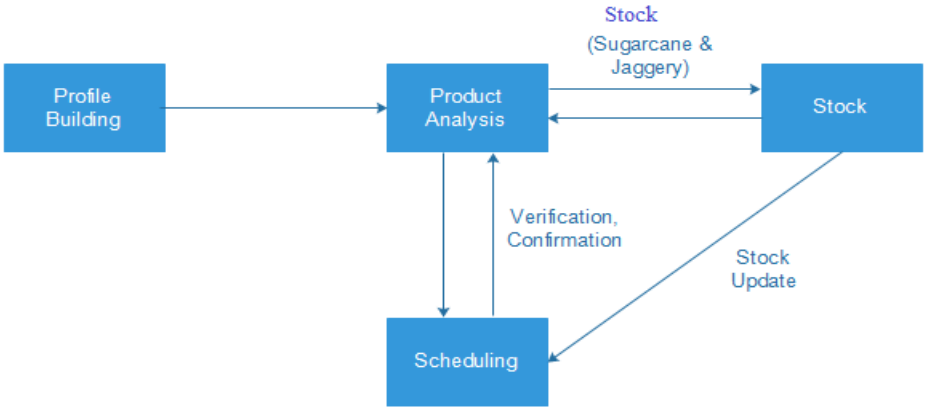

Fig.1: Block Diagram

2.5.1. MODULES

This project includes the following modules:

1. **Profile Building**

This system creates two types of users such as farmers and Warana jaggery plant members. The farmers can register into application and create a profile which will contain all the details about their crop as well as their personal information as per required by the Warana jaggery plant to deal. After registration they can even update

their profile as per any changes. Similarly the Warana Jaggery Plant members register into the application and maintain all the details about the results of the product analysis, scheduling, stock and all the information stored. They can update the schedules and even delete any kind of information that is not needed.

2. **Product Analysis**

There will be two types of analysis based on the products i.e. sugarcane analysis and jaggery analysis. The analysis of sugarcane and jaggery is to find the quality of the products which can give the best sales. This analysis will be based on the quality parameters of sugarcane and jaggery which are provided by the jaggery plant. According to these parameters the quality of the products will be determined.

3. **Stock**

As per the production it is also necessary to maintain the updates of the stock to overcome any loss by excess production and reduction in quality. This system maintains the stock updates of sugarcane as well as jaggery with respect to the storage capacity of 10 tons per day. This helps to determine the sales and production of jaggery on daily basis.

4. **Scheduling**

Scheduling will be one of the major aspect in this system which will determine the schedules for the visits of verification and confirmation of the purchase. It will also generate a schedule for harvesting of the crops. The first two schedules will be generated for jaggery plant members. The first schedule will determine the dates of visit to the farmers for verification of cultivation of crop. And the second will generate the dates of visit for confirmation of the purchase. On the basis of the information gathered so far i.e. stock updates and details of the information gathered while the visits will determine the schedule for harvesting of the crop for all the farmers that are confirmed. The alerts of these dates will be given to farmers individually and the data of all the schedules of the farmers will be maintained by the plant.

3. INFORMATION GATHERING AND ANALYSIS

The details of the project were put forth to the project group by the representative of Warana Jaggery Plant from IITB. According to the IITB team, they needed an application that will provide an interface between farmers and the jaggery plant so that they can get the finest quality of sugarcane within their range. Until now they were individually meeting the farmers to get the crops or had to attain the product by references. They needed their own application which will reduce their manual work and allow them to know the farmers that are interested to provide their crops. In this application, they also needed the schedules for visiting the farmers that had been registered to verify the dates of cultivation of crops, another one for analyzing the crops for confirmation of the purchase and one for the dates for harvesting of the crops for each farmer by analyzing the details gained by the farmers and the visits.

According to the requirements the information gathered during the survey of farmers and the quality parameters of the products are as follows:

1. Farmer

1. Farmer name, location and contact details.
2. Information about the source of water for irrigation.
3. Problems faced during farming
4. Information regarding any other jaggery plants in the area.
5. Information about sugarcane i.e. species, area under plantation, date of cultivation and production achieved.
6. Mode of transport and cost.
7. Any government schemes provided to the farmers.
8. Their preferences for selling their sugarcane.

2. Sugarcane

1. Brix > 17%
2. Age of crop > 11months
3. Variety - not specific
4. Last water dose – 15 days before harvesting of crops.

3. Jaggery

1. Reducing sugars < 12%
2. Moisture < 8%
3. Sulphur < 70ppm

4. Project Scope statement and Analysis

4.1. Project Justification

An interface between a farmers and jaggery plant to reduce manual work which will provide schedules to farmer and jaggery plant and gives updates on stock and product analysis to jaggery plant.

4.2. Requirement Analysis

4.2.1 Requirements

The following are the requirements discussed with the customer:

1. Farmers and jaggery plant should be able to communicate.
2. Should reduce manpower required for various tasks.
3. Registration of farmers should be done with detailed contents.

4. Should check the quality of sugarcane and jaggery.
5. Should have confirmation system that allows farmers to know about the confirmation of the purchase.
6. Should maintain all the data.
7. They would manually visit the farms to confirm the cultivation date and confirmation of the purchase.
8. Harvesting dates provided to farmers should be after 12 months of cultivation date.

According to these requirements we studied about the various aspects of sugarcane and jaggery, their characteristics, their quality parameters and the types of soil required. We analyzed that we will be needing two users i.e. farmers and jaggery plant users. For the jaggery plant we added a new feature of stock updates of sugarcane and jaggery to determine the production of jaggery on daily basis and to avoid the loss of quality of sugarcane by keeping it for longer duration. It also needed to check the quality of sugarcane and jaggery. Also there was a need to manage the hazardous situations occurred.

Considering the actual implementation there was a need to analyze which application should be developed so as it will be available to everyone at anytime and anywhere and feasible to the users.

4.2.2. Feasibility Study

- **Economical**

  All the resources used for developing this application are open source and hence no cost is needed for the resources. It also reduced the cost needed

by the jaggery plant for the workers who had to find the farmers and deal with them till the delivery of the product.

The application is available to farmers at minimal cost.

- **Technical**

Farmers need to register into the application to communicate with jaggery plant so as to trade their sugarcane. It provides farmers the dates as in when the representatives of jaggery plant will visit their farms and dates of harvesting the crops. Whereas the user at jaggery plant will know about all the schedules, stock updates and analysis report of quality of sugarcane and jaggery. As the application will be having drop box methods for filling in the required information even the people not very well educated can operate it easily.

- **Time**

This application reduces the manual work of jaggery plant for finding the farmers by visiting them personally or getting references. It also reduces the time for creating schedules, updating stocks and maintaining the all the data manually. For farmers it will be easier to communicate with the jaggery plant and confirm the purchase without actually visiting the plant. Also taking into consideration the next cultivation season of sugarcane, this application will be ready to use by jaggery plant.

