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COLLEGE OF ENGINEERING
NAAC Accredited Autonomous Institution
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A Project Report
on

ESTIMATE THE CROP YIELD USING DATA ANALYTICS

Submitted in partial fulfillment for the award of the degree
of

BACHELOR OF ENGINEERING

in

COMPUTER SCIENCE AND ENGINEERING

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ABSTRACT

India being an agriculture country, its economy predominantly depends on agriculture yield growth and agroindustry products. Data Mining is an emerging research field in crop yield analysis. Yield prediction is a very important issue in agricultural. Any farmer is interested in knowing how much yield he is about to expect. Analyze the various related attributes like location, pH value from which alkalinity of the soil is determined. Along with it, percentage of nutrients like Nitrogen (N), Phosphorous (P), and Potassium (K) Location is used along with the use of third-party applications like APIs for weather and temperature, type of soil, nutrient value of the soil in that region, amount of rainfall in the region, soil composition can be determined. All these attributes of data will be analyzed, train the data with various suitable machine learning algorithms for creating a model. The system comes with a model to be precise and accurate in predicting crop yield and deliver the end user with proper recommendations about required fertilizer ratio based on atmospheric and soil parameters of the land which enhance to increase the crop yield and increase farmer revenue.

CHAPTER 1
INTRODUCTION

1.1 Project Overview

Agriculture is becoming increasingly information and knowledge centric today. Due to the large rural population, agriculture plays a vital role in Indian economy. In the current scenario, a large number of data is generated from various sources like weather, climate, geo-spatial, crop production, consumed by stakeholders, location specific crop disease in farm practice. But it is not used effectively and optimally by the experts due to lack of information flow. Thus, to bridge the gap between users and information, data analytics can be one of the solution. Crop recommendation system model integrating with data analytics has been proposed. The system consist of components; web services, data analytics, and web application development. The RESTful weather and agriculture web services were built to interaction with various data sources. The use of technology in agriculture has increased in recent year and data analytics is one such trend that has penetrated into the agriculture field. The main challenge in using big data in agriculture is identification of effectiveness of big data analytics. Crop yield prediction helps the farmers in various ways by providing the record of previous crop yield. This is helpful to government in framing policies related to crops such as crop insurance policies, supply chain operation policies.

1.2 Purpose

Agriculture Data analytics in crop yield helps in analysing some important visualization, creating a dashboard and by going through these we will get most of the insights of Crop production in India. Farmers need

information regarding crop yield before sowing seeds in their fields to achieve enhanced crop yield. The use of technology in agriculture has increased in recent year and data analytics is one such trend that has penetrated into the agriculture field being used for management of crop yield and monitoring crop health. The recent trends in the domain of agriculture have made the people to understand the significance of Big data.The analysis of data related to agriculture helps in crop yield prediction, crop health monitoring and other such related activities.

CHAPTER 2

LITERATURE SURVEY

2.1 Existing Problem

With the changing of climate, agriculture faces increasing problems with extreme weather events leading to considerable yield losses of crops. Most often, crop plants are sensitive to stresses since they were mostly selected for high yield, and not for stress tolerance. The four most important factors that influence crop yield are soil fertility, availability of water, climate, and diseases or pests. These factors can pose a significant risk to farms when they are not monitored and managed correctly.

2.2 References

1.A Survey on Crop Yield Prediction based on Agricultural Data,2000.

This paper describes and gave the details us for list of used methods, In India there are dissimilar agriculture crops production and those crops depends on the several kind of factors such as environmental science, economy and also the geographical factors covering such methodologies and methods on historic yield of dissimilar crops, it is possible to get info or data which can be supportive to farmers and government organizations for creation well decisions and for make better rules which help to increased production.

2.Analysis of agriculture data using datamining techniques,2004.

This paper discussed a several subdivision in India is facing rigorous problem to make the most of the crop productivity. Current growths in Information Technology for agriculture field have developed an interesting research area to forecast the crop yield. The problematic of yield prediction is a

major problem that remains to be solved based on accessible data. Data mining methods are the better selections for this purpose. Different Data Mining methods are used and evaluated in agriculture for approximating the upcoming year's crop production.

3.Comparison of clustering algorithms using quality metrics with invariant features extracted from plant leaves,2007

This paper describes that the suggested Fresh market fruits like apples are graded into quality groups according to their size, color and shape and to the attendance of defects. This paper presents the three former points on the basis of a literature review, the research outcomes being absorbed on the last point: having extracted data from images acquired on fruits, the paper defines a classifying technique which was implemented on an existing machine and tested on Jon gold apples (bi-color fruits).

4.Data Mining Techniques and Applications to Agricultural Yield Data,2010

This paper presented a Precision agriculture (PA) and information technology (IT) are closely interwoven. The former frequently refers to the application of nowadays' technology to agriculture. This paper deals with suitable modeling methods for those agricultural data where the objective is to uncover the surviving patterns. In specific, the use of feed-forward back propagation neural networks will be evaluated and suitable parameters will be projected.

5.The Impact of Data Analytics in Crop Management based on Weather Conditions. International Journal of Engineering Technology Science and Research,2016

This paper discussed that the data mining extraction of unseen predictive information from huge records, is a powerful new technology with great potential to help companies focus on the most significant data in their Data warehouses. Data mining tools predict upcoming trends and performance and growth, allowing businesses to make proactive, knowledge driven decisions. This article gave us a detail project that is smearing a range of machine learning plans to problems in agriculture and horticulture.Discussed various data mining

techniques utilized for prediction of rice crop yield for the state of Maharashtra, India. WEKA tool was applied in dataset processing.

S.NO	AUTHOR NAME	PUBLISHED YEAR	DESCRIPTION
1	P. S. Cornish	2000	Farmers plantrain-fed crops in the Kharif to accommodate preKharif cultivation and the Rabi winter.
2	S. Rajeswari	2004	Big data, mining techniques, cloud-based big dataanalytics, and IoT technologies play major roles in smart agricultural feasibility studies.
3	S. Athmaja	2007	Agricultural communities worldwide have benefited from comparison information produced from big data analysis
4	R. Kaur and colleagues	2010	The Hadoop and Hive technologies were used to collect, clean, and standardize the data.
5	MR Bendre	2016	Crop patterns and irrigation

Table2.1 Literature Survey

2.3 Problem Statement Definition

Agriculture is the most important sector in today's life. India is an agricultural country. Yield of each crop depends on its dependent factors. It is very important to predict the yield of a crop to help farmers. Crop Yield Prediction is predicting the yield of a crop in future based on the dependent factors. Crop yield is dependent on factors like rainfall, pressure, temperature and area geographical location. This is achieved by

a) Designing a system to predict crop yield.

b) Providing graphical user interface to view prediction result and historical dataset.

I am	The farmer who is trying to cultivating the crops for huge profit and very control in using crop yield.
I'm trying to	Use the recent technologies to increase the quantity and quality of crops.
But	I am unaware of the existing technology that can help me a lot to predict the yield ratio and I don't know to use the correct crop yield for season.
Because	I don't want to spoil the soil quality and crops quality.
Which makes me feel	I'm not capable of cultivating the crops and maintaining the quality of land and producing good quality of crops.

Table2.2 Problem Statement

CHAPTER 3

IDEATION & PROPOSED SYSTEM

3.1 Empathy Map Canvas

An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes. It is a useful tool to helps teams better understand their users. Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Example

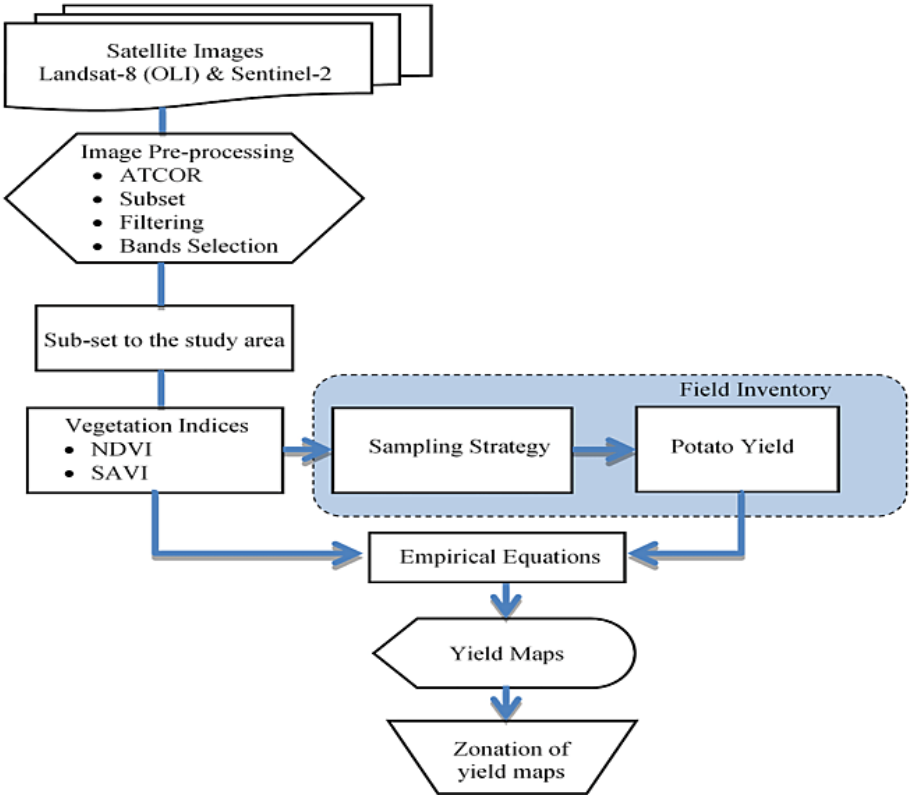

Figure 3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming

Step 1: Team Gathering, Collaboration and Select the Problem Statement

In the Ideation & Brainstorming, set the goal, learn how to use the facilitation tools and defined the problem statement.

