ESTIMATE THE CROP YIELD BY USING DATA ANALYTICS

Project report
submitted by

PETCHIMUTHU C	**95191902072**
PRIYADHARSHINI P	**95191902078**
SIVASANKARI S	**95191902097**
SHARA K	**95191902095**
SREENIDHI K	**95191902101**

BACHELOR OF ENGINEERING

in the department of

Electronics and Communication Engineering

TEAM ID:PNT2022TMID13569
GITHUB ID: IBM-Project-52917-1661227482

CONTENT

1. INTRODUCTION

1.1. Project overview

Agriculture is the backbone of the Indian economy. The majority of farmers in India are not obtaining the expected agricultural production for a variety of reasons. Weatherhas a significant influence on agricultural productivity. The amount of rainfall also has an effect on rice farming. Farmers in this circumstance would undoubtedly want early aid in forecasting future crop productivity, and an analysis will be performed to assist farmers in optimising crop production in their crops. Yield prediction is a key topic in agriculture. Every farmer wants to know how much output to expect. Previously, farmer expertise with a certain crop was included when estimating productivity. In Indian agriculture, there is a massive amount of data.Data may be turned into information and utilised for a number of reasons. Cognos Business Intelligence is an IBM web-based comprehensive business intelligence suite. It provides a package of tools for analytics, score carding, reporting, and event and data tracking.The software is made up of severalparts that are designed to meet the various information needs of a business. IBM Cognos, for example, includesIBM Cognos Framework Manager, IBM Cognos,Cube Designer, and IBM Cognos Transformer. Cognos Analysis Studioenables business users to receive prompt responses to commercially relevant questions.

1.2. Purpose

Agriculture is important for human survival because it serves the basic need. A well-known fact that the majority of population (≥55%) in India is into agriculture. Due to variations in climatic conditions, there exist bottlenecks for increasing the crop production in India. It has become challenging task to achieve desired targets in Agri based crop yield. Various factors are to be considered which have directimpact on the production, productivity of the crops. Crop yield prediction is one of the important factors in agriculture practices. 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. The main challenge in using data in agriculture is identification of effectiveness of data analytics. Efforts are going on to understand how data analytics can agriculture productivity.

2. Literature Survey

2.1. Existing problem

At present we are at the immenseneed of another Green revolutionto supply the food demand of growing population. With the decrease of available cultivable land globally and the decreased cultivable water resources, it is almost impossible to report higher crop yield. Agricultural based big data analytics is one approach, believed to have a significant role and positive impact on the increaseof crop yield by providingthe optimum conditionfor the plant growth and decreasing the yield gaps and the crop damage and wastage.

2.2.References

[1]Dhivya B H, Manjula R, Siva Bharathi S, Madhumathi R. A Survey on Crop Yield Prediction based on Agricultural Data, International Journal of Innovative Research in Science, Engineering and Technology. 2017; 6(3).

[2] Jharna Majumdar, Sneha Naraseeyappa, Shilpa Ankalaki. Analysis of agriculture data using datamining techniques: application of big data. Journal of Big data. 2017.

[3] Majumdar J, Ankalaki S. Comparison of clustering algorithms using quality metrics with invariant features extracted from plant leaves. International Conference on Computational Science and Engineering. 2016.

[4] D Ramesh, B Vishnu Vardhan. Data Mining Techniques and Applications to Agricultural Yield Data. International Journal of Advanced Research in Computer and Communication Engineering. 2013; 2(9).

[5] Swarupa Rani. The Impact of Data Analytics in Crop Management based on Weather Conditions. International Journal of Engineering Technology Science and Research. 2017; 4(5):299-308.

[6] F K Van Evert, S Fountas, D Jakovetic, V Crnojevic, I Travlos, C Kempenaar. Big Data for weed control and crop protection. John Wiley & Sons Ltd on behalf of European Weed Research Society, 2017: 218−233.

[7] Wu Fan, Chen Chong, Guo Xiaoling, Yu Hua. Prediction of crop yield using Big Data. 8th International Symposium on Computational Intelligence and Design. 2015.

[8] Dakshayini Patil, M .S, Shirdhonkar. Rice Crop Yield Prediction using Data Mining Techniques: An Overview. International Journal of Advanced Research in Computer Science and Software Engineering, 2017; 7(5):427-431.

[9] Dhivya B H, Manjula R, Siva Bharathi S, Madhumathi R. A Survey on Crop Yield Prediction based on Agricultural Data, International Journal of Innovative Research in Science, Engineering and Technology. 2017; 6(3):4177-4182.

[10] Yogesh Gandge, Sandhya. A Study on Various Data Mining Techniques for Crop Yield Prediction, International Conference on Electrical, Electronics, Communication, Computer and Optimization Techniques, IEEE, 2017;420- 423

[11] R. Sujatha, P.Isakki Devi. A Study on Crop Yield Forecasting Using Classification Techniques, IEEE, 2016.

[12] V. Sellam and E. Poovammal. Prediction of Crop Yield using Regression Analysis, Indian Journal of Science and Technology, 2016; 9(38).

[13] Patricio Grassinia, Lenny G.J. van Bussel, Justin Van Warta, Joost Wolf, Lieven Claessens, d, Haishun Yanga, Hendrik Boogaarde, Hugo de Groote, Martin K. van Ittersumb, Kenneth G. Cassman. How good is good enough?
Data requirements for reliable crop yield simulations and yield-gap analysis. Field Crops Research. 2015; 49−63.

[14] David B. Lobell, The use of satellite data for crop yield gap analysis, Field Crops Research-143, 2013; 56−64.

[15] Martin K. van Ittersuma, Kenneth G. Cassmanb, Patricio Grassinib, Joost Wolfa, Pablo Tittonell, Zvi Hochmand. Yield gap analysis with local to global relevance-A review. Field Crops Research − 143, 2013; 4−17

2.3.Problem Statement Definition:

Agriculture is the field that enables the farmers to grow ideal crops in accordance with the environmental balance. In India, wheat and rice are the major grown crops along with sugarcane, potatoes, oil seeds etc. Farmers also grow non-food items like rubber, cotton, jute etc. More than 70% of the household in the rural area depend on agriculture. This domain provides employment to more than 60% of the total population and has a contribution to GDP also (about 17%) [8]. In the farm output, India ranks second considering the world wide scenario. This is the widest economic sector and has an important role regarding the framework of socio-economic fabric of India. Farming depends on various factors like climate and economic factors like temperature, irrigation, cultivation, soil, rain fall, pesticide and fertilizers. Agriculture sector is struggling to increase the productivity of crop in India. Monsoon rainfall is the main source of water for more than 60 percent of the crops. Smart agriculture driven by Information Technology is the emerging trendin the research in this area in recent days. One of the areas being explored is the problem of yield prediction which is a major concern.

Agriculture contributes about 17% to the total GDP and provides employment to over 60% of the population.

Data mining is defined as a process of identifying previously unknown inferences from the huge volume of available data. It finds application in market analysis, production control, fraud detection, customer retention, E commerce etc. Data mining software analyses relationships and patterns in storedtransaction data based on open ended user queries.

On the basis of the nature of data being mined there are two categories of functions involved in data mining namely, Descriptive function that deals with general properties of data and Prediction function that identifies the trends based on available data. As far as agriculture is concerned predictive types that include classification, association, clustering and regression are used.

Author and publication	Techniquesused	Parameters achieved	Limitations
Grajales , 2015	A web is application developed using Open source tools.	The details of the selectedlocation from map are available at one look to theuser.	Nil
Bendre , 2015	Map Reduce and Linear Regression algorithm are used for weatherforecasting.	The effective modelto improve the accuracy of rainfall forecasting is investigated.	The forecasting is done based on only a weatherdata.
Hemageethaa , 2016	Naïve Bayes,Appriori algorithm are used for yield prediction.	Focuses mainly on various soil parameters like pH, Nitrogen, moisture etc and comparison accuracy is also presented.	Only 77% of accura i cy s achieve d.
Rub , 2009	MLP, Regression tree,RBF,SVM are used.	Comparative of studyvarious i algorithms s presented.	Nil
Sujatha , 2016	Naïve Bayes,J48, randomforests, support vector machines, artificial neuralnetworks are	Climate data and Crop parameters are used forcrop yield is predicted.	Other parameters like soil are not considered.

	implemented.		
Kushwala , 2015	Hadoop File Distributed System (HDFS) is used.	The proposed prediction algorithm helps in building a decision supportsystem for precision farming.	It only predicts the suitability of crop for the givensoil parameters andnot the yield.
Fathima , 2014	k means and Appriorialgorithm are used.	Crop type and Irrigationparameters are considered.	Focus on the policies that government could frame by the cropping practices of farmers
Veenadhari , 2014	k-means, ID3 algorithms, the k nearestneighbor, support vectormachines, artificial neural networks are discussed.	The purpose of Data Miningtechniques in the field of agriculture is presented.	Nil
Sellam , 2016	Regression Analysis (RA), Linear Regression (LR) are cited.	Describes aboutvarious environmental factorsthat influence the crop yieldand the relationship among these parameters is also established.	Nil
Raorane , 2012	Artificial Neural Network (ANN), Decision Tree	The techniques used for crop production is	Nil

	algorithm, Regression Tree, Bayesian network, Support Vector Machine(SVM) and K means arediscussed.	discussed.	
Kaur , 2014	They use BP neural network and simulate the result using MATLAB.	The suitable data model for achieving highaccuracy for price prediction is found.	The prediction is mainly based on onlyprice.
Ankalaki, 2016	DBSCAN, AGNES and MLR are used.	The comparative studybetween DBSCAN and AGNES is presented.	The formula isderived for each crop separately.
Gayatri , 2015	IOT and GPS Imagecapturing are used.	Images are captured. Far and near nodes are communicated through cloud.	Focuses mainlyon image processing techniques.