4.3. Summary of project deliverables

4.3.1 Project Management related deliveries

Project Charter

Project Title: Warana Jaggery Plant

Project Start Date: 25th June, 2018

Project Finished Date: 28th February, 2018

Project Guide: Mr. K. K. Awale

Project Objective:

- To analyze quality sugarcane from the farmers for jaggery production from available resources.
- To have stock updates on sugarcane as well as jaggery so as to determine the production.

Approach:

- Categorization of users i.e. farmers and jaggery plant users.
- Create schedules for various visits and harvesting of crops.
- Analysis of sugarcane and jaggery.
- Management of stock.

Roles and Responsibilities

Names	Role	Contact Information
Mr. Kiran Awale	Project Guide	kiran_awale@tkietwarana.org
Ms. Nikita Asalkar	Project Leader	nikitaasalkar97@gmail.com
Ms. Shreya Jadhav	Project Member	shreyajadhav75@gmail.com
Ms. Rutuja Khade	Project Member	rutuja1396@gmail.com
Ms. Samruddhi Patil	Project Member	patilsamruddhi2305@gmail.com

4.3.2. Product Related Deliverables

- Scheduling

Creates schedule for the visits to the farm for verifying the cultivation date, confirmation of purchase and harvesting of crops.

- Stock Management

The jaggery plant can update the stock details of sugarcane as well as jaggery so as to determine sales and production of jaggery on daily basis.

- Product Analysis

To check the quality of sugarcane and jaggery, analysis will be done based on few quality parameters.

4.4. Software Requirement Analysis and Specification

4.4.1. Functional Requirements

- Analyze the information about sugarcane provided by the farmer.
- Create schedules for verification, confirmation and harvesting of crops.
- Produce stock updates.
- Analyze quality of jaggery.

4.4.2. Non-Functional Requirements

- Network connection.

4.4.3. Software Requirements

- Operating System : Windows XP and above
- Front End and Back End : Python
- Database : MySQL
- Server : Apache Tomcat

4.4.4. Hardware Requirements

- Standard PC configuration

4.5. Project Boundaries

- Confirmation of cultivation date and purchase to be done through manual visits.
- In hazardous situations like fire or drought the jaggery plant has to change the schedules manually.
- Sales and transport of the products are not monitored.

5. SYSTEM DESIGN AND ANALYSIS

5.1. Project modules and architecture

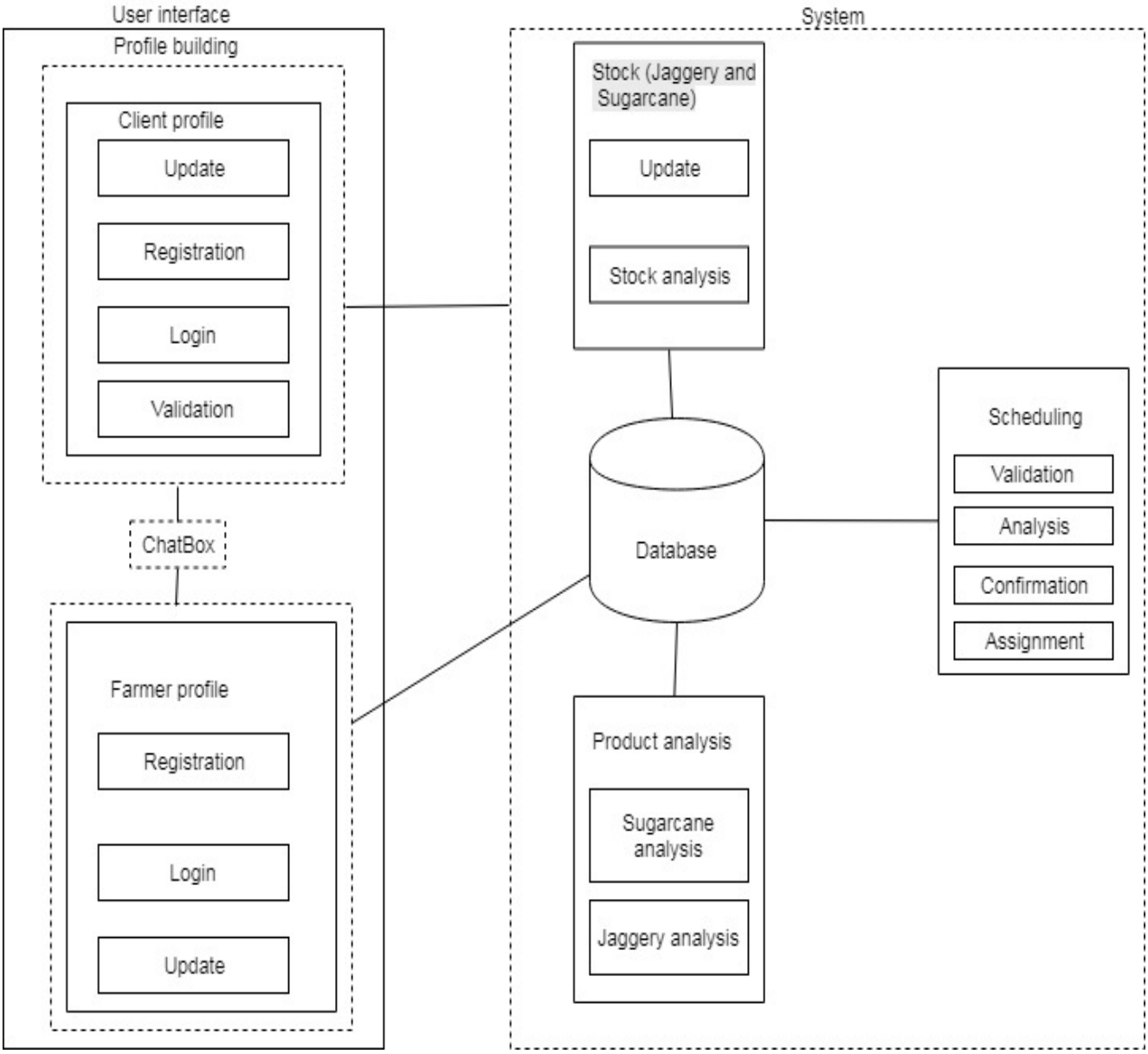

Fig.2: System Architecture

System architecture consist of two main parts i.e. user interface and system. User interface consist of two modules client profile i.e. jaggery plant user and farmer profile. The jaggery plant profile consists of the sub modules that they will perform. The sub modules are, registration – the jaggery plant users have to register first to get the access of the system, login – they have to login so as to maintain the security, update – any kinds of updates that are to be done manually can be done by the plant users, validation – they can validate all the information about the farmers and all the data stored. Similarly, farmer profile consists of three sub modules registration, login and update. The farmers have to register first to continue will further procedure which can create an individual account of each farmer so as they can get the updates regarding the jaggery plant users by login and access the account. The farmers and jaggery plant user can also communicate through chat box for any issues. On the other hand, system consists of three main modules i.e. stock, scheduling and product analysis. The stock has two sub modules update and stock analysis. Here, the information regarding stocks of jaggery and sugarcane are maintained on daily basis. Product analysis consists of sub modules like sugarcane analysis and jaggery analysis where analysis of these products is done to determine the best quality of product using few quality parameters gathered. In scheduling there are four sub modules validation, analysis, confirmation and assignment. Here three different schedules are created and once they are validated they are assigned to the farmers. All the system information will be stored in database.