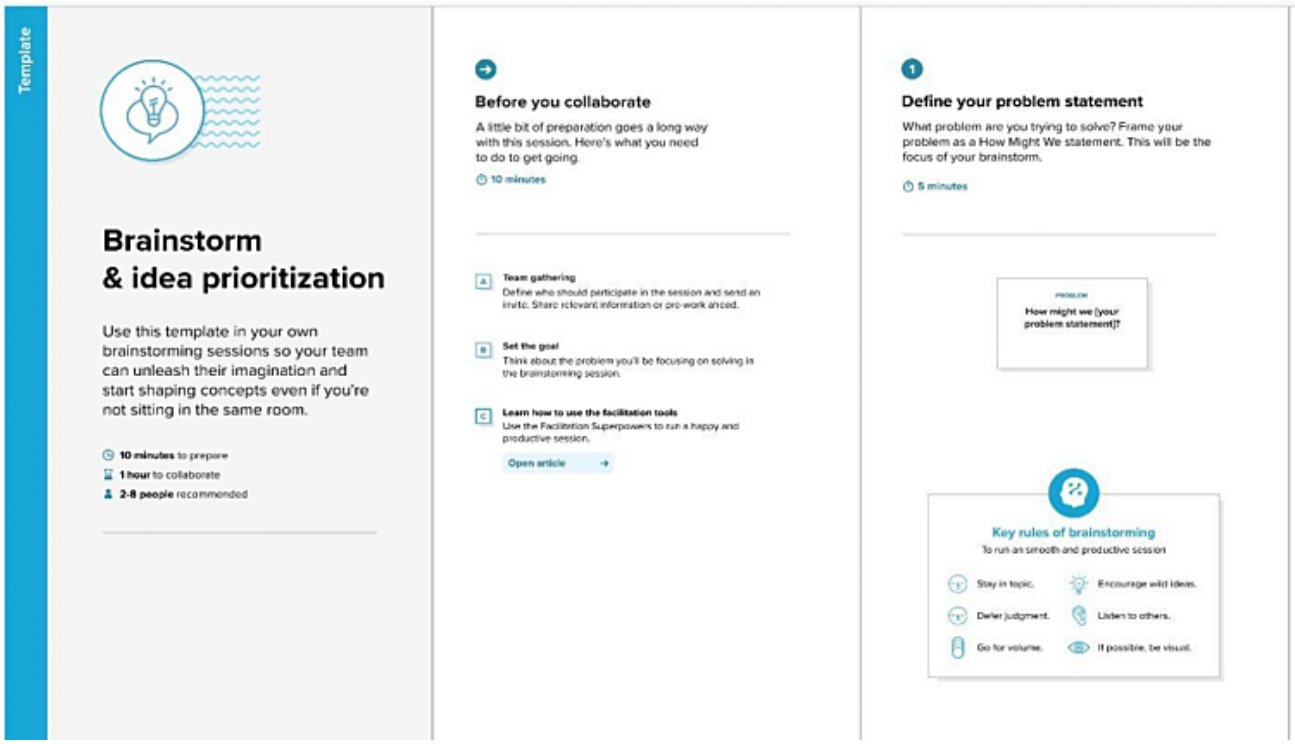

Figure 3.2 Brainstorm & idea prioritization

Step 2: Brainstorm, Idea listing and Grouping

In the brainstorming, write the own ideas that come to mind that address our problem statement. Take turns sharing our ideas while clustering similar or related notes.

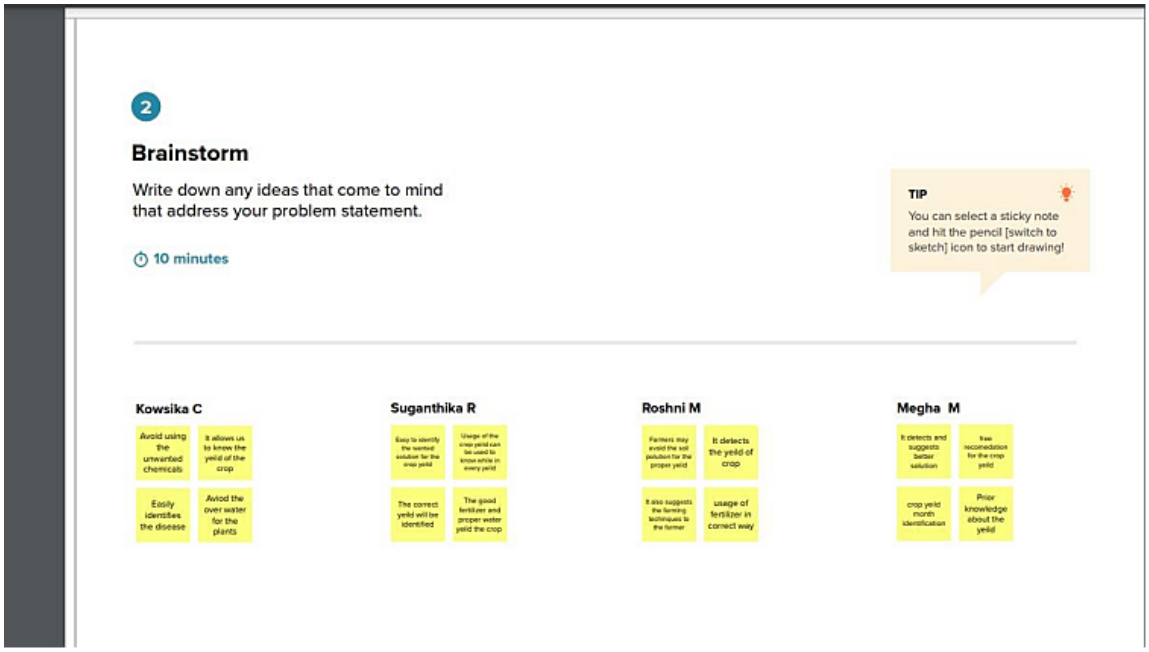

Figure 3.3 Idea Listing & Grouping

Group ideas is a group problem-solving method that involves the spontaneous contribution of creative ideas and solutions.

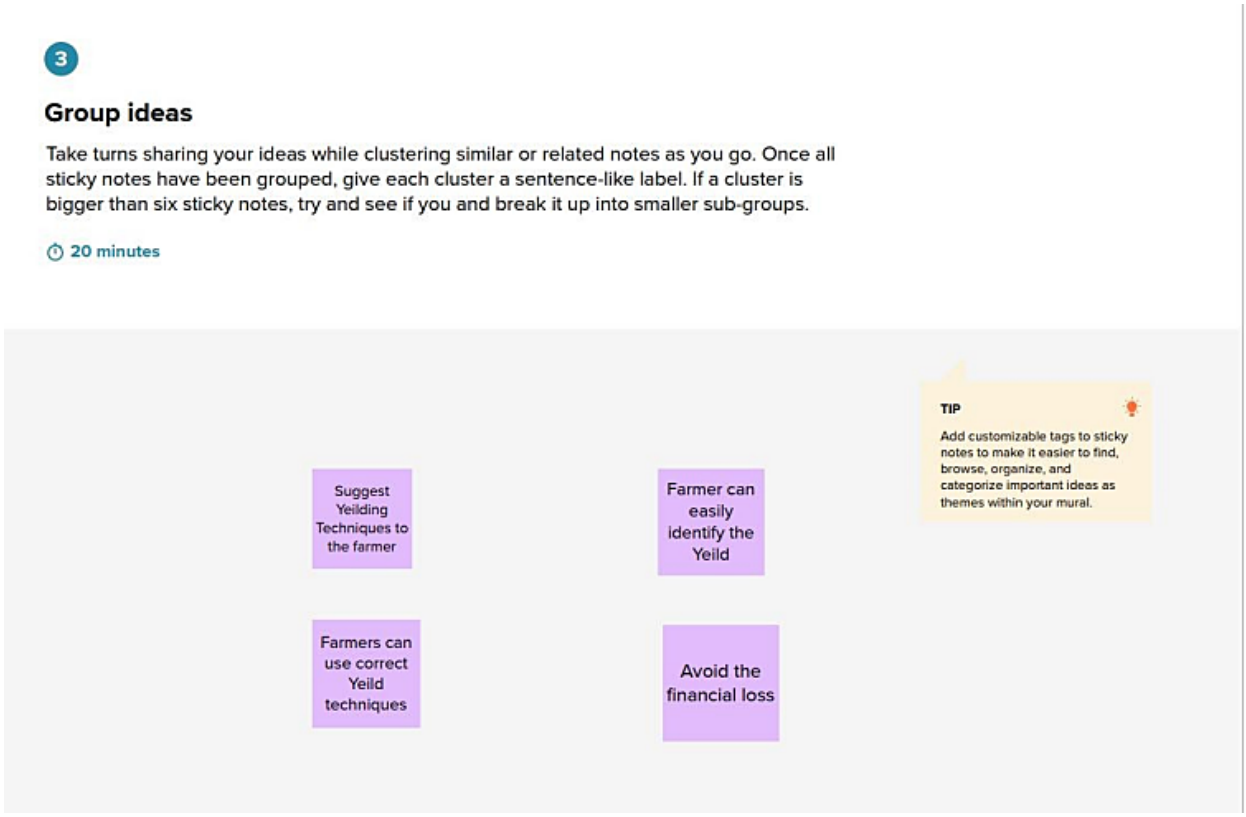

Figure 3.4 Group Ideas

Step 3: Idea Prioritization

Place ideas on the grid to determine which ideas are important and which are feasible.