3. Ideation and Proposed Solution

3.1. Empathy map canvas:
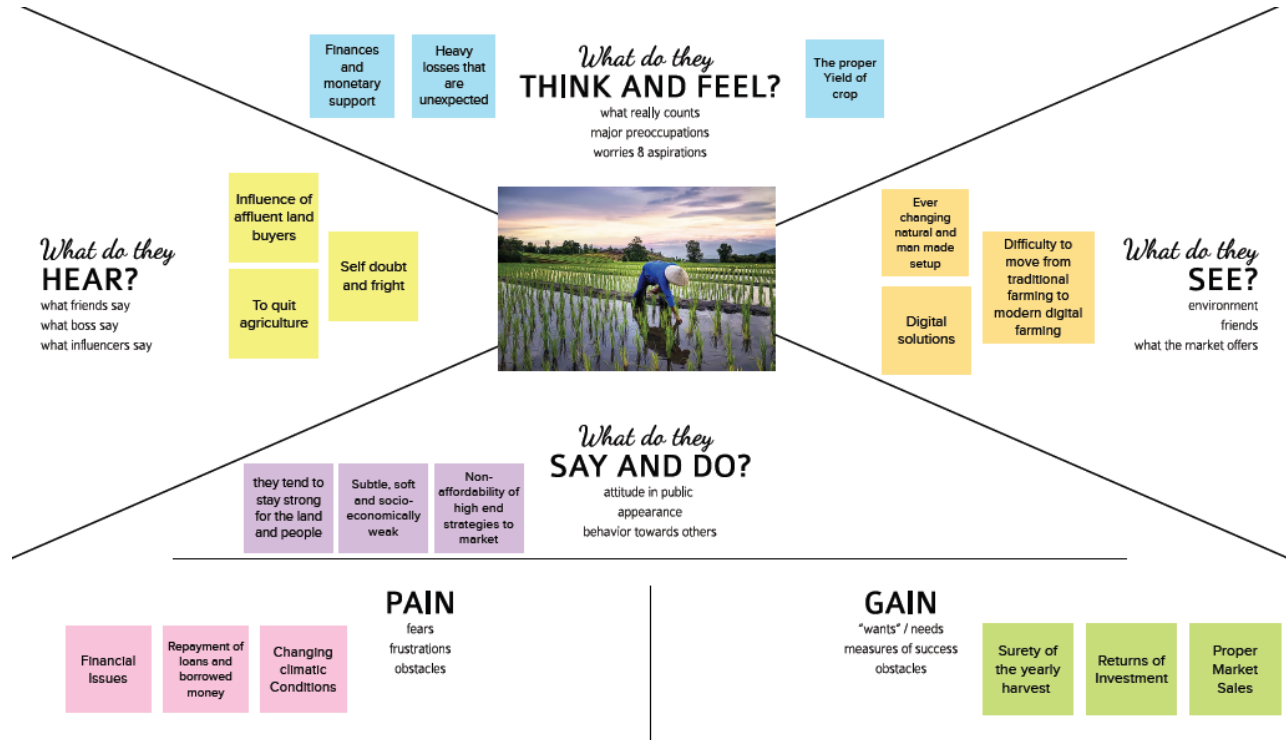
3.2. Ideation and Brainstorming

Brainstorm & Idea Prioritization Template:

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.
Reference: https://www.mural.co/templates/empathy-map-canvas

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

①

Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕐 **5 minutes**

PROBLEM

Crop yield prediction is one of the important factors in agriculture practices. 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.

Step-2: Brainstorm, Idea Listing and Grouping

②

Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕐 10 minutes

TIP 💡
You can select a sticky note and hit the pencil [switch to sketch] icon to start drawing!

Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

- 🕐 **10 minutes** to prepare
- ⧗ **1 hour** to collaborate
- 👤 **2-8 people** recommended

→

Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕐 10 minutes

A **Team gathering**
Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.

B **Set the goal**
Think about the problem you'll be focusing on solving in the brainstorming session.

C **Learn how to use the facilitation tools**
Use the Facilitation Superpowers to run a happy and productive session.

Open article →

Person 1

usage of manure	climate change	problems with extreme weather reasons
collecting the seed's price	estimation of crop's price	quantity of manure to be used
using the solar energy	due to heavy rainfall crops may damage	over use of fertilizers and manures

Person 2

industrial pollution	quality of seeds	how to recycle the waste
predicting the quality of soils	using the wind energy	farmer's budget
poor storage facilities	predicting the weather conditions	managing profit or loss criteria

Person 3

quantity of fertilizers used	to remove the weeds on the field	decrease of soil fertility
providing knowledge about harvesting	heat and drought	irrigation
protecting the environment	crop may get damage	knowing how much nutrients does the crop has

Person 4

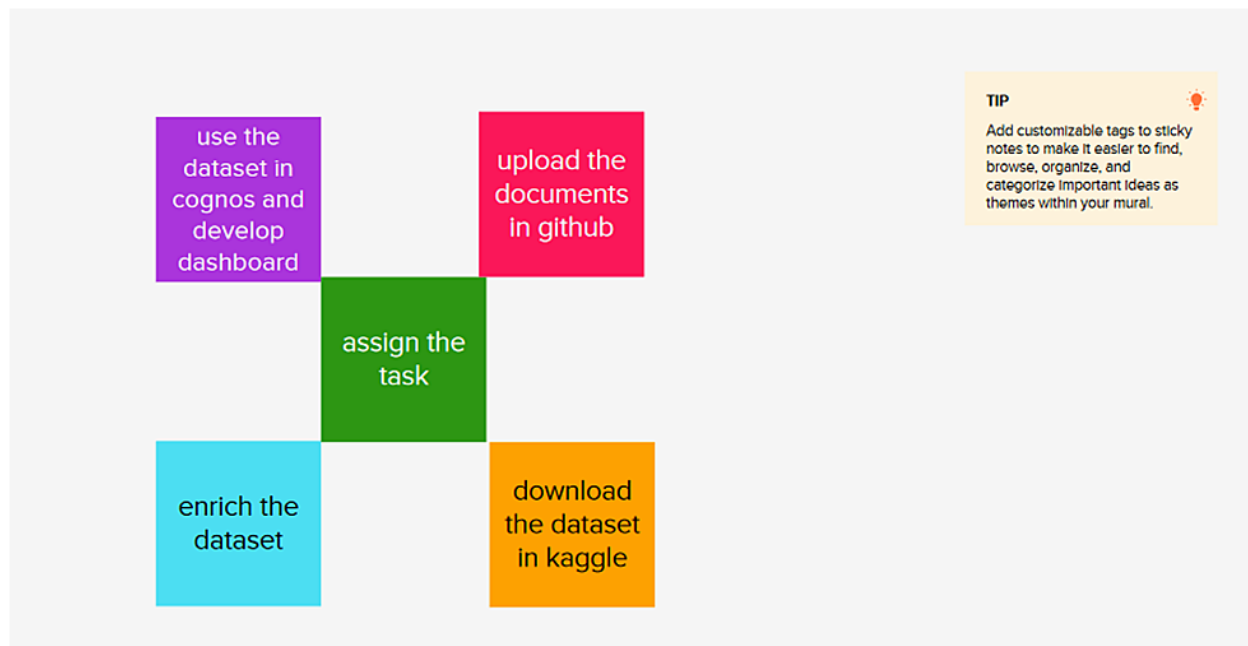|		
buying relevant tools	quantity of water to be supplied	biodiversity affects
predicting the natural calamities	fertilizers quality	deterioration of soil
giving the health conditions to cattles and animals	using more chemical fertilizers	manage the climate changes

person 5

rising demand for more food	insufficient amount of necessary nutrients	providing the best ways of practice of farming
overuse of water and manures	knowing the market area	sowing in the right time
adaption to climate	soil testing and nutrition value	know about the farmers budget

③

Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

🕐 20 minutes

use the dataset in cognos and develop dashboard

upload the documents in github

assign the task

enrich the dataset

download the dataset in kaggle

TIP

Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mural.