5.2 System Design and Modeling

5.2.1 Class diagram

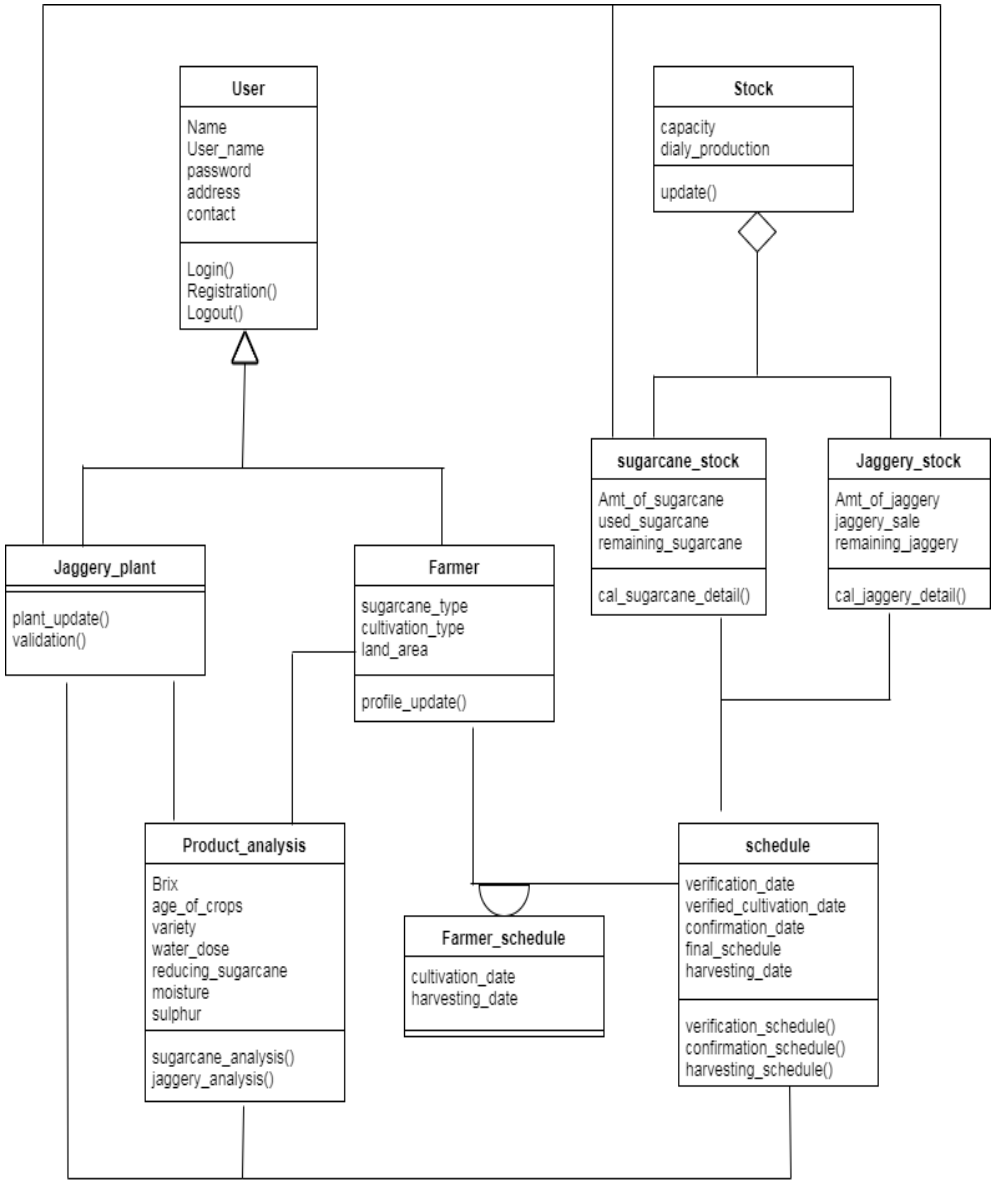

Fig.3: Class Diagram

The fig.3 shown above consists of 4 main class that are user, stock, product_analysis and schedule. User class have two derived classes jaggery plant and farmer. Here Jaggery plant and farmer could register and login by providing their details. Stock class also have two derived classes jaggery and sugarcane. In stock daily updates of sugarcane and jaggery production is maintained. Schedule consists of 3 main schedules i.e. verification, confirmation and harvesting. Product analysis consists of two types of analysis jaggery and sugarcane based on given parameters.