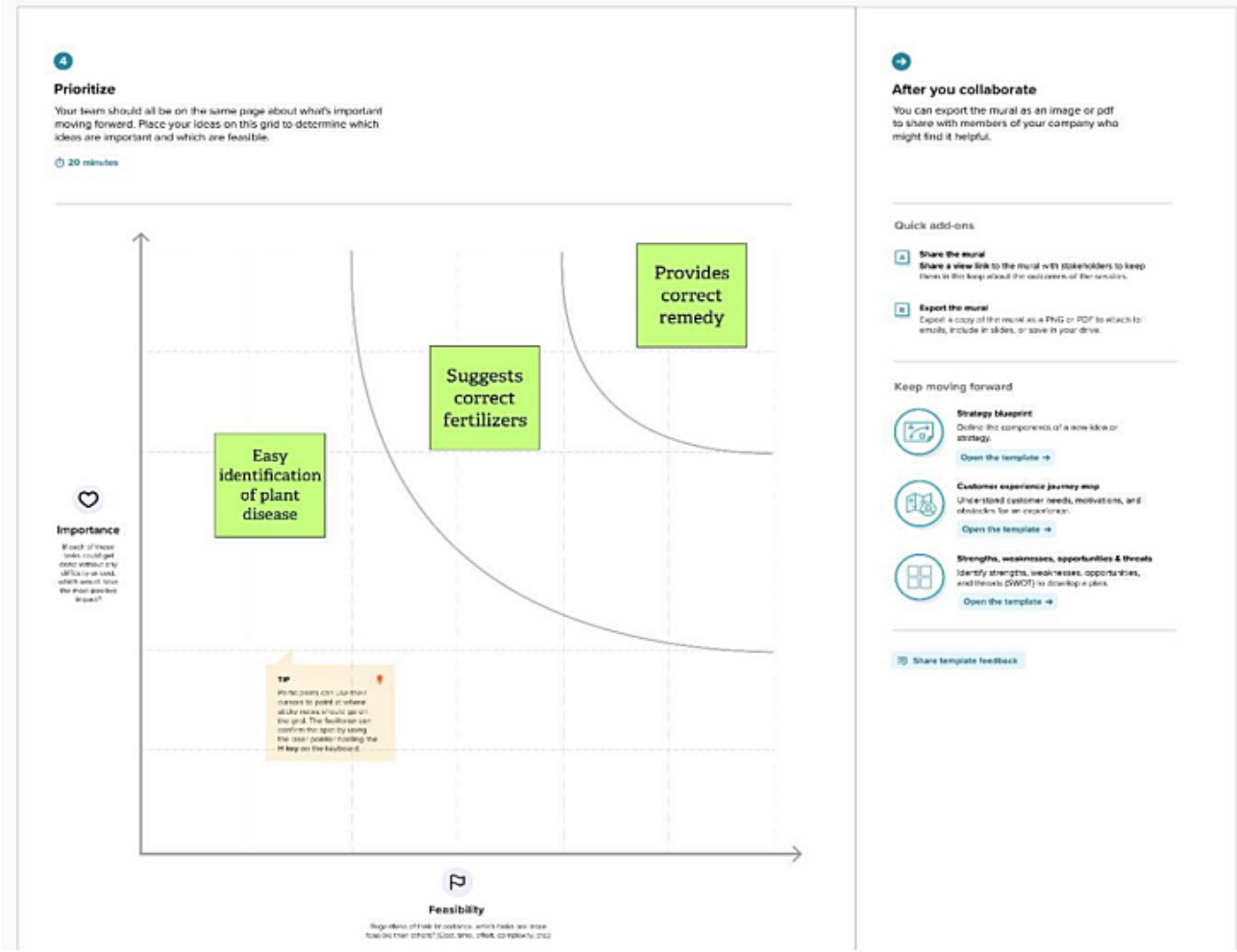

Figure 3.5 Idea Prioritization

3.3 Proposed Solution

In this proposed system, the datasets are collected and refined based on the commonality. The input parameters are given. By analysing and predicting using KNN algorithm, the result are produced and some suggestions are given.

Collection of Agricultural Datasets

The datasets have been collected and refined based on commonality uses such as location, crop, Area, soil type, temperature, humidity etc. From these parameters nameof the crop and net yield rate of the crop can be predicted.

Selection of Parameters

Based on various analyses the parameters location, soil type and area are taken as input and prediction have been undertaken. The attribute soil type specifies the type of soil in a particular region such as Coastal alluvials, Laterite soil and Dark brown alayey soil and the attribute location specifies the 4 different areas such as Mangalore, Kodagu, Hassan, Kasargod.

Prediction based on Parameters

By using KNN algorithm, the particular crop has been analysed and predicted by taking various parameters into an account such as soil type area and location.

Result and Suggestions

By analysing and predicting the crop name and price of particular crop can be found out. This helps the farmers to take the correct decision to sow the crops such that yield rate can be increased.

S.No	Parameter	Description
1.	Problem statement (problem tobe solved)	Disease in plants reduced the quantity and quality of the plants productivity. Identifying the disease in plant is hard to find.
2.	Idea/solution description	One of the solution of the problem is to identifying the disease in early stage and usingthe correct yield.
3.	Novelty / uniqueness	This application can suggest good yield for the plant by recognizing the images.
4.	Social impact/customer satisfaction	It helps the farmer by identifying the disease in the early stage and increase the quality and quantity of crops in efficient way.
5.	Business model(revenue model)	The application is recommends to farmer in subscription basis.
6.	Scalability of the solution	This application can be improved by introducing online purchases of crops, yield easily.

Table 3.1 Proposed Solution

3.4 Problem Solution Fit

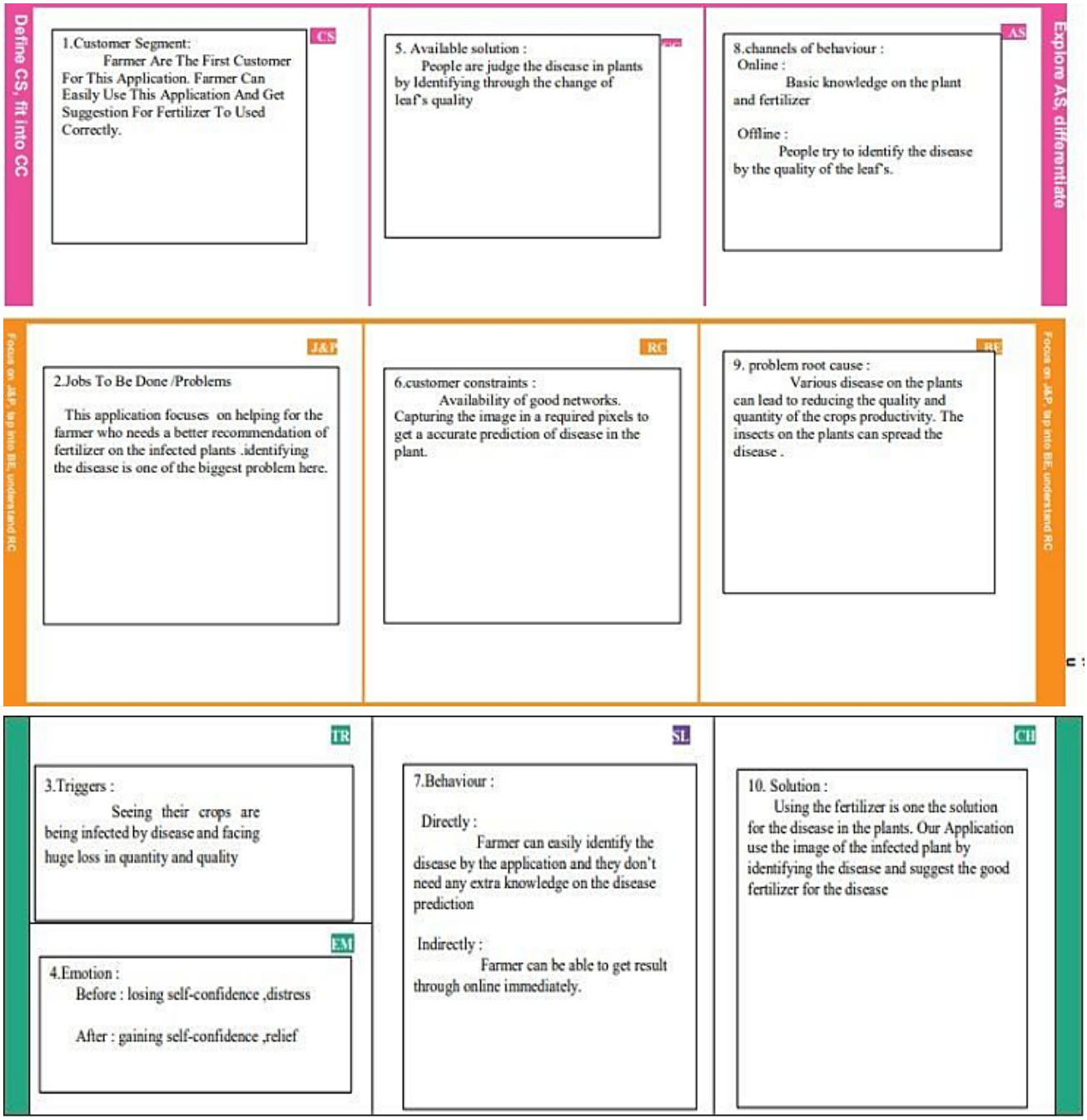

Figure 3.6 Problem Solution Fit

CHAPTER 4

REQUIREMENT ANALYSIS

4.1 Functional Requirement

Following are the functional requirements of the proposed solution.