Step-3: Idea Prioritization

④

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

🕐 20 minutes

3.3. Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	To estimate crop yields using data analytics, to aid farmers in making better decisions in order to have healthy crop production.
2.	Idea / Solution description	Provide perfect data report after deep analysis of the past data. Helping them out to overcome loss in farming and business.

3.	Novelty / Uniqueness	The dataset contains information about the crops in various districts, states, seasons and areas. Using all these facts, farmers making the best crop choice for their region during a specific growing season to increase output.
4.	Social Impact/ Customer Satisfaction	Perfect data visuals create large impact of the crop yield and hence farmers will be able to gain more benefit.
5.	Business Model(Revenue Model)	A profit will be made by promoting this solution a an easily available mobile app for anyone to access and get benefit from it. Venture partnership with government may yield financial rewards.
6.	Scalability of the Solution	There are no issues about the storage of dataset and collection of data. Hence, the solution can be easily scaled results in positive impact on traffic and increased number of users.

3.4. Problem Solution Fit

4.Requirement Analysis

4.1.Functional Requirement

Following are the functional requirements of the proposed solution.

| FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIN
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User profile	User Details Farm Details
FR-4	Required Data	The past crop yield data and data of the farmer to analyze their yield.
FR-5	Analysis	An analysis is done by the given data to gain useful insights on the crop yields.
FR-6	Estimation	Creating the perfect data module, visuals using IBM Cognos to increase the estimation of the crop yield.

4.2 Non-functional Requirement:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	Ease of usage along with ease in-access of tools and features
NFR-2	**Security**	The user information is protected by the user login and registration with a secured password
NFR-3	**Reliability**	The interactive data visuals of the dashboard can make easy to understand by the farmers
NFR-4	**Performance**	Multiple technologies and services that will improve the usability in agricultural activities.
NFR-5	**Availability**	The dashboard could be easily available viewed in every devices like smart phones, laptops and systems, etc
NFR-6	**Scalability**	Should be able to incorporate as many visualizations and datasets as possible

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.
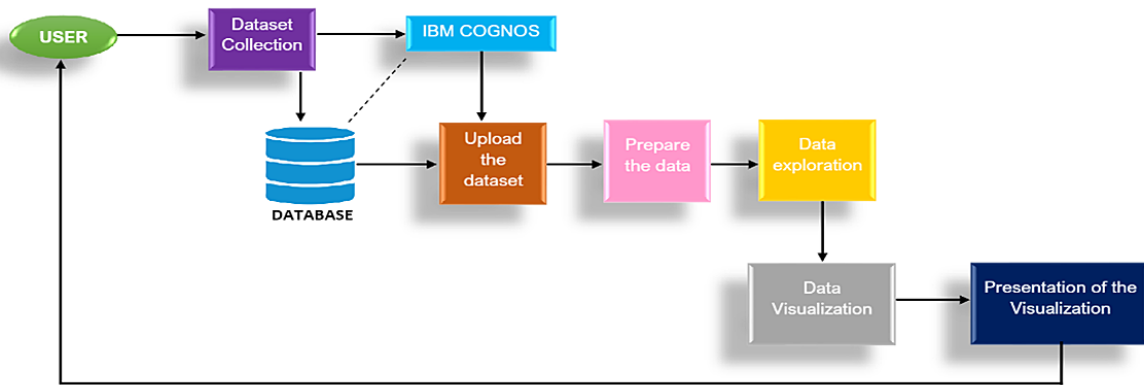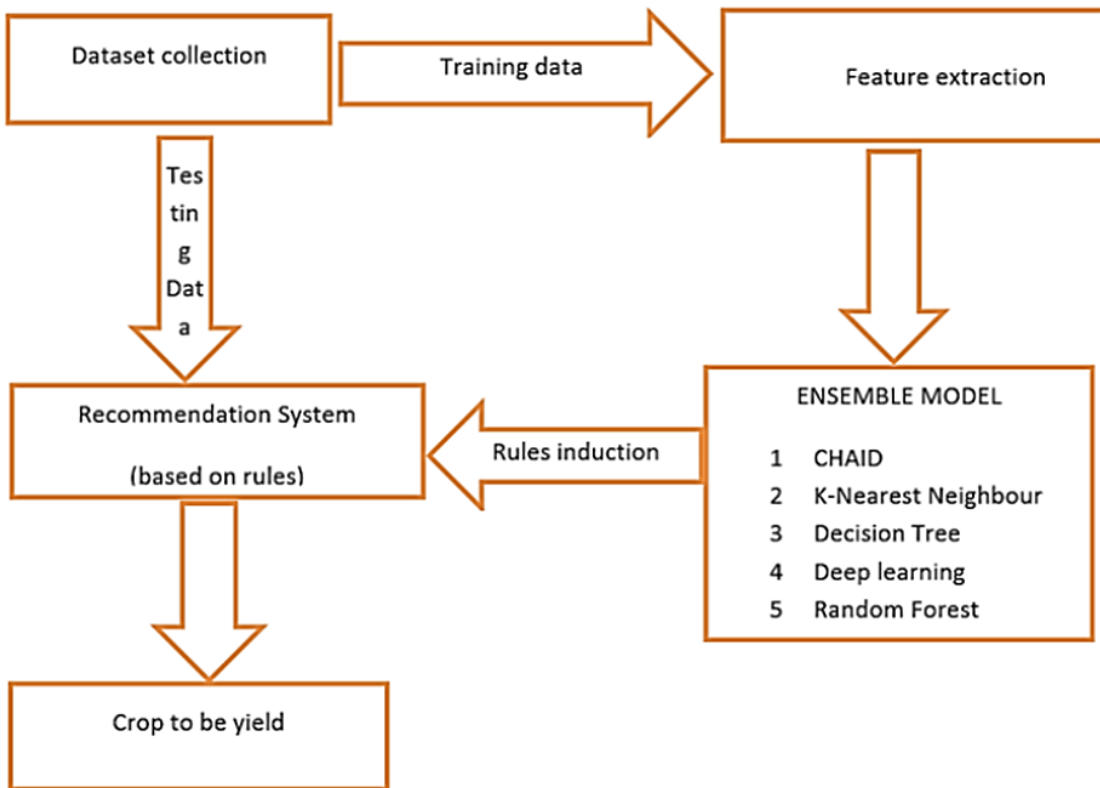

## 5.2.Solution and Technical Architecture:

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.

- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.

- Define features, development phases, and solution requirements.

- Provide specifications according to which the solution is defined, managed, and delivered.

Technical Architecture:
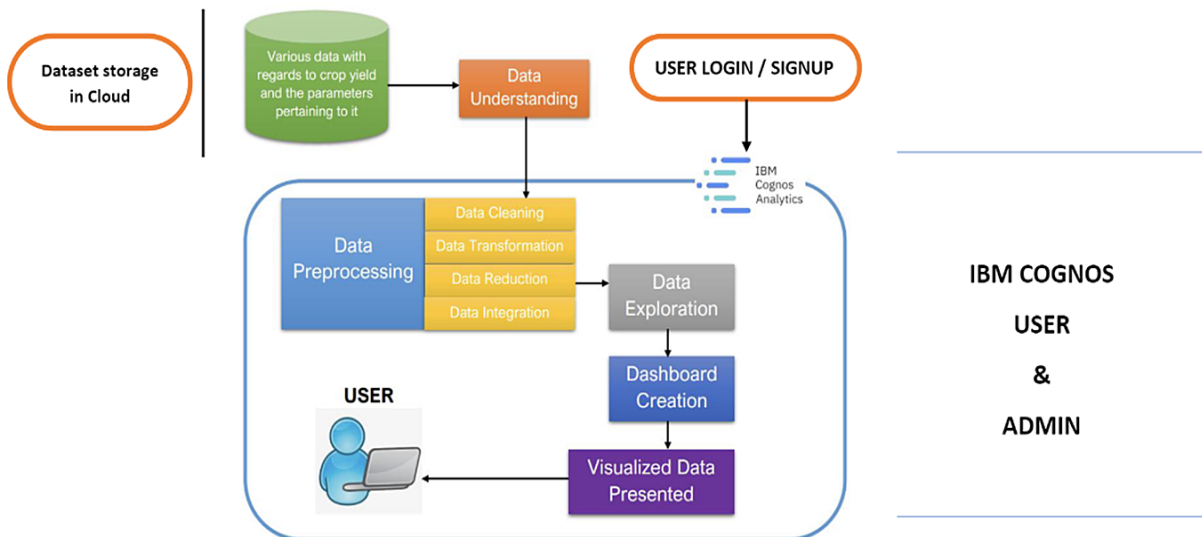
5.3.User Stories

User Type	Functional Requirement (Epic)	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 my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1
		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through Facebook	I can register & access the dashboard with Facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail		Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password		High	Sprint-1
	Dashboard	USN-6	As a user, I can access the dashboard to get insights on a particular crop or region		Medium	Sprint-2