5.2.2. Sequence Diagram

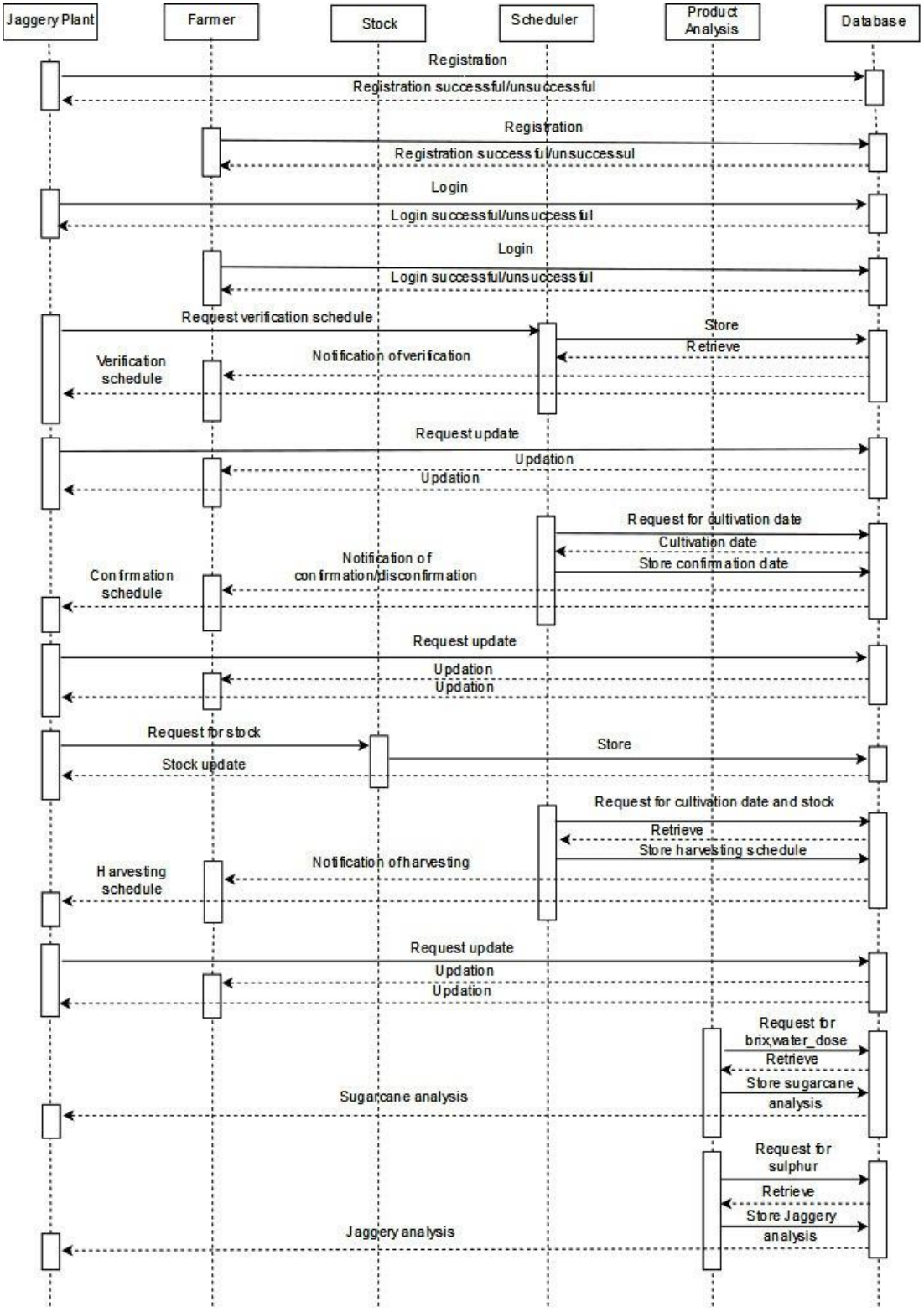

Fig.4: Sequence Diagram

A sequence diagram shows object interactions arranged in time sequence. Fig.4 diagram mainly includes six objects jaggery plant, farmer, stock, scheduler, product analysis and database. Initially, jaggery plant will register into the system. Farmer will also then register into system with information like name, address, contact, sugarcane information, etc. Then Jaggery plant and farmer will log in to system with username and password. Jaggery plant will request for verification schedule based on cultivation date scheduler will generate verification schedule and update the information. After that confirmation schedule will be generated by scheduler and update the information. Jaggery plant requests for stock updates of sugarcane and jaggery. Verified cultivation date and stock is input to the scheduler to generate harvesting schedule. Notification of each schedule is given to farmer by sms. Analysis of jaggery and sugarcane will take place at last.

5.2.3. DFD (Data Flow Diagram)

DFD level 0

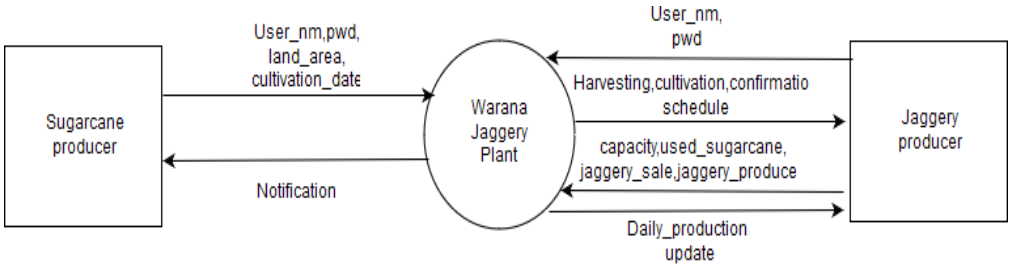

Fig.5: DFD Level 0

Fig.5 shows 0 level DFD. It shows the working of project in abstract view. Sugarcane producer and jaggery producer can login to the system with username and password once they are registered. Then according to the details provided by the sugarcane producer system will generate mainly 3 schedules i.e. verification, confirmation and harvesting. System also maintains the stocks of sugarcane and jaggery.

DFD level 1

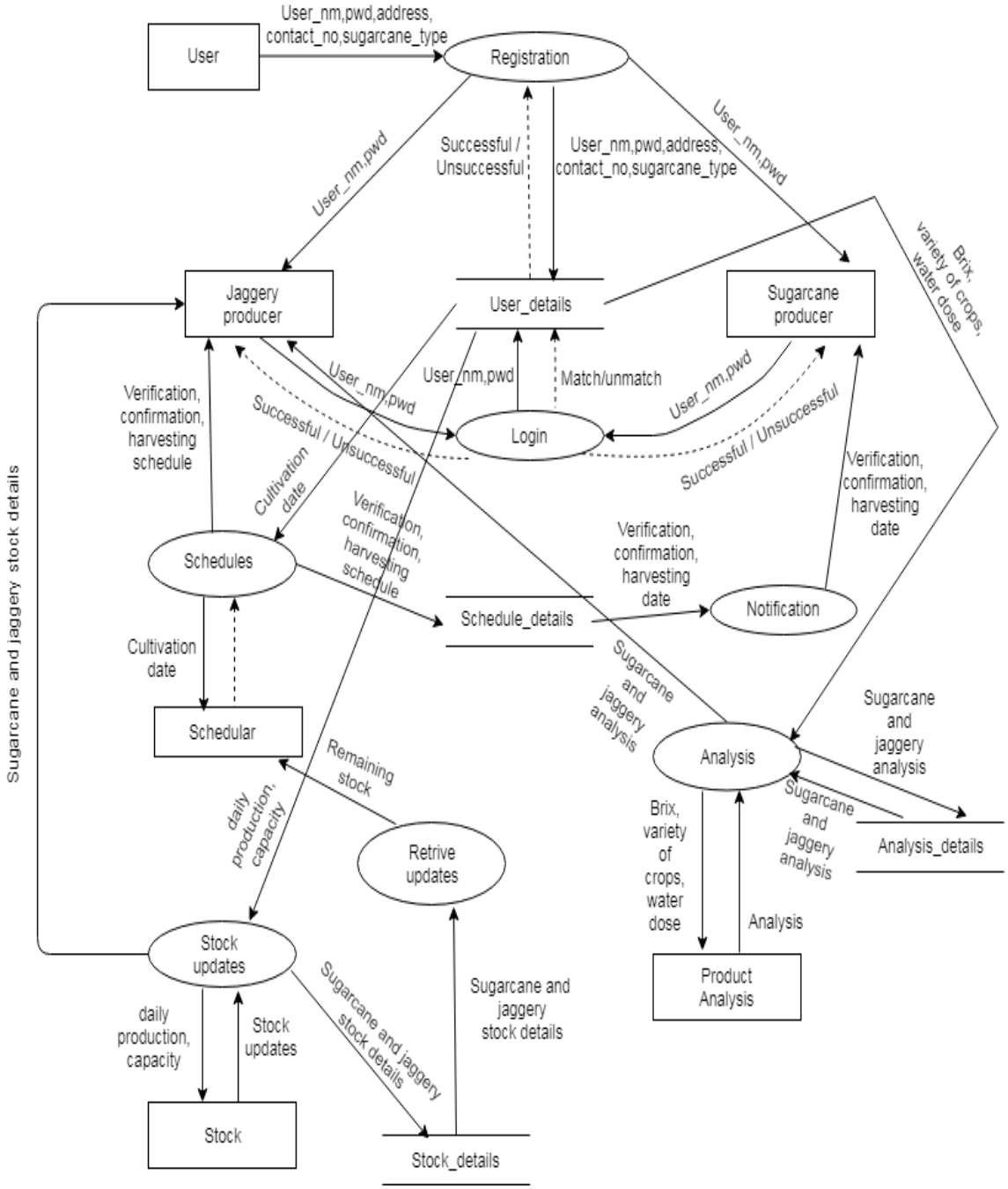

Fig.6: DFD Level 1

Fig.6 shows level 1 DFD. In DFD level 1 major processes are divided into sub processes and also identifies data stores that are used by major processes. User first

register to the system with all its details and then can login using username and password. Then jaggery producer request for schedules. Scheduler will produce schedule for verification, confirmation and harvesting by taking input as cultivation date and stock. Notification of schedules are given to the farmers after each schedule. Stock of sugarcane and jaggery will be maintained using stock updates by taking input as capacity and day production. After that sugarcane and jaggery analysis will takes place by taking input as parameters.