Fr.no	Functional requirement	Sub requirement (story/subtask)
Fr-1	User registration	Registration through form Registration through Gmail
Fr-2	User confirmation	Confirmation via OTP Confirmation via Email
Fr-3	Capturing image	Capture the image of the leaf And check the parameter of the captured image.
Fr-4	Image processing	Upload the image for the prediction of the seasonal images for the crop yield.
Fr-5	Leaf identification	Identify the seasonal images and estimate the crop yield.
Fr-6	Image description	Suggesting the best seasonal images for the correct yield.

Table 4.1 Functional Requirement

4.2 Non-functional requirement

Following are the non-functional requirement of the proposed solution

NFr.no	Non-functional requirement	Description
Nfr-1	Usability	Datasets of all the seasonal images of crops is used to detecting the estimation of thatcorrect season for right cropping.
Nfr-2	Security	The information belongs to the user and seasonal imagesare secured highly.
Nfr-3	Reliability	The leaf quality is important for the predicting the cropyield.
Nfr-4	Performance	The performance is based on the quality of the leaf used for yield prediction
Nfr-5	Availability	It is available for all user to predict the yield in theplant
Nfr-6	Scalability	Increasing the prediction of the yield from the given seasonal pictures of those crops.

Table 4.2 Non-functional requirement

CHAPTER 5

PROJECT DESIGN

5.1 Data Flow Diagrams

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

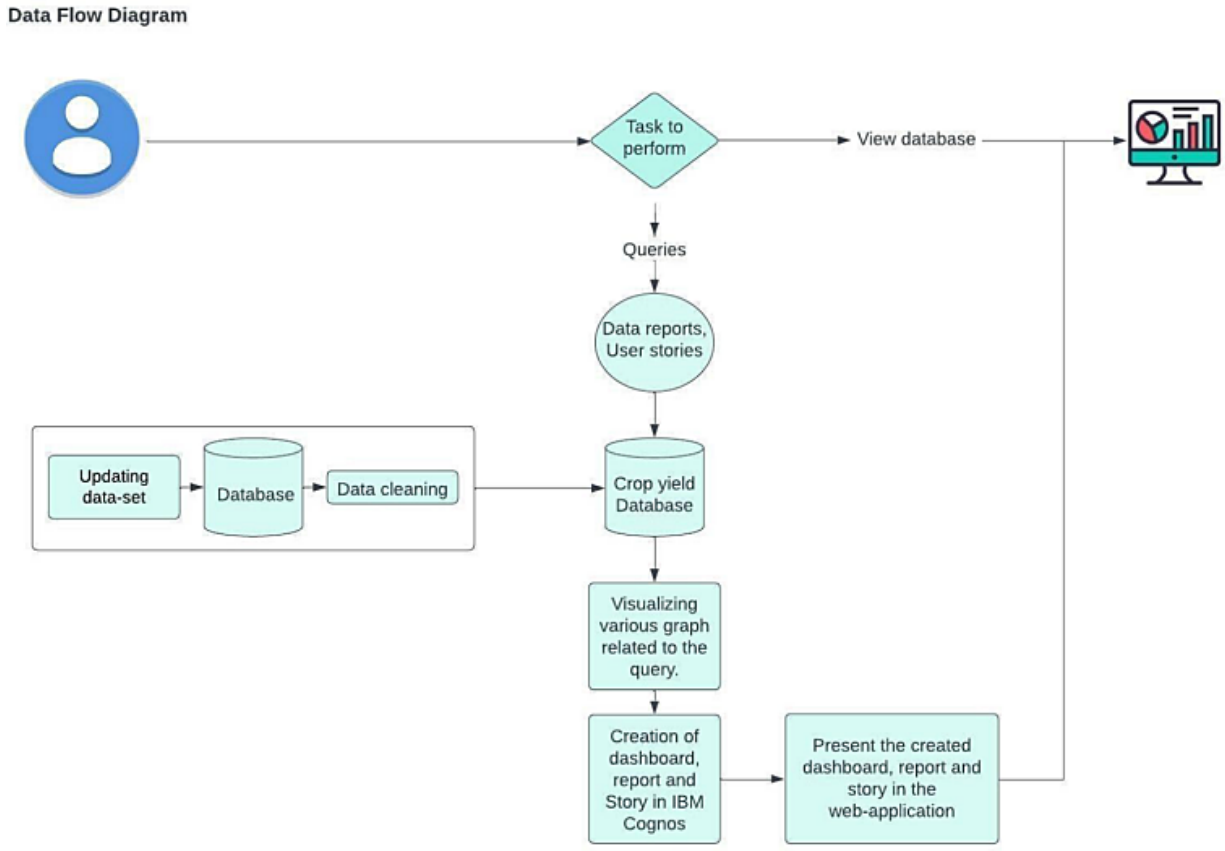

Figure 5.1 Data Flow

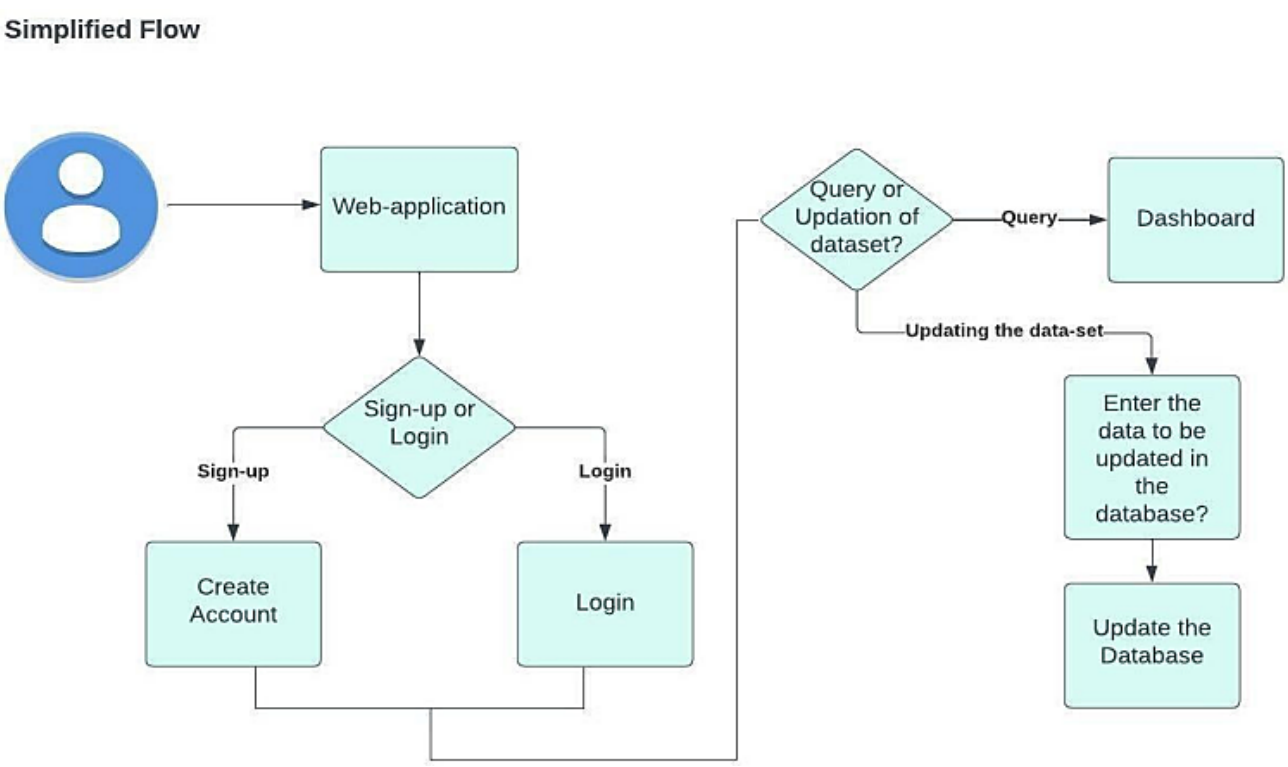

Figure 5.2 Solution & Technical Architecture

Table 1: Components & Technologies

S. No	Component	Description	Technology
1.	User Interface	How user interacts with application e.g. Web UI etc.	HTML, CSS etc.
2.	Application Logic-1	Logic for a process in the application	Python
3.	Application Logic-2	Logic for a process in the application	IBM Cognos Analytics service
4.	Application Logic-3	Logic for a process in the application	IBM Cloud
5.	Database	Data Type, Configurations etc.	MySQL
6.	Cloud Database	Database Service on Cloud	IBM Cloud
7.	File Storage	File storage requirements	IBM Block Storage or Other Storage Service or Local File system
8.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration:	Local, Cloud Foundry, Kubernetes, etc.

Table 5.1 Component & Technologies

Table 2:Application Characteristics

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	PowerBi
2.	Performance	Design consideration for the performance of the application (Number of requests per sec, use of Cache, use of CDN's) etc.	Technology used: IBM Cognos Analytics

Table 5.2 Application Characteristics

5.3 User Stories

User Type	Functional Requirement	User Story Number	User Story/ Task	Acceptance Criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering email and password	I can access my account/ dashboard	High	Sprint-1
Customer (Web user)	Activity	USN-2	As a user, I can register for the application through any web-browser	I can get a pop-up or a notification from the browser about the login	Low	Sprint-2
Customer Care Executive	Access Resources	USN-3	As a user, I can use my logincredentials inthe web-application to access the available resourcesy	No one else can login into my account without the knowledge of user	High	Sprint-3
Administrator	set events	USN-4	As a user, I can plan some events for the upcoming days or a to-dolist fora day		High	Sprint-4

Table 5.3 User Stories

CHAPTER 6
PROJECT PLANNING AND SCHEDULING

6.1 SPRINT PLANNING AND ESTIMATION

Sprint	Functional Requirement	User story Number	User Story/ Task	Story Points	Priority	Team Members
Sprint 1	Registration	USN-1	As a user, I can register for the application by entering email and password	I can access my account/ dashboard	High	Kowsika Megha
Sprint 2	Activity	USN-2	As a user, I can register for the application through any web-browser	I can get a pop-up or a notification from the browser about the login	Low	Roshni Suganthika
Sprint 3	Access Resources	USN-3	As a user, I can use my logincredentials inthe web-application to access the available resourcesy	No one else can login into my account without the knowledge of user	High	Megha Roshni
Sprint 4	set events	USN-4	As a user, I can plan some events for the upcoming days or a to-dolist fora day		High	Kowsika Suganthika

Table 6.1 Sprint Planning and Estimation

Sprint 1

To collect the dataset and do preprocessing techniques in order to clean the dataset. Cleaning includes the process of removing the null values, scaling the values of the column which has higher values, removing the noisy data and checking for the outliers. After preprocessing is done, we understand the dataset by doing the exploratory analysis of the data. Finally, we have to upload the data into cognos analytics to do the analysis.