Customer (Web user)	Activity	USN-7	As a user, I can register for the application any web-browser	I can get a pop up or a notification from the browser about the login	Low	Sprint-1
Customer Care Executive	Access resources	USN-8	As a user, I can use my login credentials in the web appplication to access the available resources	No one else can login into my account without the knowledge of the user	High	Sprint-1
Administrator	Set events	USN-9	As a user, I can plan some events for the upcoming days or to do list for a day		High	Sprint-2

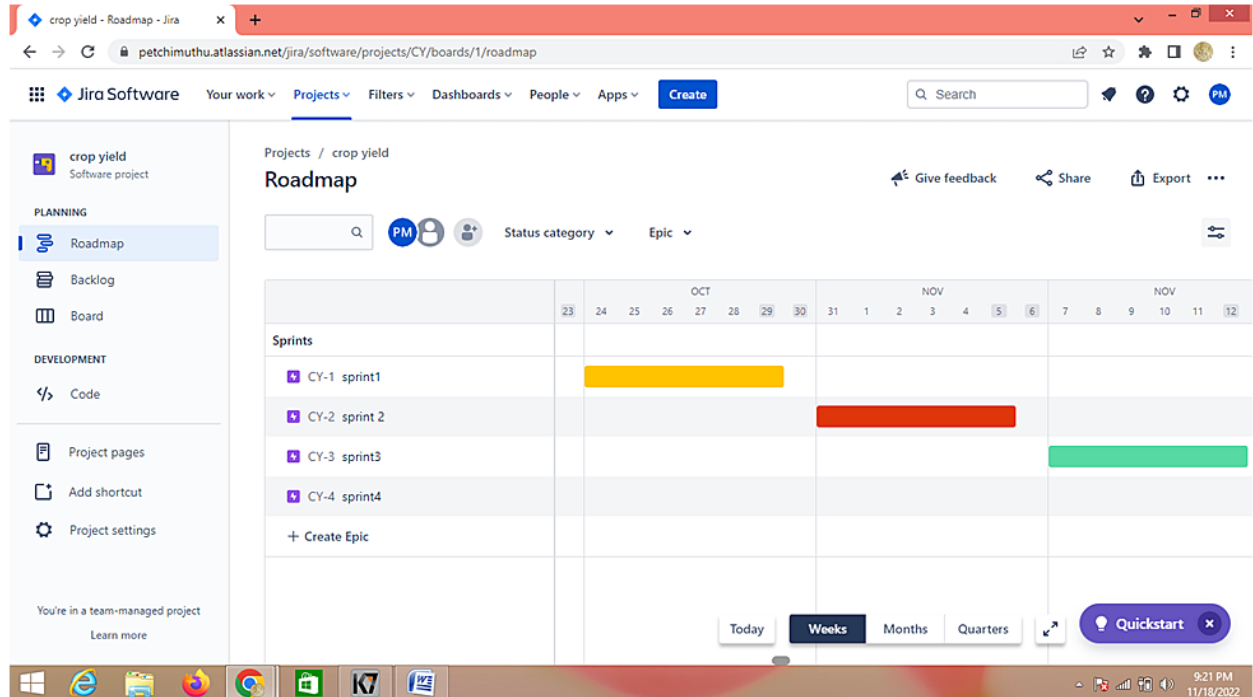# 6. PROJECT PLANNING & SCHEDULING

6.1.Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	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 my email, password, and confirming my password.	2	High	Petchimuthu Sreenidhi Shara Sivasankari Priyadharshini
		USN-2	As a user, I will receive confirmation email. I confirmed the mail .	2	High	Petchimuthu Sreenidhi Shara Sivasankari Priyadharshini
	Login	USN-3	As a user, I can call and request or approach for the dataset.	2	Medium	Petchimuthu Sreenidhi Shara Sivasankari Priyadharshini
Sprint-2	Working with the data set	USN-4	Work on the given dataset, understand the given dataset.	2	Medium	Petchimuthu
		USN-5	Load the dataset to cloud platform	2	High	Sivasankari

Sprint						
Sprint-3	Data Visualization Chart	USN-6	Using the crop production in india dataset, create various graphs and charts to highlight the insights and visualizations.Build the seasons with average productions.	10	High	Priyadharshini
		USN-7	Build the visualizations for with years usage of area and production	4	High	Shara
		USN-8	Create visualizations for Top 10 States with most area	4	High	Sreenidhi
		USN-9	Create visualizations for state with crop production	4	High	Petchimuthu
		USN-10	Create state with crop production along with Season (text table) in cognos	4	Medium	Sivasankari
Sprint-4	Creating The Dashboard	USN-11	In Cognos, create the dashboard using the dataset.	20	High	Petchimuthu Sivasankari Priyadharshini
	Export The Analytics	USN-12	Export the created Dashboard	20	High	Sreenidhi Shara

6.2.Sprint Delivery Schedule

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

6.3.Reports from JIRA

7.CODING & SOLUTIONING (Explain the features added in the project along with code)

1. Dashboard Design

The dashboard is createdusing IBM cognos tool which efficiently visualises a given data

The design is incorporated along with login page and provides excellent

insights on variousdata regarding crops.

```html
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Login Page in HTML with CSS Code Example</title>
  <link href="https://fonts.googleapis.com/css?family=Open+Sans" rel="stylesheet">
<link             href="https://maxcdn.bootstrapcdn.com/font-
awesome/4.7.0/css/font-awesome.min.css" rel="stylesheet"
integrity="sha384-
wvfXpqpZZVQGK6TAh5PVlGOfQNHSoD2xbE+QkPxCAFlNEevoEH3Sl0sibVcOQVn
N"crossorigin="anonymous"><link rel="stylesheet" href="./style.css">
</head>
<body>
<!-- partial:index.partial.html -->
<div class="box-form">
<div class="left">
<div class="overlay">
<h2>ESTIMATION OF CROP YIELD USING DATA ANALYTICS</h2>
<span>
<a href="#"><i class="fa fa-facebook" aria-hidden="true"></i></a>
<a href="#"><iclass="fa fa-twitter" aria-hidden="true"></i> Login with Twitter</a>
</span>
</div>
```

```
        </div>

        <div class="right">

        <h2>Login</h2>

        <div class="inputs">

        <input type="text" placeholder="User name">

        <br>

        <input type="password" placeholder="Password">

        </div>

        <br><br>

        <div class="remember-me--forget-password">

        </div>

        <br>

        <a href="dashboard.html"><button>Login</button></a>

        </div>

        </div>

        <!-- partial -->

        </body>

        </html>
```

2.Webpage creation

```
<htm
l>
        <head>
        <title> Crop yield estimation </title>
        </head>
        <body>
        <body>

        <body style="background-color:powderblue;">
```

```
<h1 style="background-color:DodgerBlue;"><p style="color:white;">    &#
Using Data Analytics!!!...</marquee>
</p></h1>
 </h1>




<img src="https://user-images.githubusercontent.com/111339599/195016514-24efecef-255c-4aa8

<p1 style="font-family:verdana;"> <br> <h3 style="background-color:DodgerBlue;"><p style="
</p></h3>
</p>
<br> Crop production in India is one of the most important sources of income and India is
As per this project we will be analyzing some important visualization, creating a dashboard

<p>Let us look upon an attractive dashboard to know the crop production using IBM COGNOS A
<p><iframe src="https://us1.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_
allowfullscreen=""></iframe></p>

<p style="font-family:verdana;">
</p1><br>

<p style="color:DodgerBlue;">Please use the below link to see our Git repository..</p>

<a href="https://github.com/IBM-EPBL/IBM-Project-52917-1661227482">Github </a>
</p>

<iframe src="https://us1.ca.analytics.ibm.com/bi/?perspective=story&amp;pathRef=.my_folders
allowfullscreen=""></iframe>

</body>
</html>
```

8.Testing

8.1.Test cases

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Result	Status
Home Page_TC_OO1	Functional	Home Page	Verify user is able to see the Login/Signup popupwhen user clickedon Login Buttonin the Homepage	1.Enter URL and click go 2.Click on Login Button 3.Verify login/Singup popupdisplayed or not	Login page shouldpop up as soon as the Login buttonis clicked	Pass
Login Page_TC_OO2	UI	Login Page	Verify the UI elementsin Login/Signup popup	1.Enter URL and click go 2.Click on Login Button 3.Verify login/Singup popupwith below UI elements: a.emailtext box b.pass word textbox c.Login button d.New customer? Createaccount link	Application should showbelow UIelements: a.login with twitter &facebook b.password text box c.Loginbutton with orangecolour d.Last password? Recovery password	Fail

				e.Last password? Recovery password link	link	
Login Page_ TC_O O3	Functional	Login Page	Verify user is able to log into application with Valid credentials	1. Enter URL(login. html) and click go 2. Click on My Account dropdown button 3. Enter Validusern ame/email in Email text box 4. Enter valid password in password	User should navigate to user account homepage	Pass

				text box 5. Click on login button			
Dash board_ TC_O O4	Functional	Dashboa rd page	Verify user is able toview the dashboard and see the charts	1.Enter URL(dashboard.h tml) 2.Clickon the different charts that the user wants.	Application shouldshow the expected charts fromcognos	Pass

8.2.User Acceptance Testing

Purpose of Document:

The purpose of this documentis to briefly explain the test coverage and open issues of Estimate TheCrop Yield UsingData Analytics projectat the time of the release to User Acceptance Testing (UAT).