DFD Level 2 (for scheduling)

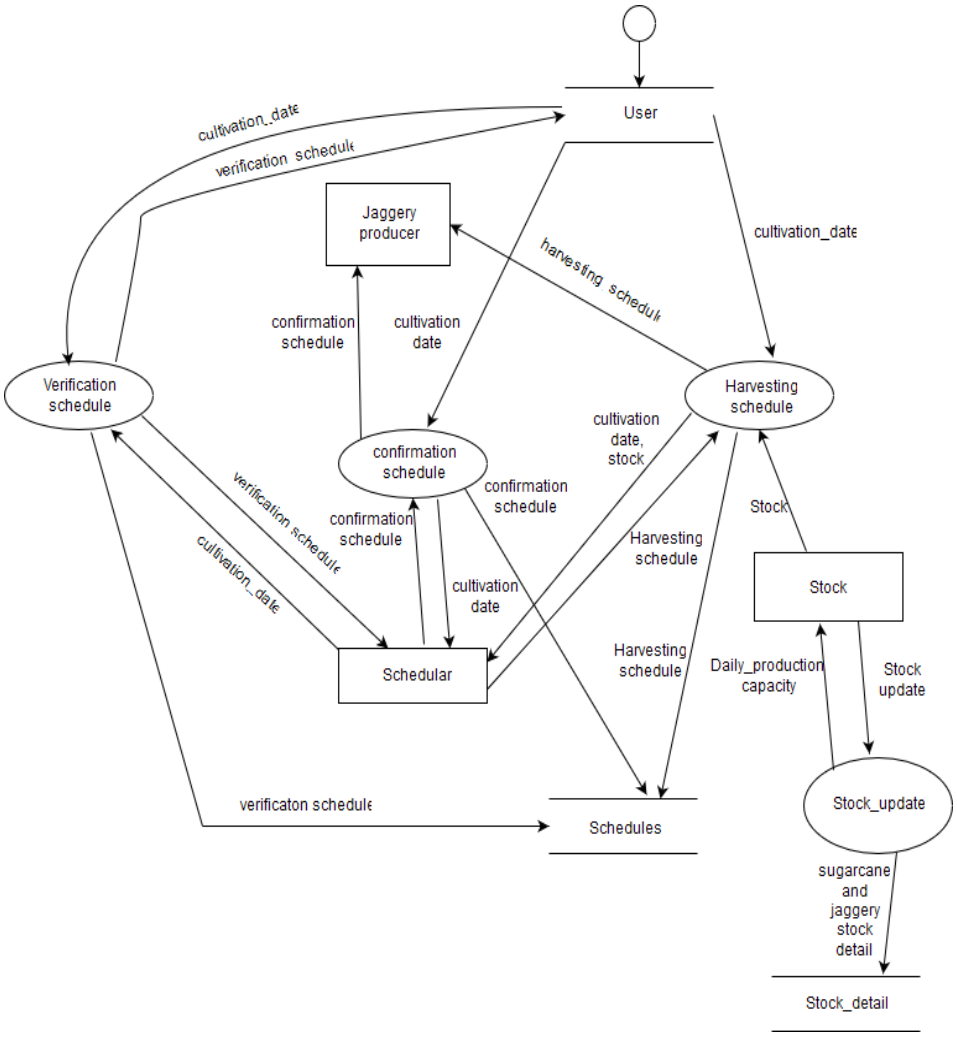

Fig.6.1: DFD Level 2 (Scheduling)

This is level 2 DFD for scheduling. A level 2 DFD offers a more detailed look at the processes that make up an information system that a level 1 DFD does. First schedule

will be verification schedule that will take cultivation date as input from user and produce verification schedule. Second schedule will be confirmation schedule which will take input as verified cultivation date and produce confirmation schedule. Final schedule will be harvesting schedule which will take input as verified cultivation date and stock that will produce harvesting schedule. Based on sugarcane capacity and daily production of jaggery stock updates will be done.

DFD level 2 (for Product analysis)