Sprint 1 is estimated to be completed within one week.

Sprint 2

To develop the dashboard for attrition status. To showcase the attrition status based on the Rainfall on each month, each day, each week. And next is to visualize the attrition status of the Farmers by Day- wise, Month-wise. By using the Cognos Cloud.

Sprint 2 is estimated to be completed within 6 days.

Sprint 3

To develop the visualization that represents Rainfall status based on every year of Percent, Visualization shows the prediction of data analytics. The employment of a programming model and a complexly distributed algorithm for data processing results in applying big data analytics to future processes and challenges in agricultural prediction. Agriculture applications have a unique opportunity to provide advanced weather to increase crop output and decrease unnecessary harvesting costs. This will be developed by using Python, IBM DB2, IBM CLOUD.

Sprint 3 is planned to complete in one week of time.

Sprint 4

In this sprint we have to represent the Crop Yield Prediction Dashboard that shows the various insights that is used to reduce the attrition in corporate.As sprint 4 is a integration of all other three sprints and It is estimated to be completed within 4 days.

Project Tracker, Velocity & Burn down Charts

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	20	29 Oct 2022
Sprint-2	20	6 Days	31 Oct 2022	05 Nov 2022	20	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	20	12 Nov 2022
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

Table 6.2 Project Tracker and Velocity

Velocity

We have a 24-day sprint duration, and the velocity of the team is 20 (points per sprint). Let’s calculate the team’s average velocity (AV) per iteration unit (storypoints per day).

AV = Sprint Duration/ Velocity =6/ 10 =0.6

Burndown Chart

A burn down chart is a graphicalrepresentation of work left to do versustime. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any projectcontaining measurable progressover time.

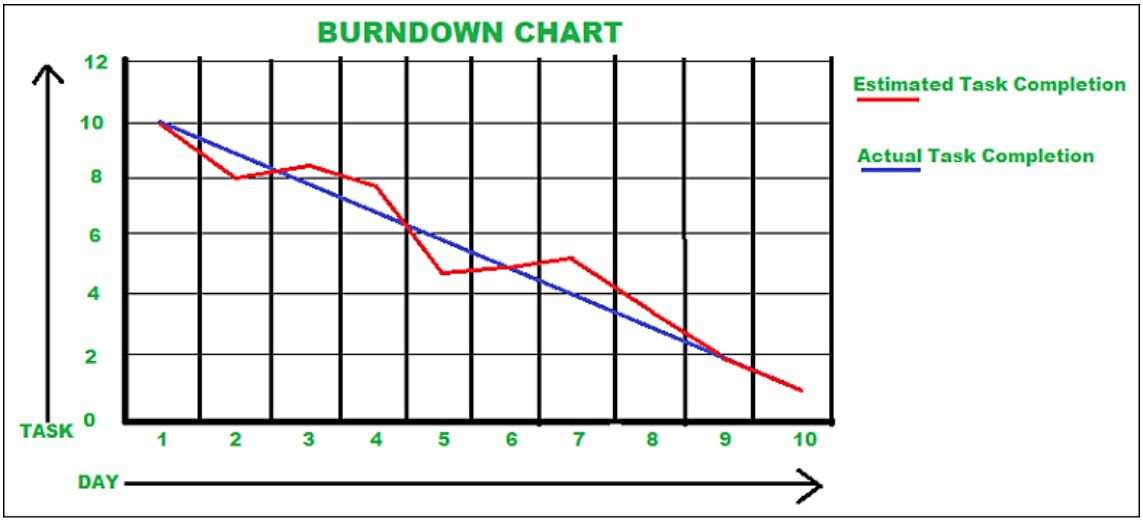

Figure 6.1 Burndown Chart

6.2 Sprint Delivery Schedule

TITLE	DESCRIPTION	DATE
Literature Survey & Information Gathering	Literature survey on the selected project & gathering information by referring the technical papers, research publications, journals etc.	1 SEPTEMBER 2022
Prepare Empathy Map	Prepare Empathy Map Canvas to capture the user Pains &Gains, Prepare list of problem Statements that are to be solved by this project.	7 SEPTEMBER 2022
Ideation	List the ideas by organizing a brainstorming session and prioritize the top 3 ideas based on the feasibility & importance	14 SEPTEMBER 2022
Proposed Solution	Prepare the proposed solution document, which includes novelty, feasibility of idea, revenue model, social impact, scalability of	21 SEPTEMBER 2022

	solution, etc.	
Problem Solution Fit	Prepare problem - solution fit document.	27 SEPTEMBER 2022
Solution Architecture	Prepare solution architecture document.	29 SEPTEMBER 2022
Sprint 1	Loading the dataset, Understanding the dataset Date	29 OCTOBER 2022
Sprint 2	Average crop productionby seasons, Crop Production by State, States with Seasonal Crop Production using a text representation, Top 10 States in Crop Yield Production by Area, Yearly Usage of Area in Crop Production.	05 NOVEMBER 2022
Sprint 3	Creating the Dashboard	12 NOVEMBER 2022
Sprint 4	Exporting the Analytics Analytics	19 NOVEMBER 2022

Table 6.1 Sprint Delivery Schedule

CHAPTER 7

CODING AND SOLUTIONING

7.1 Feature 1

Excel worksheets come with a standard limit of 1,048,576 rows. While performance in Excel will slow well before the said row limit, it's a common requirement for users to analyze datasets over one million rows in size. Congo's Analytics compresses your data so you can extract insights from large datasets. With a well- built data model, Congo's Analytics can help you analyze datasets containing over 100 million rows.

Cognos Analytics also offers useful features for working with truly large datasets that are greater than several hundred million rows. For example, users can set up aggregation tables in Cognos Analytics. Aggregations take advantage of pre-calculated data to speed up queries, reducing the time needed to render your reports.

Additional computing power can be unlocked with Cognos Analytics Premium. If your organization needs to store very large datasets in Cognos Analytics, you can purchase dedicated cloud Cognos Analytics Premium instances to enable even faster query times and refresh capabilities.

While Cognos Analytics supports many standard data visualizations out of the box, it's also possible to build your own with custom data visualizations. By adding open- source data visualization libraries from R and Python, analysts can create highly customizable visualizations to add to their next Cognos Analytics report.

With around 750 million users, Excel remains the world's number one data analysis tool. With so many people actively using the tool, it's no surprise that users often ask for an Excel export of the data displayed in reports and dashboards.

The challenge for BI analysts has been how to offer this flexibility in a way that maintains the integrity of the connected reporting environment.

With that in mind, Microsoft released Analyse in Excel. Excel can connect directly to your underlying Cognos Analytics data, so users can do their own tabular and ad- hoc reporting. If you're comfortable creating PivotTables in Excel, you can use this familiar experience to slice and dice your data, referencing the same datasets used in other Cognos Analytics reports.

Finally, users can get the latest data from Cognos Analytics datasets by refreshing their Excel connections. This ease of access is a game-changer for organizations stuck between the two platforms.

7.2 Feature 2

Cognos Analytics can help you build interactive and insightful mapping data visualizations. It comes standard with three different map types: Standard Map, Filled Map (choropleth), or ArcGIS Maps for Cognos Analytics.

Aligning on one version of the truth across many reports is a challenging undertaking that often ends with inconsistent definitions of metrics and KPIs. One of Cognos Analytics most compelling features is its ability to define measures in a data model and then re-use these calculations across numerous connected reports. By defining your KPI calculations in central datasets, you can ensure "Gross Profit" and "Sales Revenue" return the same numbers, regardless of which report you're viewing.

This feature differentiates Cognos Analytics from other data visualization tools, which often define KPIs in each report individually.

CHAPTER 8

TESTING

8.1 Test Cases

1.Seasons With Average Productions

As production of crops depends on different seasons, so let's plot the graphs to visualize the average production based on different seasons.

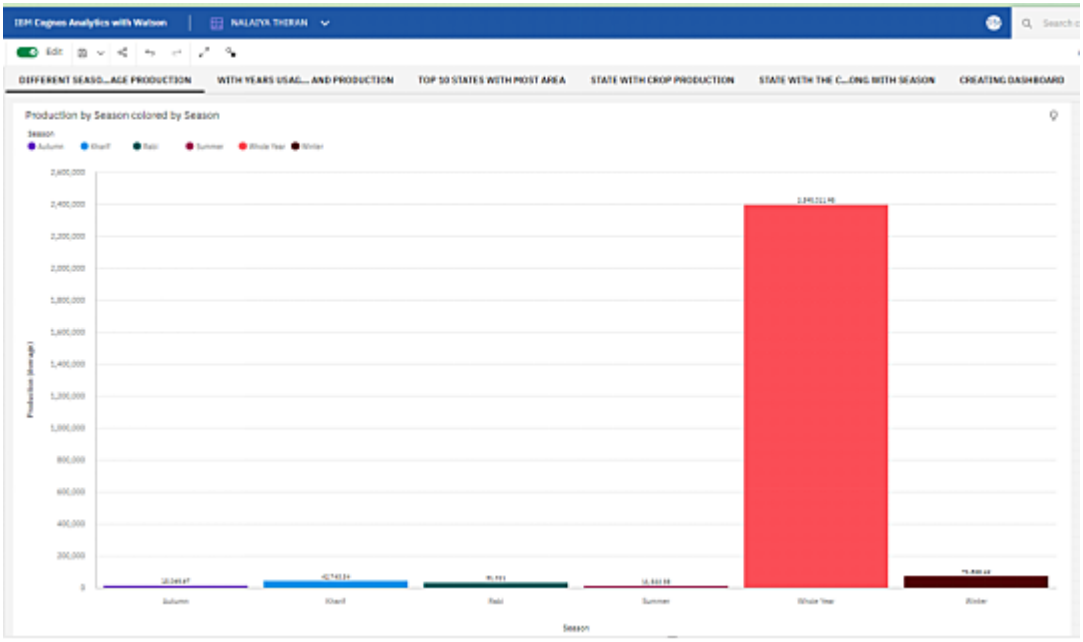

Figure 8.1 Seasons with Average Productions

2.With Years Usage of Area and Production

In our dataset we also have a year's columns by which we will plot a line and area graphs to see the change in these both data with respect to increase in years.

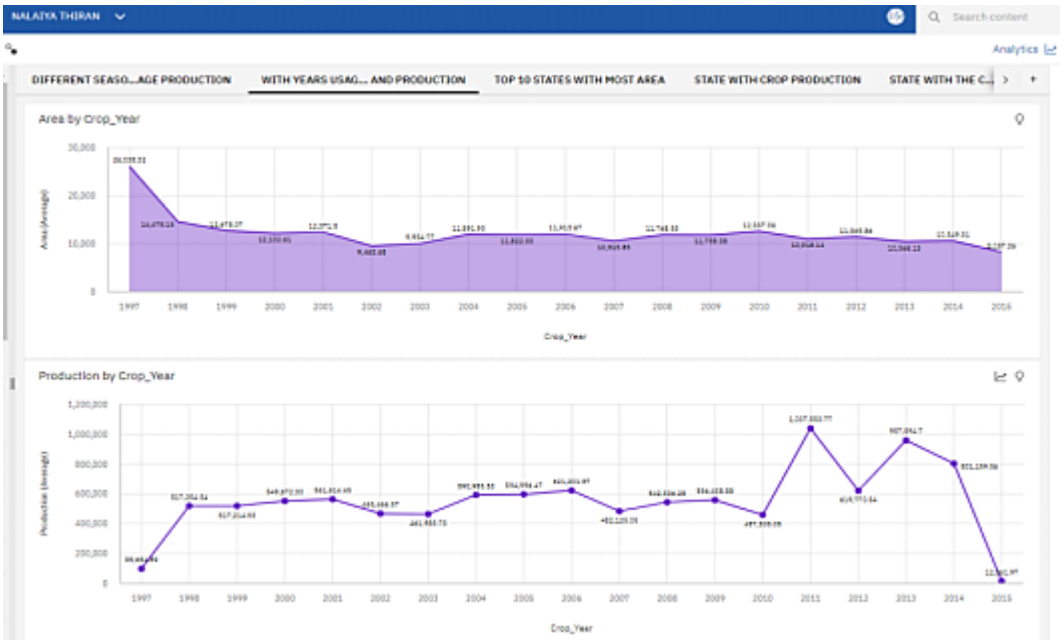

Figure 8.2 With Years Usage of Area and Production

3.Top 10 States With Most Area

As we have an area data in our dataset, we will be plotting some graphs to visualize the top 10 Indian states with the most area.

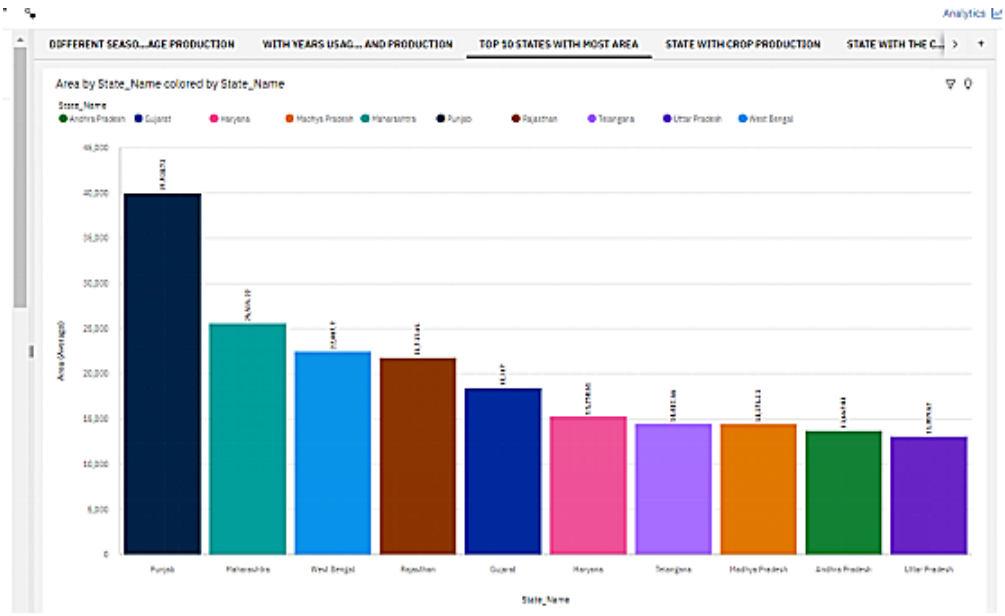

Figure 8.3 Top 10 States with Most Area

4.State with Crop Production

There are so many different crops produced in Indian and most of us don’t know which crop is belongs to which state so we will be plotting and highlight the states in map according to different crops.

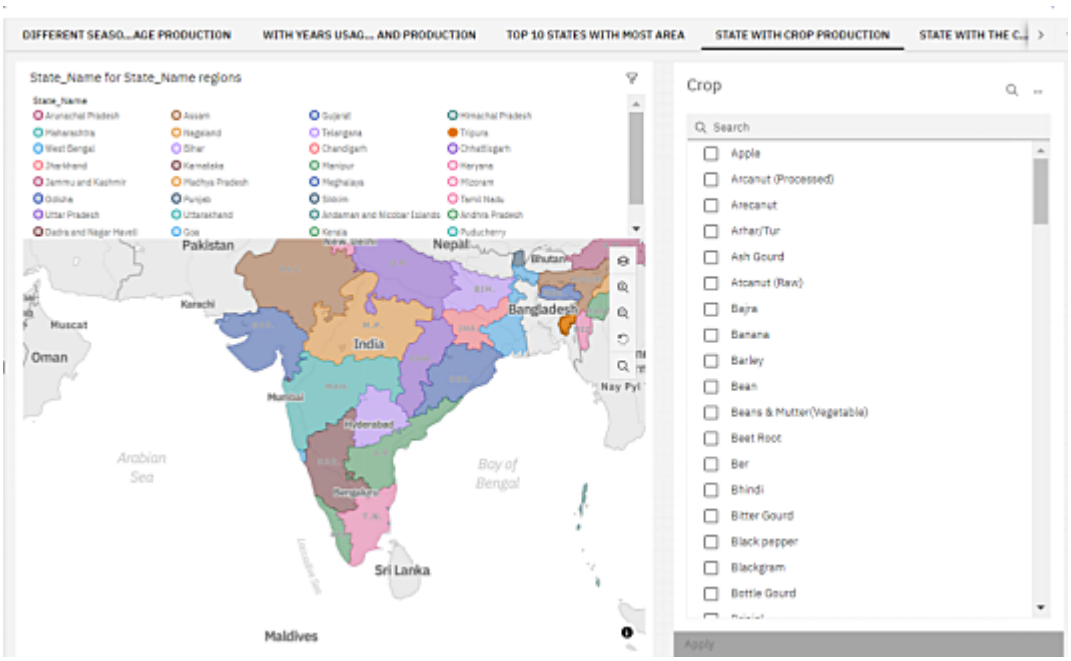

Figure 8.4 State with Crop Production

5.States with the Crop Production along with Season (Text Table)

Taking forward the previous plot we will be fetching the state name and showing it in a text table whenever different crops are chosen.

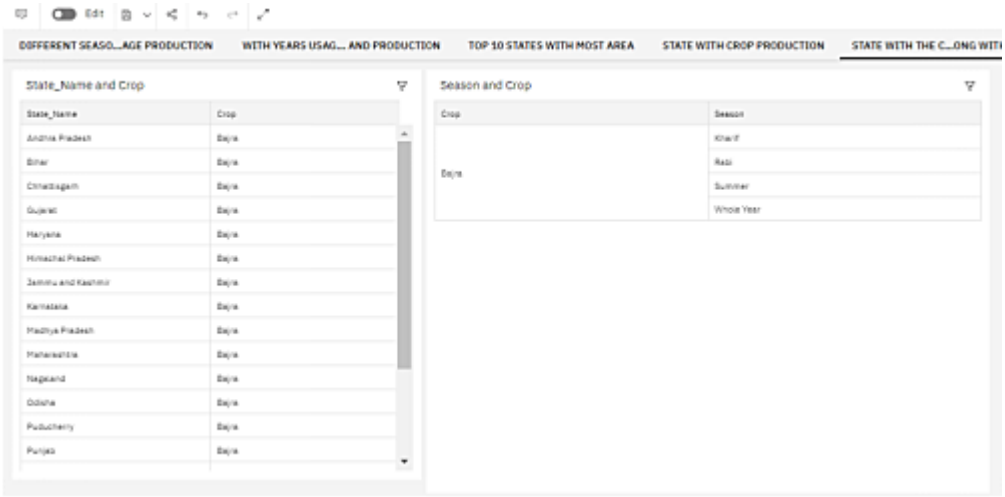

Figure 8.5 States With The Crop Production Along With Season (Text Table)

6.Creating the Dashboard

Once you've created views on different tabs in Cognos analytics, you can pull them into a dashboard.

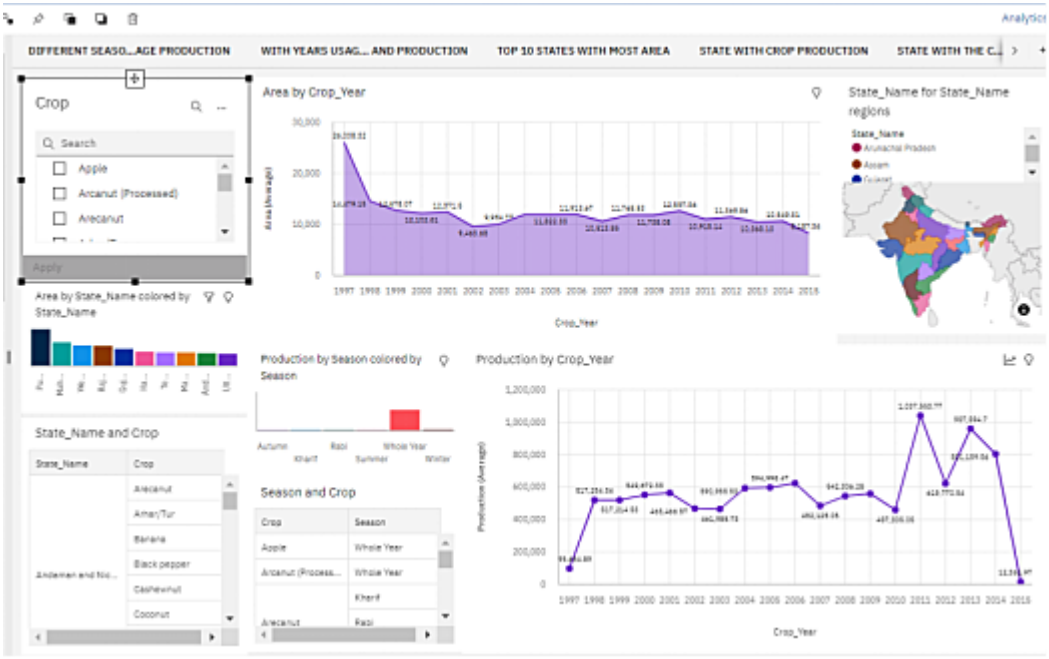

Figure 8.6 Creating the Dashboard

CHAPTER 9

RESULTS

9.1 Performance Metrics

1.Seasons With Average Productions

As production of crops depends on different seasons, so let’s plot the graphs to visualize the average production based on different seasons.

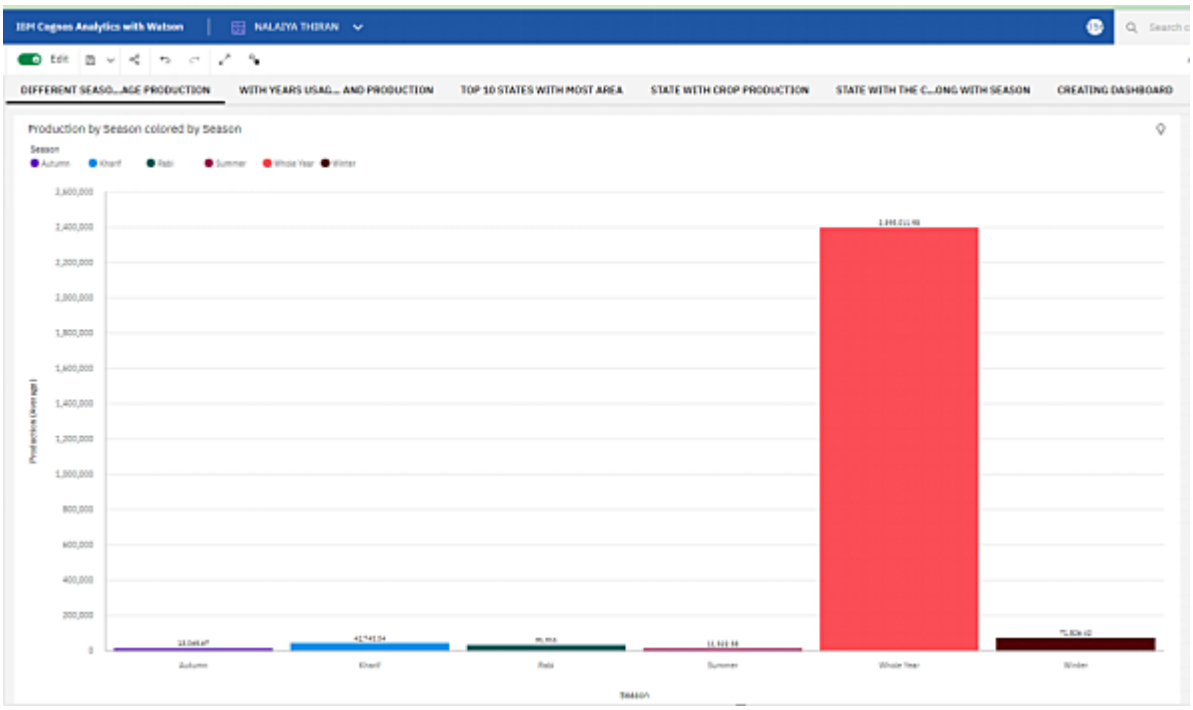

Figure 9.1 Seasons with Average Productions

2.With Years Usage of Area and Production

In our dataset we also have a year’s columns by which we will plot a line and area graphs to see the change in these both data with respect to increase in years.

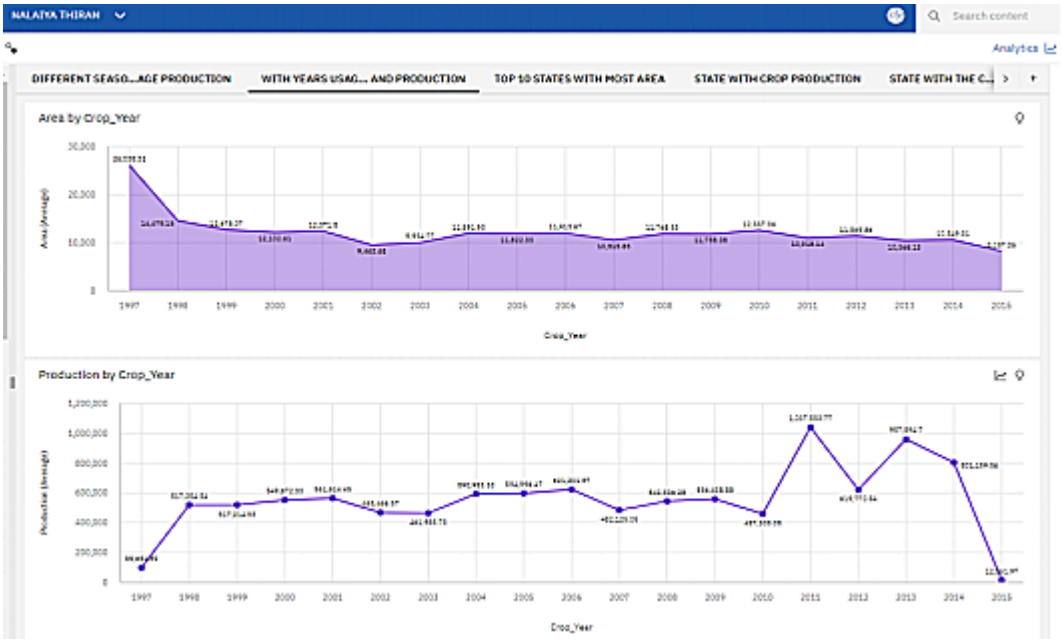

Figure 9.2 With Years Usage of Area and Production

3.Top 10 States with Most Area

As we have an area data in our dataset, we will be plotting some graphs to visualize the top 10 Indian states with the most area.

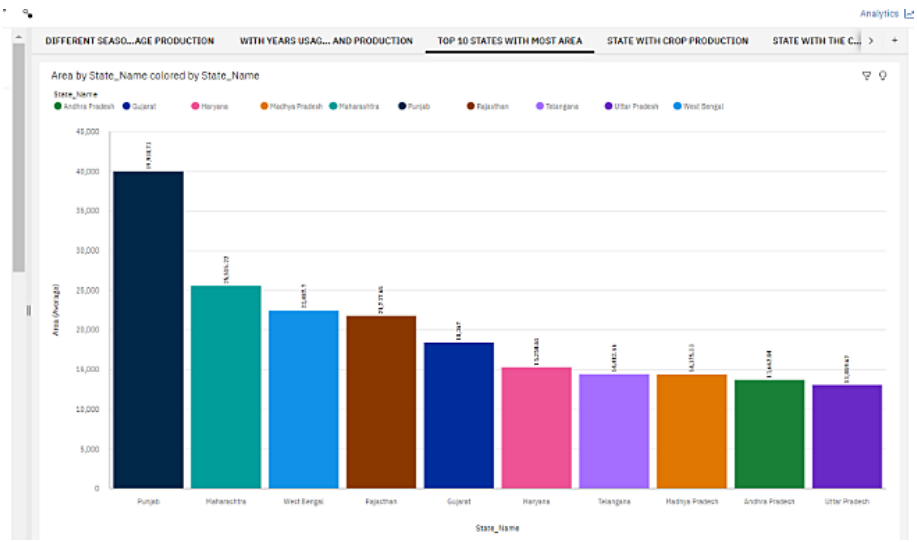

Figure 9.3 Top 10 States with Most Area

4.State with Crop Production

There are so many different crops produced in Indian and most of us don't know which crop is belongs to which state so we will be plotting and highlight the states in map according to different crops.

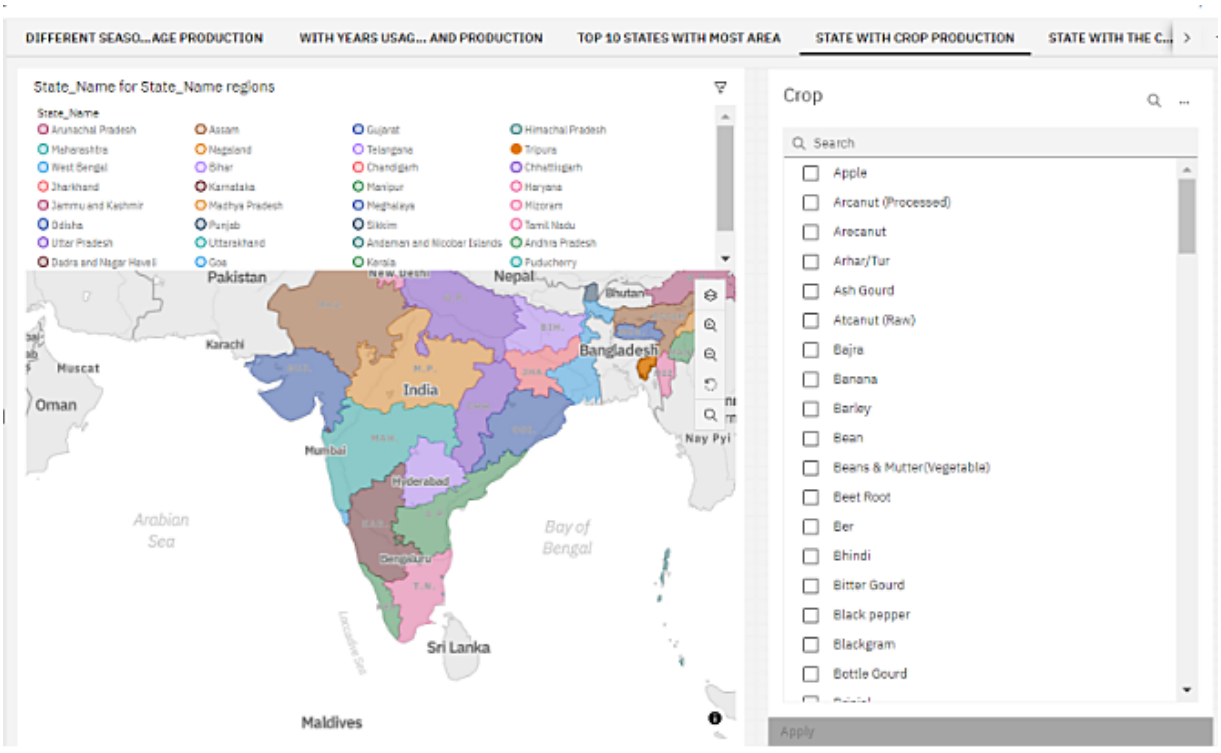

Figure 9.4 State with Crop Production

5.States with the Crop Production Along with Season (Text Table)

Taking forward the previous plot we will be fetching the state name and showing it in a text table whenever different crops are chosen.

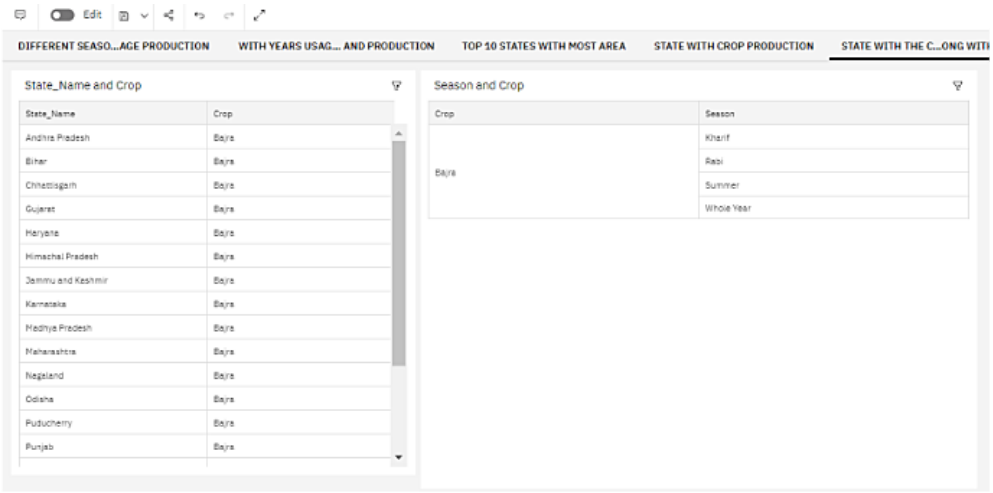

Figure 9.5 States with the Crop Production Along with Season (Text Table)

6.Creating the Dashboard

Once you've created views on different tabs in Cognos analytics, you can pull them into a dashboard.

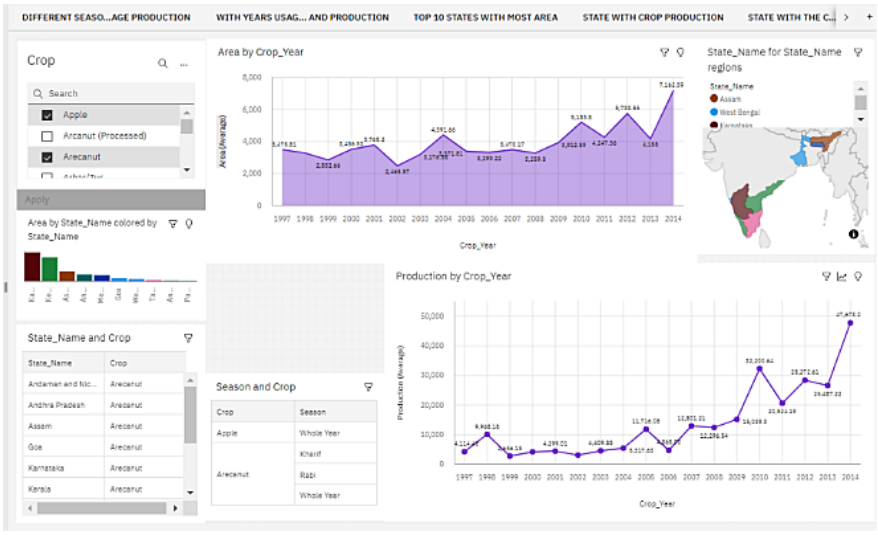

Figure 9.6 Creating the Dashboard

CHAPTER 10

ADVANTAGES AND DISADVANTAGES

Advantages

- Crop yield prediction systems provide for better planning and decision-making to increase production.
- There are various aspects when it comes to crop yield prediction. Some of these include studying climate data, satellite imagery, soil conditions, and possibilities of pest attacks.
- Farmers get a better price for his produce due to higher demand in local market. So there is regular flow of income over year.
- It improves soil structure, percolation and reduces changes of creation of hard-pan in sub soil and also reduces soil erosion.
- The family needs of feed, food, fuel, fiber, spices, sugar etc. are fulfilled and also fulfill needs of livestock.market fluctuations, mechanism of farming, growing expensive crops. So all variety of crops are grown in rotation for more benefit.

Disadvantages

- Previously yield is predicted on the bases of the farmers prior experience but now weather conditions may change drastically so they cannot guess the yield.
- Other stress factors like drought stress, flood stress, and whatever temperature conditions might prevail during a given year, compared to the climate average

CHAPTER 11

CONCLUSION

- As a result of penetration of technology into agriculture field, there is a marginal improvement in the productivity.
- The innovations have led to new concepts like digital agriculture, smart farming, precision agriculture etc.
- It has been observed that analysis has been done on agriculture soils, hidden patterns discovery using data set related to climatic conditions and crop yields data.
- The activities of agriculture field are numerous like weather forecasting, soil quality assessment, seeds selection, crop yield.
- The subsequent work a comparison of the crop yield prediction can be made with the entire set of existing available data and will be dedicated to suitable approaches for improving the efficiency of the proposed technique.Result of crop yield prediction model shows that, if we get weather forecast
- Before irrigation of crop than we can limit amount of irrigation so than we can reduce loss of crop production or will help to farmers to make decision on whether to grow cotton crop or go for the alternative crop.
-
- In the subsequent work a comparison of the crop yield prediction can be made with the entire set of existing available data and will be dedicated to suitable approaches for improving the efficiency of the proposed technique.

CHAPTER 12

FUTURE SCOPE

- Improve the results of analysis model (yield prediction model, price forecasting model), using large number of crop datasets and more weather parameters.
- Building a strong yield prediction and price forecasting model for all the crops on this analysis.

- Generating the crop recommendation using natural or local language to make it user friendly.
- The scope of the project is to determine the crop yield of an area by considering dataset with some features which are important or related to crop production such as temperature, moisture, rainfall, and production of the crop in previous years.

Chapter 13

Appendix

Project link

https://us3.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FNALAIYA%2BTHIRAN&action=view&mode=dashboard&subView=model000001845b35a3e0_00000002

Github link

https://github.com/IBM-EPBL/IBM-Project-21285-1659776760

Project demo link

https://drive.google.com/file/d/1dtn5i5vqKSQmd121oXwnEUP3Bo2_MEOG/view?usp=share_link