Defect Analysis:

This report shows the numberof resolved or closed bugs at each severity level,and how they were resolved.

Resolution	Severity 1	Severity 2	Severity 2	Severity 4	Subtotal
By Design	10	4	2	3	20
Duplicate	1	0	3	0	4
External	2	3	0	1	6
Fixed	11	2	4	20	37
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Totals	24	9	11	25	69

Test Case Analysis

This report shows the number of test cases that have passed, failed,and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

9. Results

Log in to IBM Cognos:
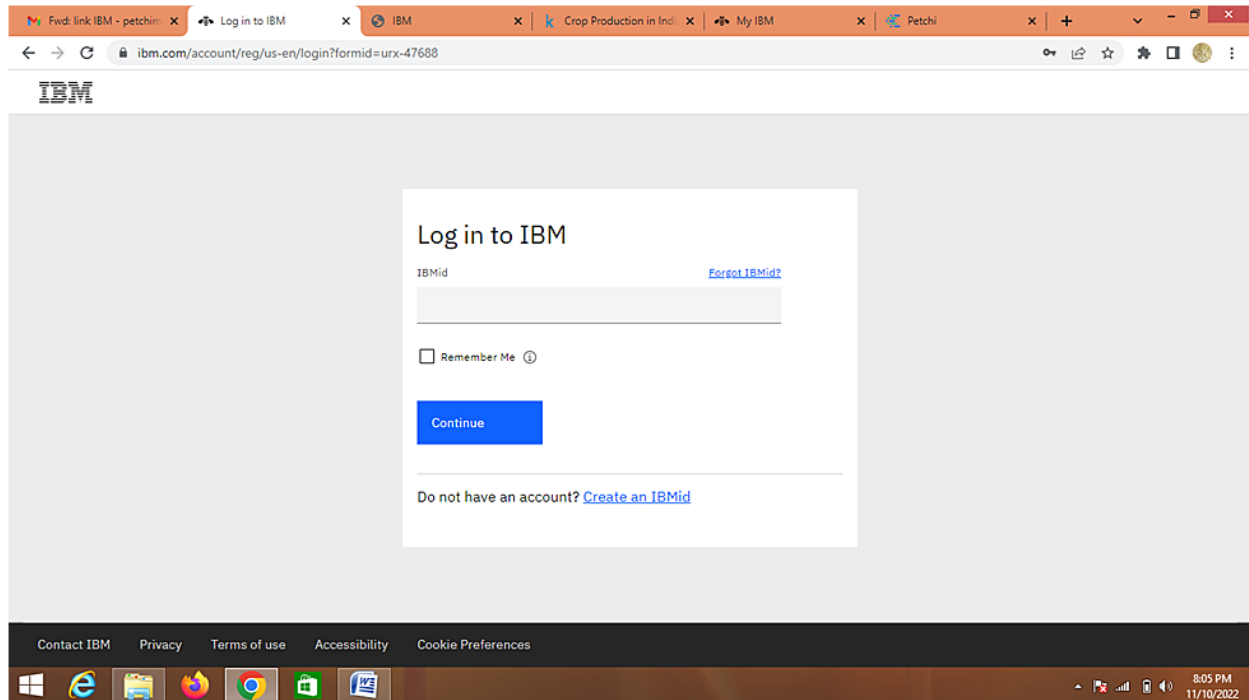
Create the Dashboard:
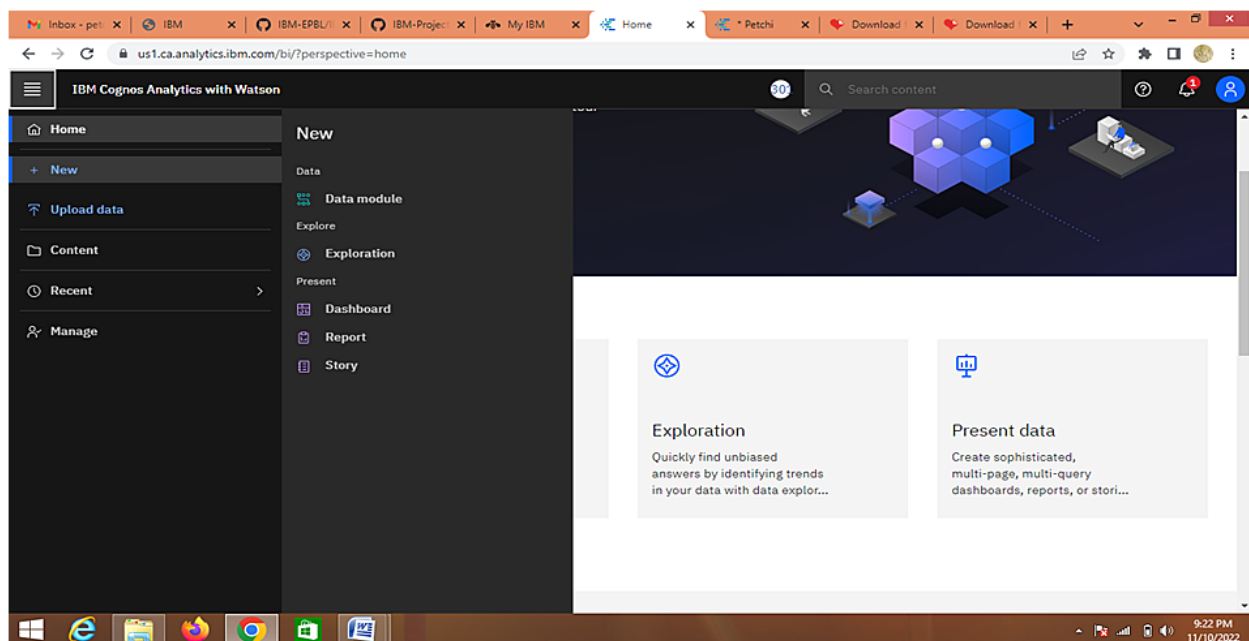
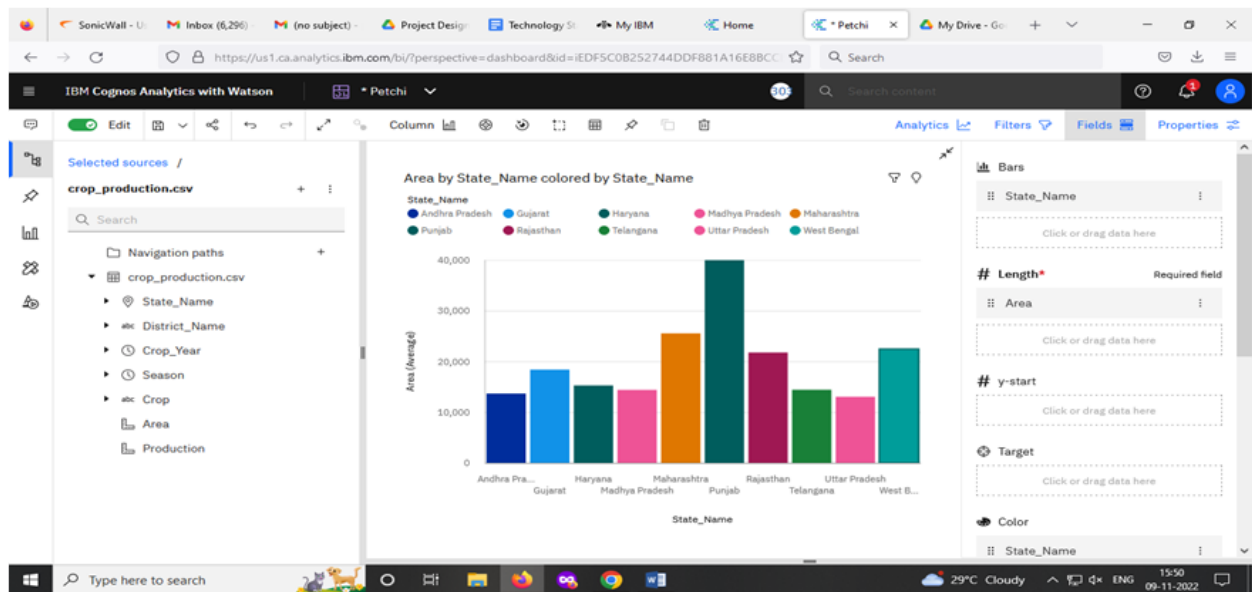**Data visualization charts:**