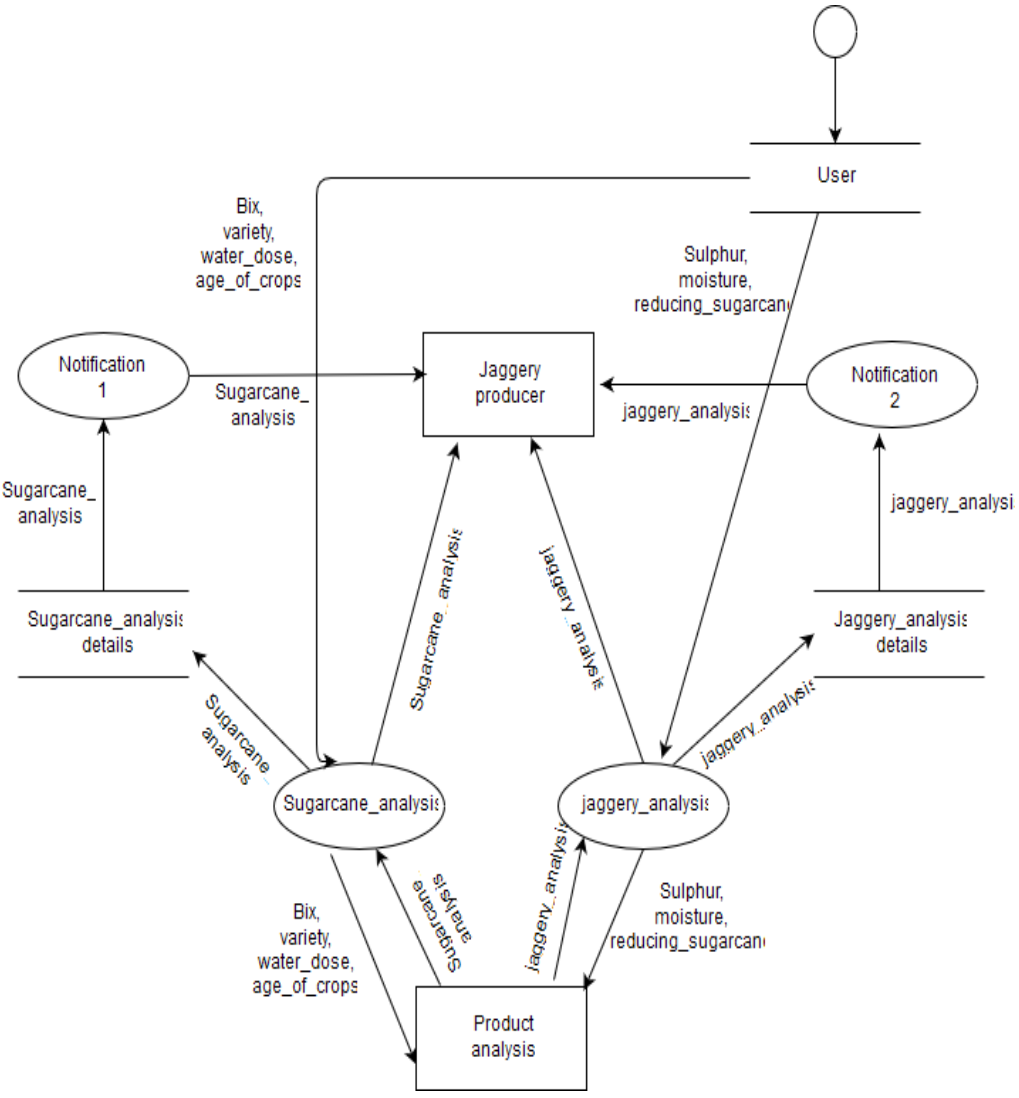

Fig.6.2: DFD Level 2 (Product Analysis)

This is level 2 DFD for product analysis. Here the analysis of sugarcane and jaggery will be takes place. By taking input parameters such as brix, variety, water_dose, age_of_crops sugarcane analysis is done. Depending upon the factors like sulphur, moisture and reducing_sugar jaggery analysis is done. After each analysis notifications will be receive by jaggery producer.

5.3 Database Design

ER Diagram

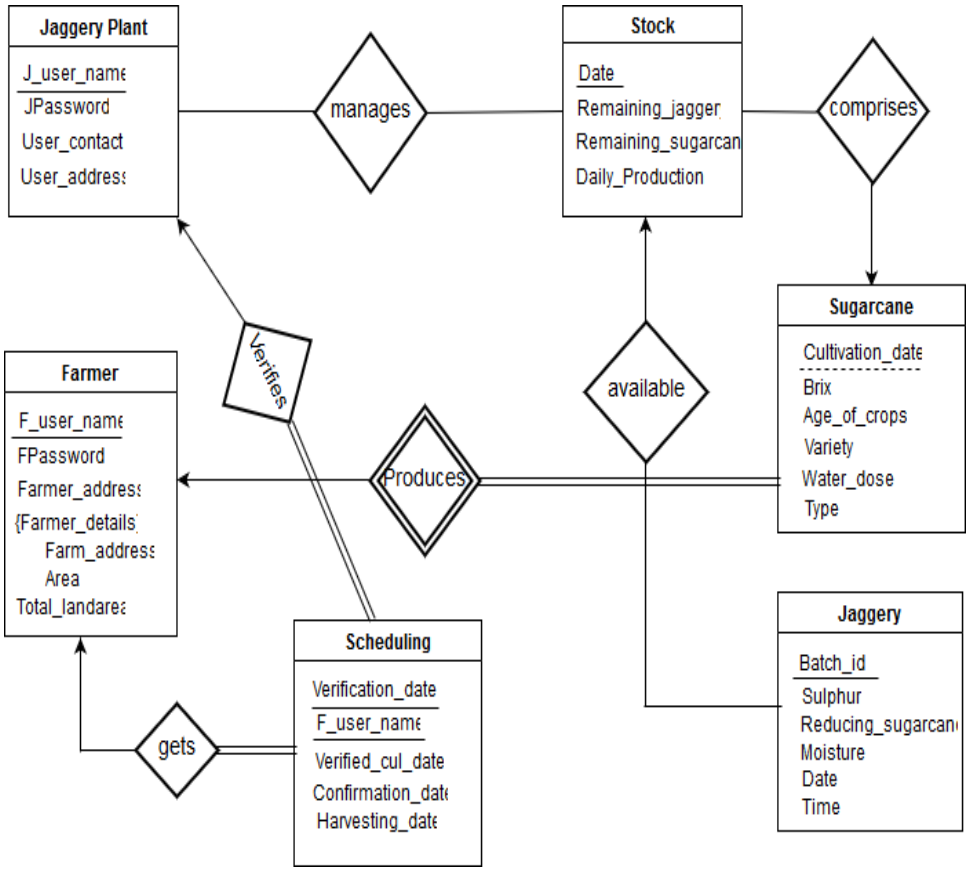

Fig.7: Entity-Relationship Diagram

5.3.1. Reduction of ER Diagram

- **Jaggery Plant**

  Jaggery_plant (J_user_nm,JPassword,user_addr)

  Functional Dependency

  J_user_nm ⟶ JPassword,user_addr

- **Manages**

  Manages (J_user_nm,date)

  Functional Dependency

  J_user_nm ⟶ date

- **Stock**

  Stock (date, remaining_jaggery,remaining_sugarcane,day_production)

  Functional Dependency

  date ⟶ remaining_jaggery,remaining_sugarcane,day_production

- **Farmer**

  Farmer (F_user_nm,FPassword, total_land_area)

  Functional Dependency

  F_user_nm ⟶ FPassword, total_land_area

- **Farmer_farmer_details**

  Farmer_farmer_details (F_user_nm,farm_addr,area)

  Functional Dependency

  F_user_nm, farm_addr ⟶ area

- **Available**

  Available **(**batch_id,date**)**

  Functional Dependency

  batch_id ⟶ date

- **Jaggery**

  Jaggery (batch_id, sulphur, date_time, reducing_sugar, moisture)

  Functional Dependencies

  batch_id ⟶ sulphur, date_time, reducing_sugar, moisture

  sulphur ⟶ reducing_sugar

- **Scheduling**

  Scheduling (F_user_name, verification_date, verified_cul_date, confirmation_date, harvesting_date)

  Functional Dependency

  F_user_name, verification_date ⟶ verified_cul_date, confirmation_date, harvesting_date

- **Sugarcane**

  Sugarcane(F_user_name, cultivation_date, variety, brix, age_of_crop, water_dose)

  Functional Dependencies

  F_user_name, cultivation_date ⟶ variety, brix, age_of_crop, water_dose

  variety ⟶ water_dose

  cultivation_date ⟶ water_dose

- **Gets**

  gets (F_user_name, verification_date)

  Trivial Dependency

- **Verifies**

  verifies (F_user_name, verification_date, J_user_name)

  Functional Dependency

  F_user_name, verification_date ⟶ J_user_name

- **Comprises**

  comprises (F_user_name, cultivation_date, date)

  Trivial Dependency

Normalization:

- **Jaggery**

  Jaggery (batch_id, sulphur, date_time, reducing_sugar, moisture)

  batch_id ⟶ sulphur, date_time, reducing_sugar, moisture

  sulphur ⟶ reducing_sugar

In the above functional dependencies, we can transitivity which can be removed by using 3NF rule for normalization.