Seasons With Average Productions
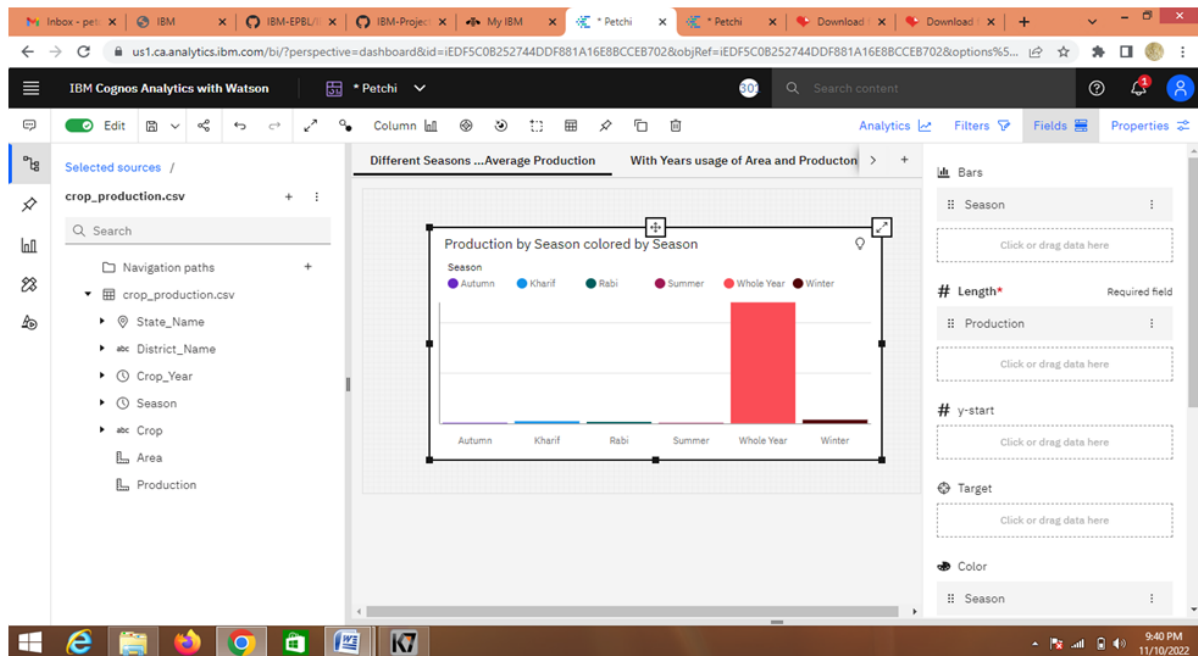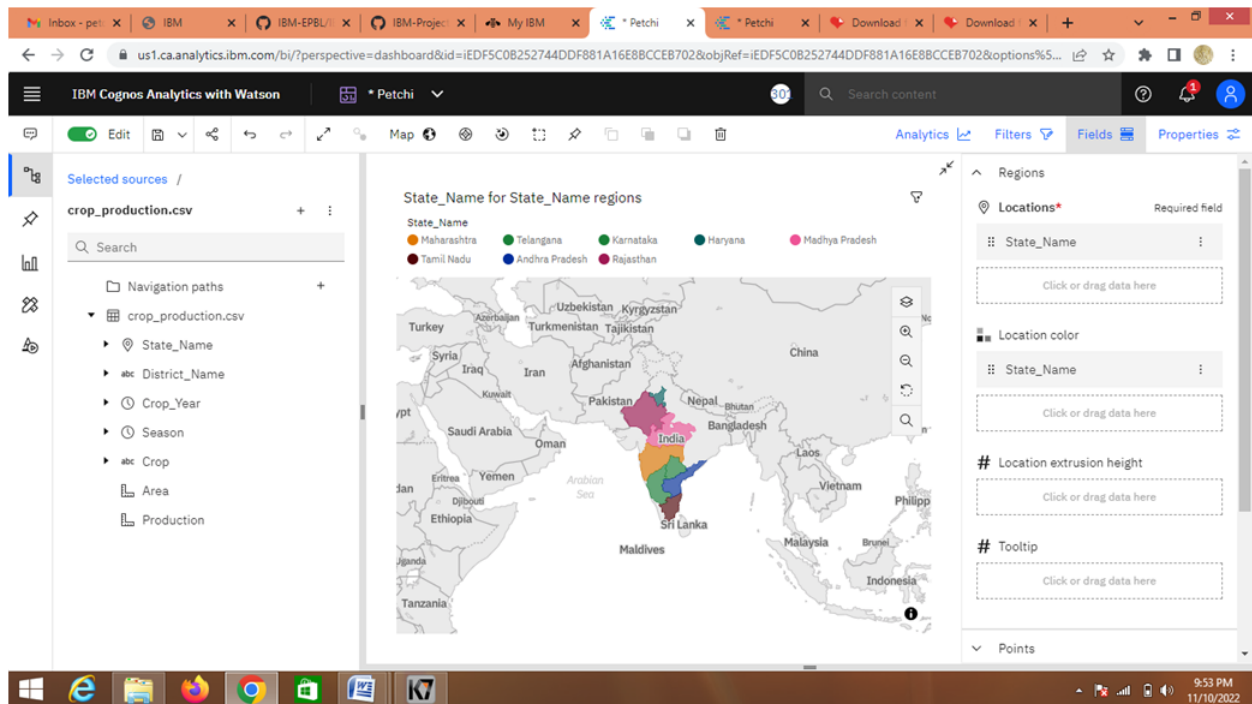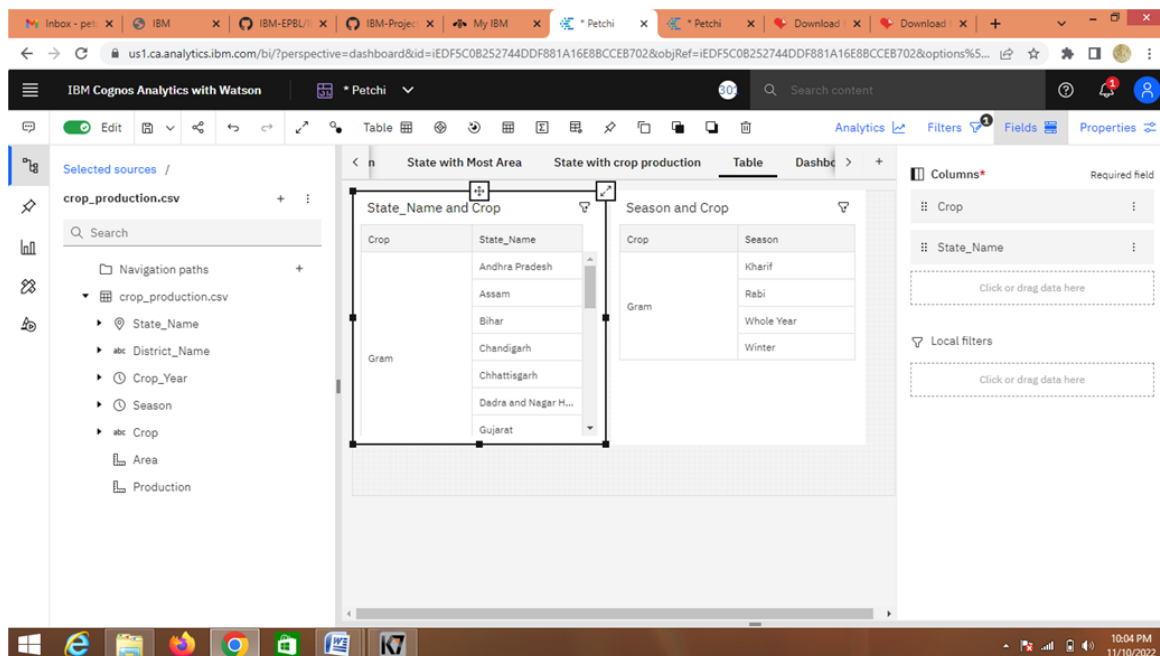

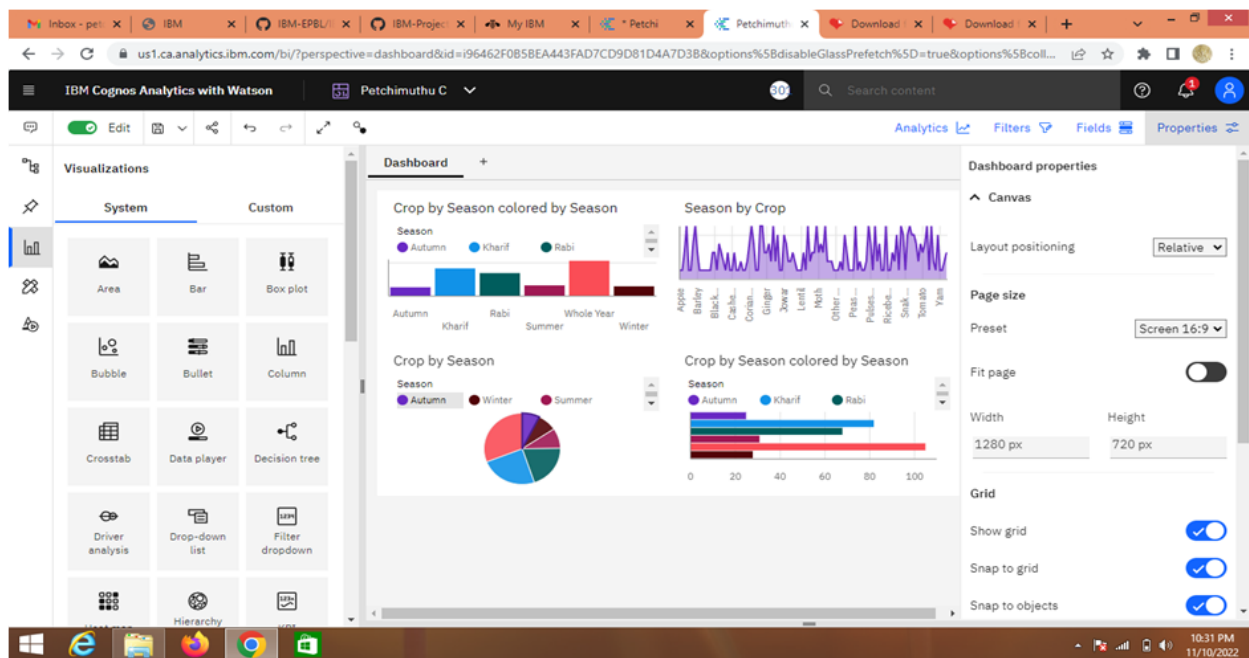**With Years Usage Of Area Production**
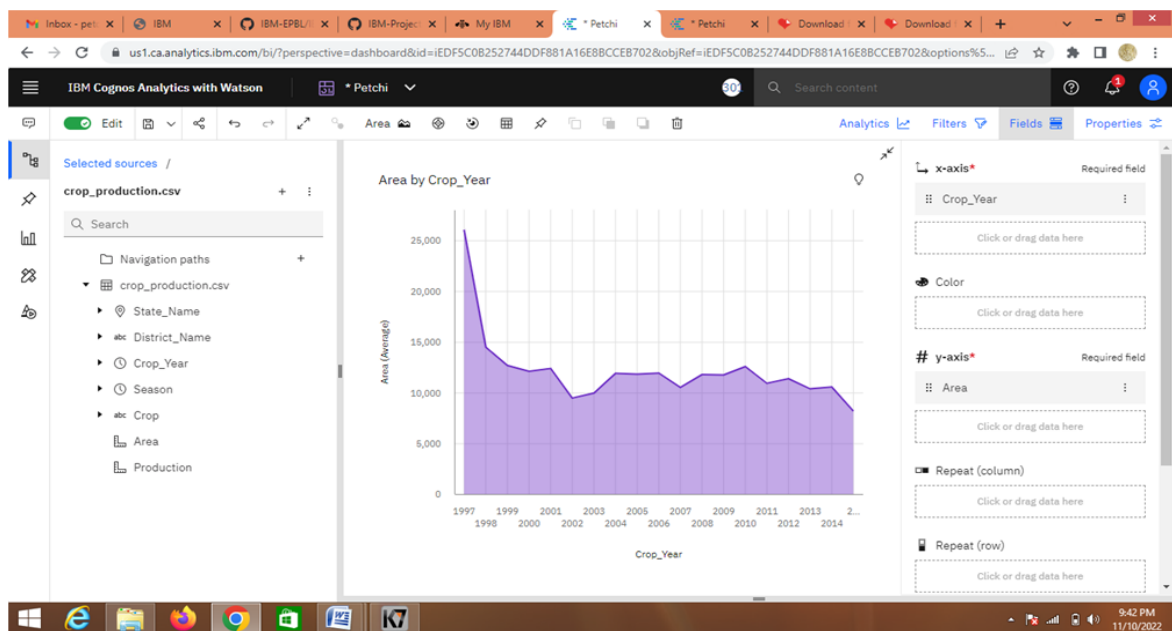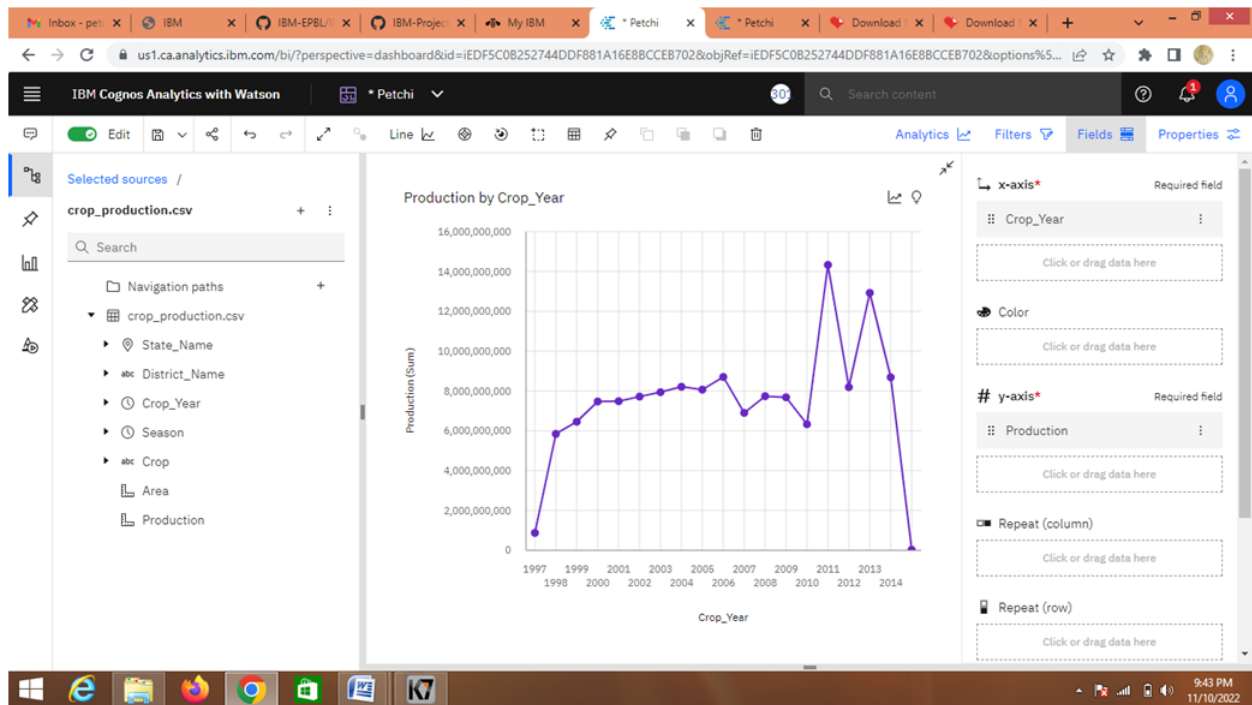
Top 10 States With Most Area
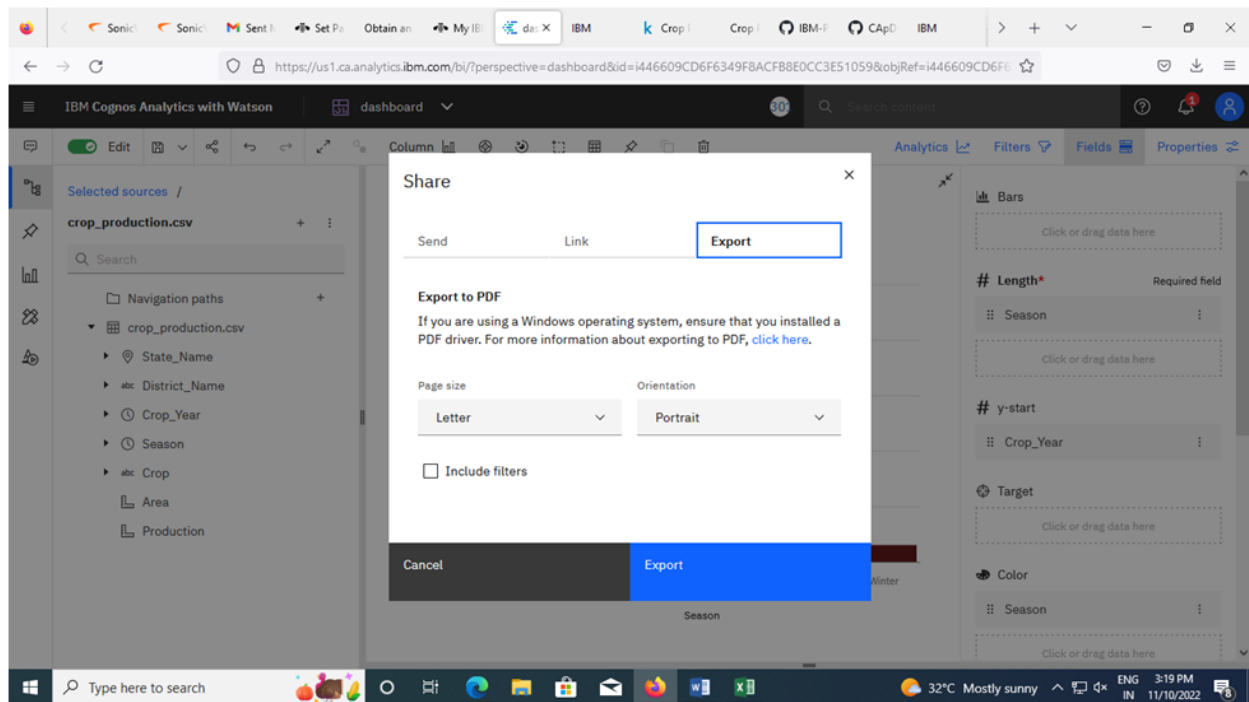
State With Crop Production