The normalization is as follows:

R (batch_id, sulphur, date_time, reducing_sugar, moisture)

Jaggery_plant ⟶ sulphur, reducing_sugar
F.D= {sulphur ⟶ reducing_sugar}

Jaggery ⟶ batch_id, sulphur, date_time, moisture
F.D={ batch_id ⟶ sulphur, date_time, moisture}

By performing normalization we have removed the transitivity and achieved the following reduced forms.

Jaggery_parameters (sulphur, reducing_sugar)
Jaggery (batch_id, sulphur, moisture, date_time)

- **Sugarcane**

  Sugarcane(F_user_name, cultivation_date, variety, brix, age_of_crop, water_dose)
  F_user_name, cultivation_date ⟶ variety, brix, age_of_crop, water_dose

  variety ⟶ water_dose

  cultivation_date ⟶ water_dose

In the above functional dependencies, we have partial dependency as well as transitivity.

The normalization is as follows

R= (F_user_name, cultivation_date, variety, brix, age_of_crop, water_dose)
R= (_cultivation_date, age_of_crop)
R1 ⟶ (cultivation_date, age_of_crop)
R2 ⟶ (F_user_name, cultivation_date, variety, brix, water_dose)
R1 (cultivation_date, age_of_crop)
R2 (F_user_name, cultivation_date, variety, brix, water_dose)

variety ⟶ water_dose

R3 ⟶ variety, water_dose
F.D= {variety ⟶ water_dose}

R4 ⟶ F_user_name, cultivation_date, variety, brix
F.D = {F_user_name ⟶ cultivation_date,variety,brix}

By performing the normalization we have removed the partial and transitivty dependency and derived these reduced forms.

Sugarcane_cul(cultivation_date, age_of_crop)
Sugarcane_type(variety, water_dose)

Sugarcane(F_user_nm, cultivation_date, variety, brix)

Normalized Schemas:

- **Jaggery_plant**

Attribute	Type	Primary Key	Nullable
J_user_nm	varchar(20)	✓	No
JPassword	Varchar(10)	–	No
user_addr	Int	–	No

- **Manages**

Attribute	Type	Primary Key	Nullable
J_user_nm	varchar(20)	✓	No
Date	Date	✓	No

- **Stock**

Attribute	Type	Primary Key	Nullable
Date	date	✓	No
remaining_jaggery	int	-	No
Remaining_sugarcane	int	-	No
day_production	int	-	No

- **Farmer**

Attribute	Type	Primary Key	Nullable
F_user_nm	varchar(20)	✓	No
FPassword	varchar(10)	-	No
total_land_area	Int	-	No

- **Farmer_farmer_details**

Attribute	Type	Primary Key	Nullable
F_user_nm	varchar(20)	✓	No
farm_addr	varchar(50)	✓	No
Area	Int	-	No

- **available**

Attribute	Type	Primary Key	Nullable
batch_id	Int	✓	No
Date	Date	-	No

- **Jaggery**

Attribute	Type	Primary Key	Nullable
batch_id	Int	✓	No
Date_time	Timestamp	-	No
Sulphur	Int	-	No
Moisture	Int	-	No

- **Jaggery_parameters**

Attribute	Type	Primary Key	Nullable
Sulphur	Int	✓	No
Reducing_sugar	Int	-	No

- **Scheduling**

Attribute	Type	Primary Key	Nullable
F_user_name	varchar(20)	✓	No
verification_date	Date	✓	No
verified_cul_date	Date	-	No
confirmation_date	Date	-	No
harvesting_date	Date	-	No

- **Sugarcane**

Attribute	Type	Primary Key	Nullable
F_user_name	varchar(20)	✓	No
Cultivation_date	Date	✓	No
Brix	Int	-	No
Variety	varchar(20)	-	No

- **Sugarcane_cul**

Attribute	Type	Primary Key	Nullable
Cultivation_date	Date	✓	No
Age_of_crop	Int	-	No

- **Sugarcane_type**

Attribute	Type	Primary Key	Nullable
Variety	Int	✓	No
Water_dose	Int	-	No

- **gets**

Attribute	Type	Primary Key	Nullable
F_user_name	varchar(20)	✓	No
verification_date	Date	✓	No

- **verifies**

Attribute	Type	Primary Key	Nullable
F_user_name	varchar(20)	✓	No
verification_date	Date	✓	No
J_user_name	Varchar(20)	-	No

- **Comprises**

Attribute	Type	Primary Key	Nullable
F_user_name	varchar(20)	✓	No
cultivation_date	Date	✓	No
Date	Date	✓	No

5.4 Algorithms

- **Algorithm for scheduling:**

  - FCFS

    With the help of this algorithm we are going to calculate the verification date, confirmation date and harvesting date based on cultivation date i.e. the first one to cultivate the crop will get first priority for other schedules as the harvesting of crop is to be done after 12 months of cultivation date so naturally the first farmer to cultivate the crop will get first harvesting date. The harvesting of date will also be derived by quality parameters.

- **Algorithm for analysis:**

  - Decision tree

    - A decision tree is a decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource cost and utility.
    - It is one way to display an algorithm that only contains conditional control statements.

    According to the quality parameters of sugarcane and jaggery given by the jaggery plant with specific values, the decision tree algorithm will decide the outcome i.e. whether the products quality is good or bad. For example,

    One of the given parameter of jaggery is sulphur which should be less than 70ppm. So if the sulphur in jaggery exceeds 70ppm the product is considered to be of bad quality. And if it is less than 70ppm it considered to be of good quality.

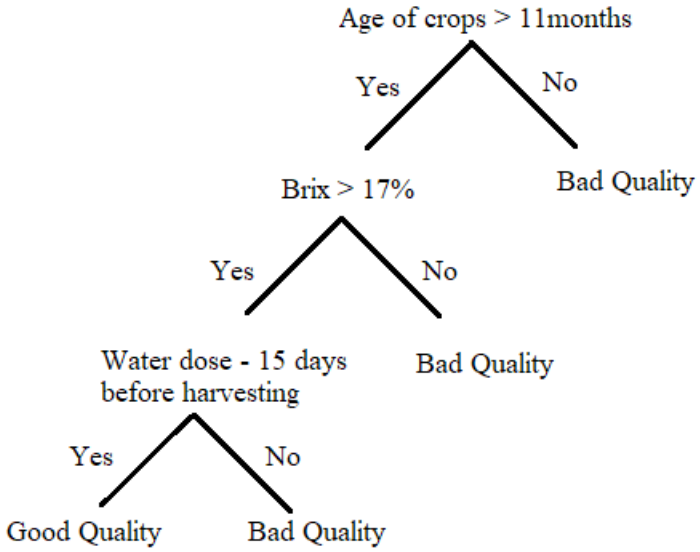

Fig.8: Decision tree for Sugarcane quality

As shown in Fig.8, the quality of the sugarcane will be determined on the basis of the given parameters and their values. Based on their values the decision will be made whether the crop is of good quality. It is also required that all the conditions should be satisfied or the crop cannot be considered as good quality.

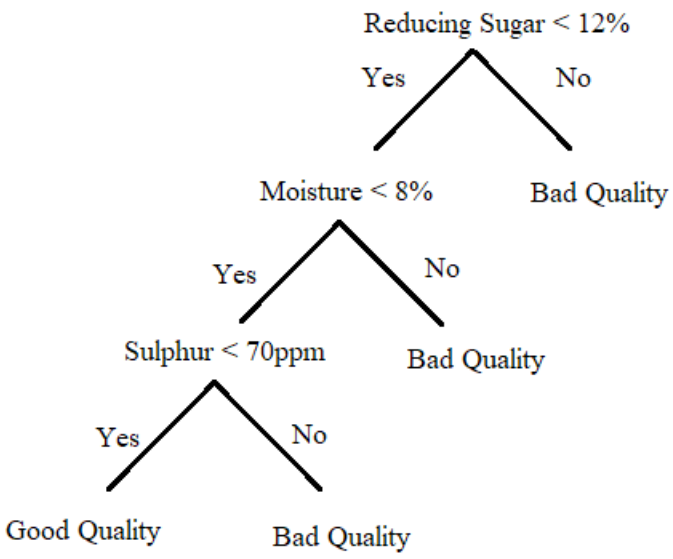

Fig.9: Decision tree for Jaggery quality

Similarly, Fig.9 shows the decision tree for good quality of jaggery. Based on the parameters of the jaggery given by the jaggery plant users and the values assigned to it, the decision tree gives the decision whether the product is of good quality or not.

6. PLANNING AND SCHEDING OF PROJECT

6.1 Process Planning

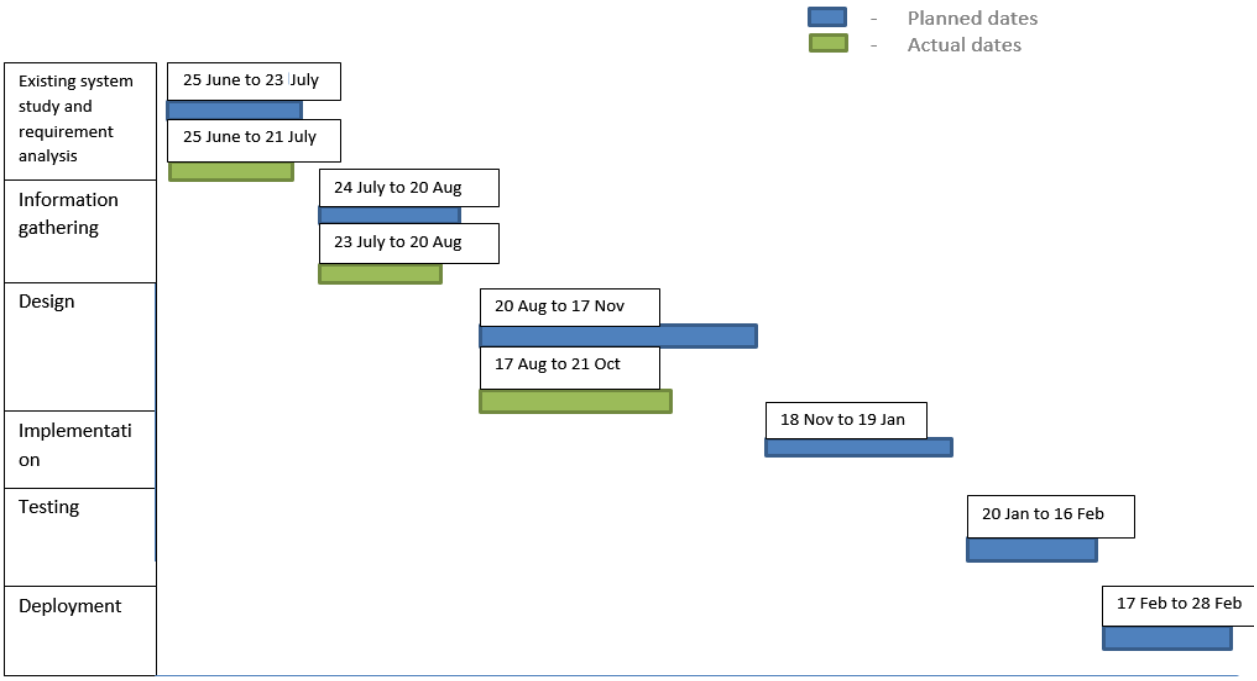

Fig.8: Process Planning

Fig.8 depicts the process planning in which time period to cover each phase of project is stated. According to SDLC there are mainly 6 phases i.e. existing system study and requirement analysis, information gathering, design, implementation, testing and deployment. First the total time period required to complete the project was calculated on the basis of starting date and ending date. So the total days needed are 249. According to the planned amount of time period each phase has a certain percentage time. And hence according to it the above diagram has been derived.

6.2. Effort Estimation

The Effort of the project depends on the nature and characteristics of the project. Effort estimation is a complete knowledge of the project. Obtained an initial estimate of the development are efforts from the estimate of thousands of delivered lines of source code. Adjust the effort estimate by multiplying the initial estimate with all the multiplying factors. As per COCOMO model, there are 3 categorized of project. The constants 'a' and 'b' for different Systems are:

System	A	B
Organic	2.4	1.05
Semidetached	3.0	1.12
Embedded	2.8	1.20

Table 6.7.2.1: Constant value of 'a' & 'b'.

LOC=6000

Effort = a*(KLOC) ^ b Person-Month

= 2.4*(KLOC) ^ 1.05 Person-Month

=2.4*(6) ^ 1.05 PM = 15.75 Person-Month i.e. 16 Person-Month

Nominal Development Time = 2.5* (15.75) ^ 0.38 = 7.13 Months

7. RISK MANAGEMENT AND ANALYSIS

- Non farmers can create a profile.

  Analysis: No categorization of farmers is done which results in increase of manual work of jaggery plant to check whether the registered person really owns a farm or not.

  Management: Visiting the farms manually by the jaggery plant users can lead to confirmation of the ownership of the farmer and continuation of the purchase.

- Wrong cultivation date can give incorrect schedule.

  Analysis: Wrong input from the farmer i.e. incorrect cultivation date can lead to incorrect schedules created by using the cultivation date which may cause purchase of poor quality of sugarcane.

  Management: The jaggery plant users have to manually visit the farms to check whether the cultivation is done according to the given dates so as to avoid any mistakes in the further process.

- Hazardous situations can change harvesting dates.

  Analysis: Suppose at some point, a hazardous situation occurs the farmer won't be able to supply the sugarcane on the given time which can disturb the whole schedule.

  Management: This system allows farmers to contact the jaggery plant by using chat box and inform them of the situation. This will help the jaggery plant to avoid the disturbance in the whole schedule by changing the dates manually.

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