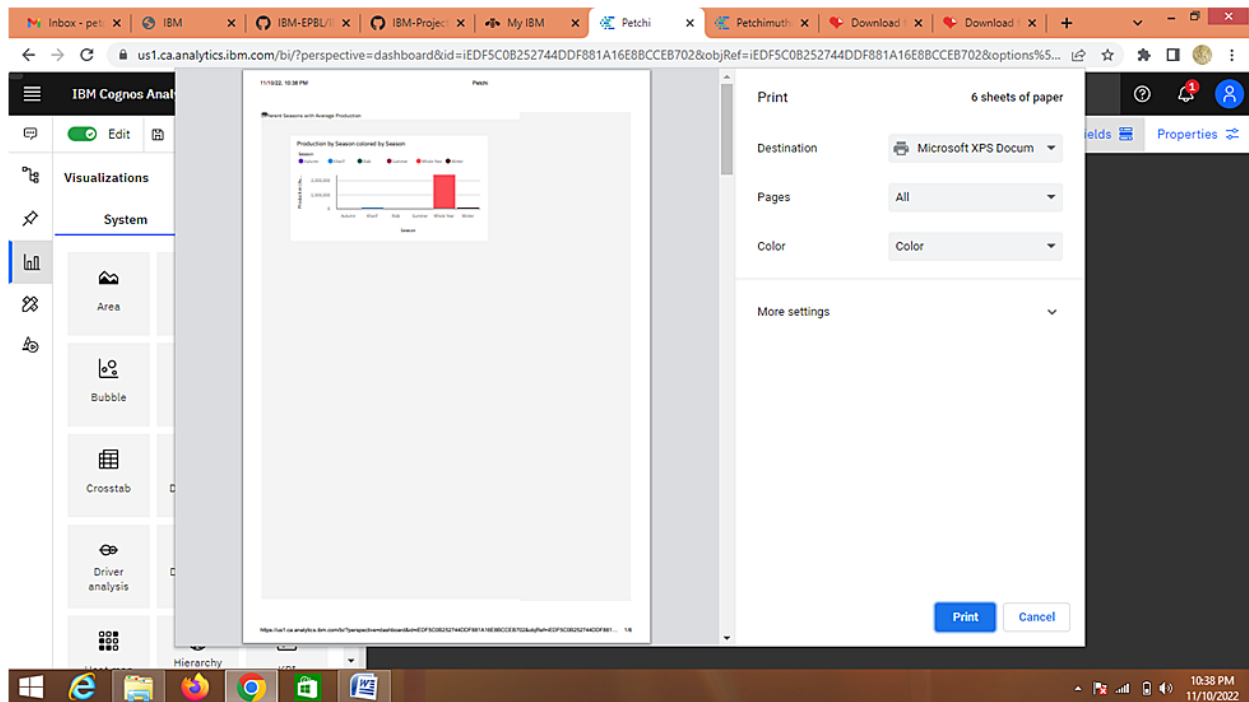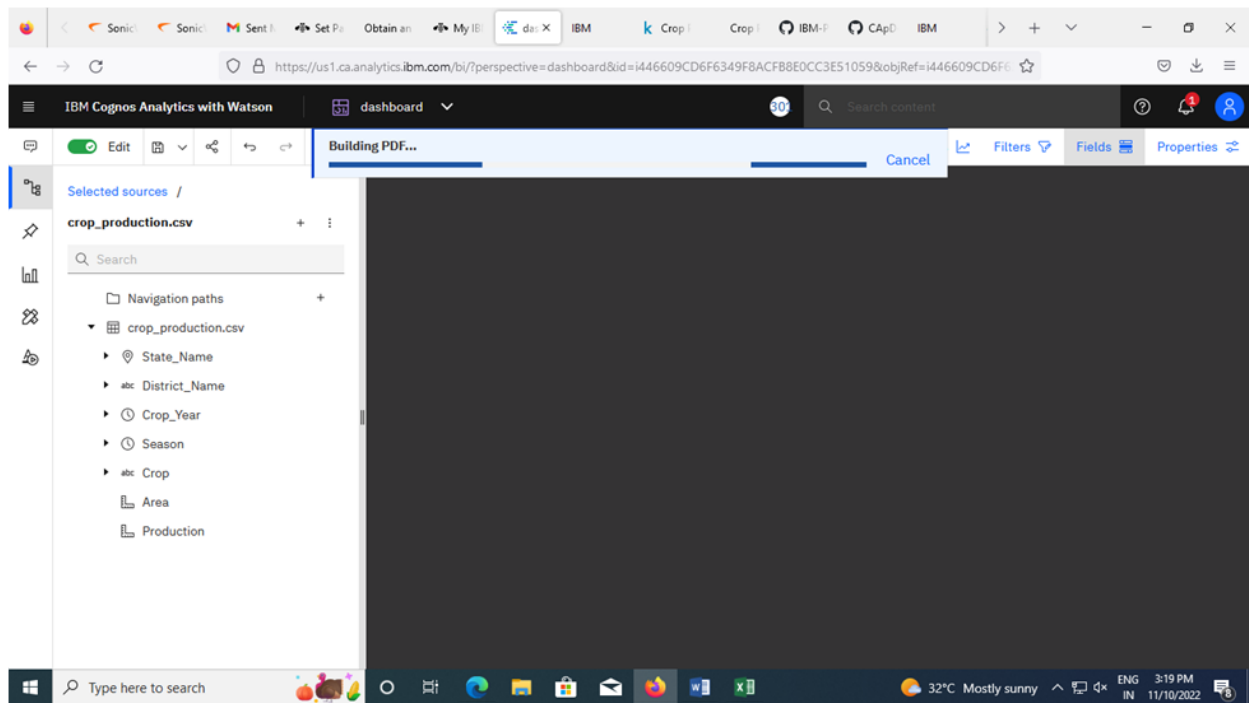**State With The Crop Production Along With Season(Text Table)**

Create the dashboard

Explore the analytics:

10. ADVANTAGES & DISADVANTAGES

10.1 Advantages

● Among the various methods present for this problem Data visualization charts helps us to understand the problem easier.

● Pictorial representation so easy to analyse

. ● Saves times for the farmers because it gives most of the insights.

● Easily portable to any servers.

● Also helps new persons to sow crops in seasonal base.

● More profitable.

10.2 Disadvantages

● Helps only for the literates because of the usage app is not easier.

● Common language is required to study the charts.

● But this does not give the exact production reports.

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. In the literature, it has been observed that analysis has been done on agriculture productivity, hidden patternsdiscovery using data set relatedto seasons and crop yields data. We have noticed and made analysis about different crops cultivated, area and productions in different states and districts using IBM Cognos some of them are 1) Seasons with average productions. In this analytics we come to know in which seasons the average production is more and in which seasons the production is less. 2) Production by crop year. In this analysis we come to know in which years the production is high and low. 3) Production by District. With this analytics we can awareof the districts with the selected crops cultivated and states too.4) Production by Area. From this we can know how much area should be cultivated and the production will be getting will be estimated. Finally created the dashboard and made analysis that in which state and in which year with crop area and to what extent the production will be are analysed.

12. FUTURE SCOPE

● Farmers get most of the insights about crop production in India.

● As it works for all the land fields the India will get higher production and get more profits.

13. APPENDIX

Source code :

IBM Cognos Link

https://www.ibm.com/account/reg/us-en/login?formid=urx-47688

Github Link:

https://github.com/IBM-EPBL/IBM-Project-52917-1661227482

Project Demo Link: