ESTIMATE THE CROP YIELD USING DATA ANALYTICS

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1. INTRODUCTION

Project Overview

Agriculture is important for human survival because it serves the basic need. Due to variations in climatic conditions, there exist bottlenecks for increasing the crop production in India. Various factors are to be considered which have direct impact on the production, productivity of the crops. Crop yield prediction is one of the important factors in agriculture practices. 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 present study gives insights on various data analytics methods applied to crop yield prediction. Agriculture forms the basis for food security and hence it is important. In India, majority of the population i.e., above 55% is dependent on agriculture as per the recent information. Agriculture is the fieldthat enables the farmers to grow ideal crops in accordance with the environmental balance. In India, wheatand rice are the major grown crops along with sugarcane, potatoes, oil seeds etc. Farmers also grow non-fooditems 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. In the farm output, India ranks second considering the world wide scenario. This is thewidest economic sector and has an important role regarding the framework of socioeconomic fabric of India.Farming depends on various factors like climate and economic factors like

temperature, irrigation,cultivation, soil, rain fall, pesticide and fertilizers. Historical information regarding crop yield provides majorinput for companies engaged in this domain. These companies make use of agriculture products as rawmaterials, animal feed, paper production and so on. The estimation of production of crop helps thesecompanies in planning supply chain decision like

production scheduling. The industries such as fertilizers,seed, agrochemicals and agricultural machinery plan production and activities like marketing based on theestimates of crop yield. Farmers experience was the only way for prediction of crop yield in the past days.Technology penetration into agriculture field has led to automation of the activities like yield estimation, crophealth monitoring etc.

Purpose

In India crop yield is season dependent and majorly influenced by the biological and economiccauses of an individual crop. Reporting of progressive agricultural yield in all the seasons is an ample taskand an advantageous task for every nation with respect to assesses the overall crop yield prediction andestimation. At present a common issue worldwide is, farmers are stressed in producing higher crop yield dueto the influence of unpredictable climatic changes and significant reduction of water resource worldwide. Astudy was carried out to collect the data on world climatic changes and the available water resources whichcan be used to encourage advanced and novel approaches such as big data analytics to retrieve theinformation of the previous results to the crop yield prediction and estimation. Study imported that theselection and usage of the most desirable crop according to the existing conditions, support to achieve thehigher and enhanced crop yield.The accurate prediction of crop yield certainly benefits the farmers in choosing the right method toreduce the crop damage and gets best prices for their crops. A research group conducted a work with anobjective of accurate prediction of crop yield through big data analytics to assess various crop yieldinfluencing factors such as Area under Cultivation interims of hectors, Annual Rainfall ratesand Food Price Index and to develop relationship among these parameters. Regression Analysis methodology was applied to examine the selected factors and their impact on crop prediction and final yield.RA methodology is a multivariable investigation practice which can categorize the factors in to groups suchas explanatory and response variables and helps to assess their interaction to obtain a resolution. All theselected factors of the present study design known

as AR, AUC and FPI were measured for a period of 10years between the years 1990-2000. A novel method called Linear Regression is applied to analyze therelationship between explanatory variables and the crop

yield considered as responsevariable. Study reported that the R2 value for the studied factors clearly indicate that crop yield is principallydepends on AR. Study also reported that the other two factors screened were also found tohave significant impact after the AR. Study shall be continued to analyze the impact of for other substantialfactors like Minimum Support Price, Cost Price Index, Wholesale Price Index etc. andtheir relationship on the yields of different crops.Crop yield gaps, measured as difference between expected yields based on the potency and actualfarm yield received. In order to achieve the higher crop yield, farmers must need to tackle the influencingfactors such as influence of change in climate conditions on the prospects of crop yields, and change in theusage of agricultural land to assess and ultimately reduce the crop yield gaps. Several researchers reportedthe applications of bio simulation models to estimate the crop yield gaps in the last decade. The impact of thecrop yield gaps assessment studies conducted through bio simulation based methodologies were negativelyinfluenced by quality and resolution of climate and soil data, as well as unscientifically expectations aboutcrop yield prediction systems and crop yield assessment modeling designs calibration method. An explicitrationale model which can effectively applied at various levels of the availability of quality information foridentifying data sources to analyze crop yield and measuring yield gaps at definite geographical locations andworks based on the rise in titer approach. The model is highly helpful in retrieving the useful data from theavailable, poor quality, less rigorous data sources or if the data is not available. A case study was discussedon the application of selected model design to quantify the yield gaps of maize crop in the state of Nebraska, and also at the different geographical locations representing the nations Argentina and Kenya atnational scale level. Different geographical locations such as Nebraska, Argentina and Kenya wereidentified to symbolize the distinct scenarios of Agri based data availability and the quality for the selectedvariables assessed to predict and estimate the crop yield gaps. The definitive aspiration of the plannedmethod is to afford transparent, easily accessible, reproducible and technically sound and strong guidelinesfor predicting the yield gaps. The proposed guidelines were also relevant for understanding and to simulatethe influence of change in climate conditions and usage of cultivable land changes from national to globalscales.

2. LITERATURE SURVEY

Existing problem

At present we are at the immense need of another Green revolution to supply the food demand ofgrowing population. With the decrease of available cultivable land globally and the decreased cultivablewater resources, it is almost impossible to report higher crop yield. Agricultural based big data analytics isone approach, believed to have a significant role and positive impact on the increase of crop yield by providing the optimum condition for the plant growth and decreasing the yield gaps and the crop damage andwastage. With this aim the present paper reviews about the various advances, design models, software toolsand algorithms applied in the prediction assessment and estimation of the crop yield. India is basicallyagriculture based country and approximately 70% our country economics is directly or indirectly related tothe agricultural crops. The principle crop which occupies the highest (60-70%) percentage of cultivable landin the Indian soil is the paddy culture and it is the major crop especially in central and south parts of theIndia. Rice crop cultivation plays an imperative part in sustenance security of India, contributing over 40% togeneral yield generation. The enhanced yield of the rice crop depends largely on the water availability andclimatic conditions. For example, low precipitation or temperature extremes can drastically diminish riceyield. Growing better strategies to foresee yield efficiency in a mixture of climatic conditions can help tounderstand the role of different principle factors that influence the rice crop yield. Big data analytic methodsrelated to the rice crop yield prediction and estimation will certainly support the farmers to understand theoptimum condition of the significant factors for the rice crop yield, hence can achieve higher crop yield.

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Problem Statement Definition

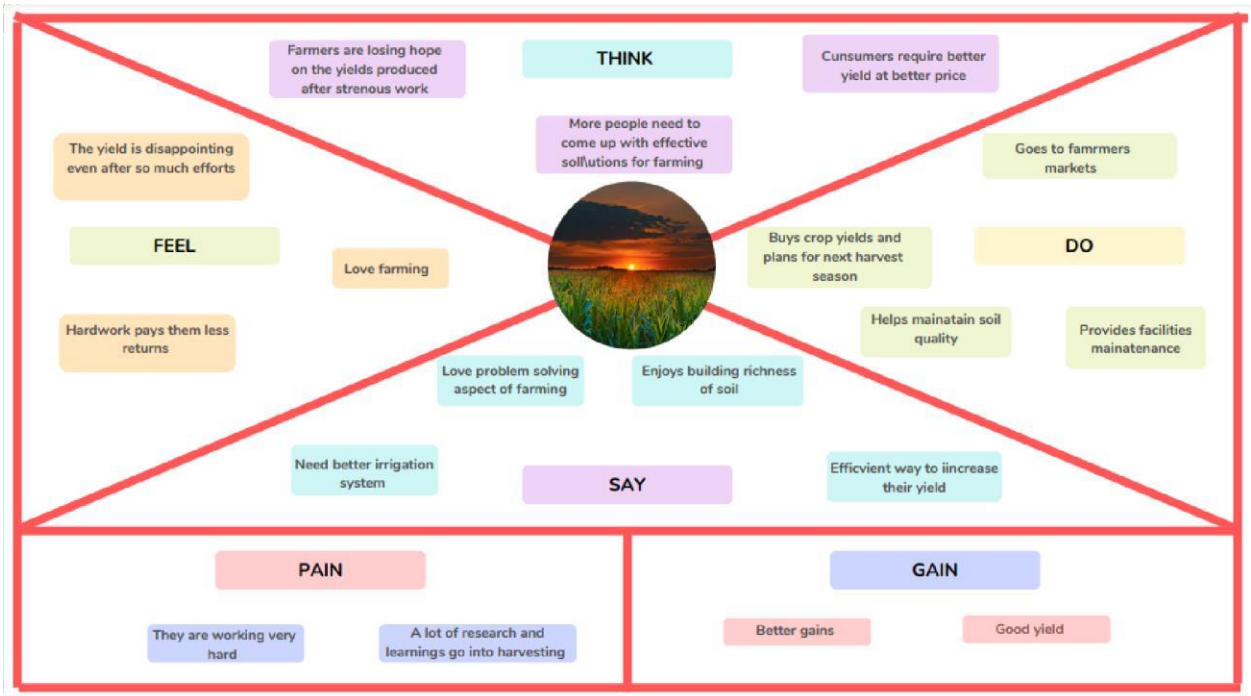
Analyzing the yields of crop is necessary to update the policies to ensure food security. A research group conducted a study with the aim in suggesting a novel data mining method to predict the yields of crop depends on agricultural big data analytics methodologies, which were progressively contrast with conventional data mining methodologies in the process of handling data and modelling designs. Study suggested that the method employed should be user friendly, work based on progressive big-data

responsive processing structure, supposed to utilize the existing agricultural based significant datasets and would still be used with the larger volumes of data growing at enormous rates. Nearest neighbours modelling is one such novel data mining technique which works on the results collected based on data processing structures form the farmers and suggest a well unbiased result on the base of accuracy and

prediction time in advance. Simulation models based on field experiment are valuable technologies for studying and understanding crop yield gaps, but one of the critical challenge remain with these methods is scaling up of these approach to assess the data collated between different time intervals from the broader geographical regions. Satellite retrieved data have frequently been revealed to present data sets that, by itself or in grouping with other information and model designs, can precisely determine the yields of crop in agricultural lands. The yield maps developed shall provide an unique opportunity to overcome both spatial and temporal based scaling up challenges and thus improve the ideology of crop yield gaps prediction. A review was conducted to discuss the applications of remote sensing technology to determine the impact and causes of yield gaps. Even though the example discussed by the research group demonstrates the usefulness of remote sensing in the prediction of yield gaps, but also many areas of possible application with respect to the crop yield assessment, prediction and improvement remain unexplored. Study proposed two less complicated, easily assessable methods to determine and quantify the yield gaps between various agricultural fields. First method works closely with the constructive maps representing the average crop yields, it can be used directly to accesses specific crop yield influencing factors for further studies whereas the second method use the remote sensing technology to retrieve the data for providing the useful information regarding the crop yield prediction and estimation

3. **IDEATION & PROPOSED SOLUTION**

Empathy Map Canvas



Ideation & Brainstorming

In coming decades, two most significant and important factors found to influence crop yield is, increase in the global population and economy, which greatly demands the higher and sustainable agricultural based crop yields. The capacities of food production at global level is going to be very limited due to the less availability of cultivable land, water resources, difficulties in maintaining the sustainable crop production levels, effects of changes in the global climatic conditions and also by various biophysical parameters which influence the crop yield. The farmers need to be educated on the application of scientifically proven methods to quantify the crop yield capacities and same need to be informed to higher authorities to maintain transparency in sharing the actual information, intern helps in making the policy based, research oriented, development and investment related decisions that aim to influence future crop yield. Crop production abilities and yield gaps can be assessed and measured by comparing the possible yields at normal conditions with respect to the crop production under, respectively, irrigated and rain fed conditions by keeping the crop yield levels limited by the less availability of the water as benchmarks. Yield gaps can be defined as the difference between the expected crop yields with respect to the actual crop yield and accurate, spatially unambiguous awareness and information about the yield gaps is necessary to achieve sustainable amplification of agricultural yields. Keeping an aim of discussing the impact of the various methods practiced in measuring the yield gaps with a spotlight on the local-toglobal importance of outcomes, a research group carried out a survey on the various methods applied to estimate yield gaps.

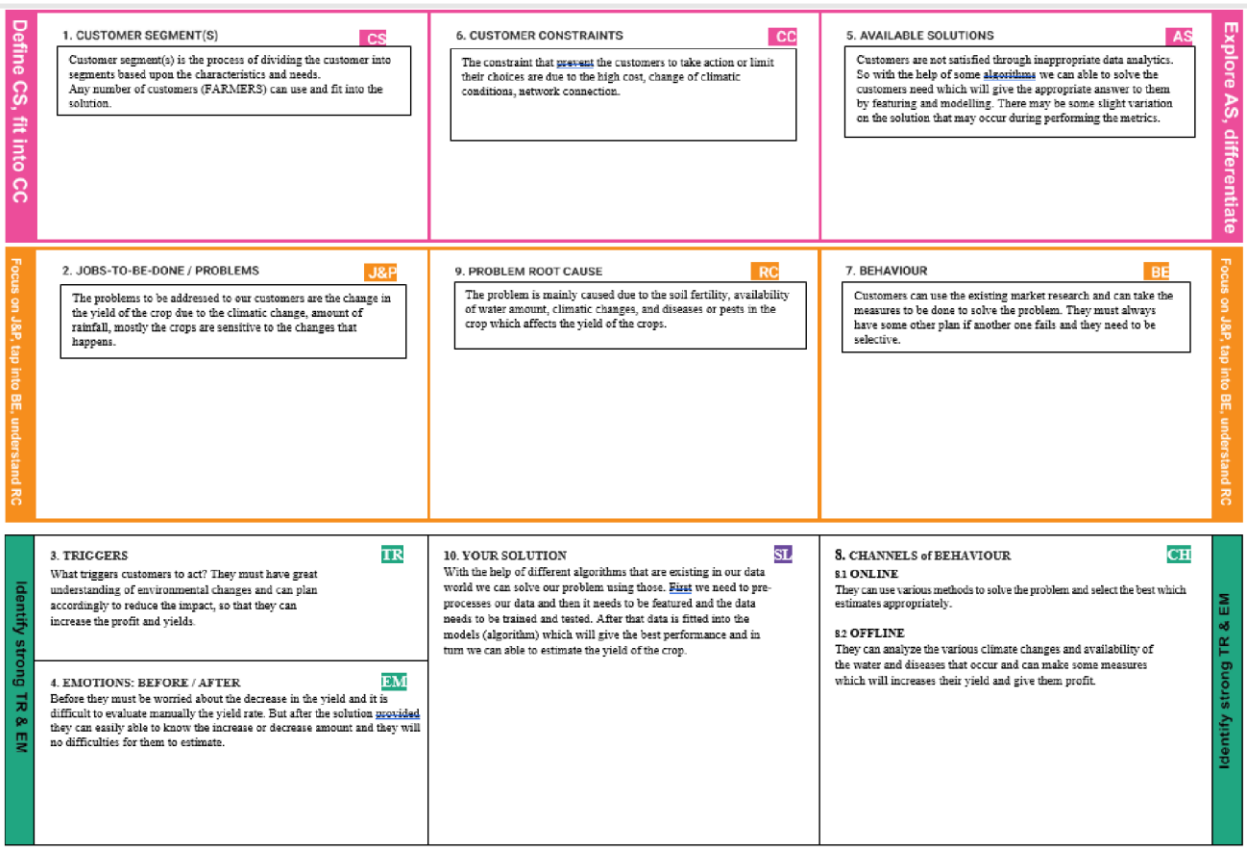
Study reported few standard operation methods, employed in quantifying the crop yield potential on the data collected from the farmers of western Kenya, Nebraska and Victoria. Study recommended for the use of accurate and recent yield data assessed through calibrated crop model designs and further upscaling validated methods in the prediction of crop yield gaps The bottom-up application of this global protocol allows verification of estimated yield gaps with on-farm data and experiments.

Proposed Solution

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Crop production in India is one of the most important sources of income and India is one of the top countries to produce crops. Where Digital Farming and Precision Agriculture allow precise utilization of inputs like seed, water, pesticides, and fertilizer s at the right time for the crop for maximizing productivity, quality, and yields.
2.	Idea / Solution description	Predicting the crop yield well in advance prior to its harvest can help the farmersand Government organizations to make appropriate planning like storing, selling, fixing minimumsupport price, importing/exporting etc.
3.	Novelty /Uniquenes s	Optimizing and improving the accuracy of data visualization. Personalisation and Serviceprovided with deep analysis of data.
4.	Social Impact / Custom er Satisfaction	Increasing innovation and productivity. Reducing wasteand improving profits.
5.	Business Model (Revenue Model)	Extreme weather events, such as periods of high temperature, heavy storms, or droughts, can severely disrupt crop production.

6.	Scalability of the Solution	In comingdecades, two mostsignificant and important factors found to influence crop yield is increase in the global population and economy, whichgreatly demands the higher and sustainable agricultural based crop yields.

Problem Solution fit



4. **REQUIREMENT ANALYSIS**

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 Facebook
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	Crop Information	Survey reports , graphs
FR-4	Crop Yield Estimation	Entering information about crops, weather

Non-Functional requirements

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

NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	It can be used by farmers or anyone related to growing crops.
NFR-2	Security	The data given is secure and it is used only to estimate the yield.
NFR-3	Reliability	The information of the dataset is useful in estimating the crop yield.
NFR-4	Performance	It predicts the accurate results and provides results faster.
NFR-5	Availability	Its interface is made in a way that it's available to the users all the time and can fetch results whenever required.
NFR-6	Scalability	It can be scaled by adding different featured to help the users by letting them know more about crops and the yield.

5. **PROJECT DESIGN**

Data Flow Diagrams

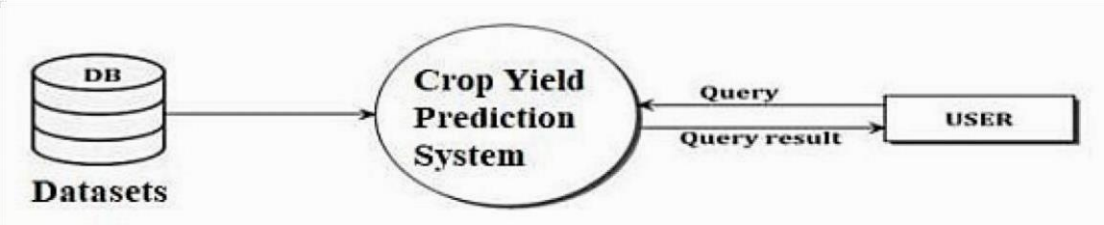


Fig.5.1.1 DFD Level 0

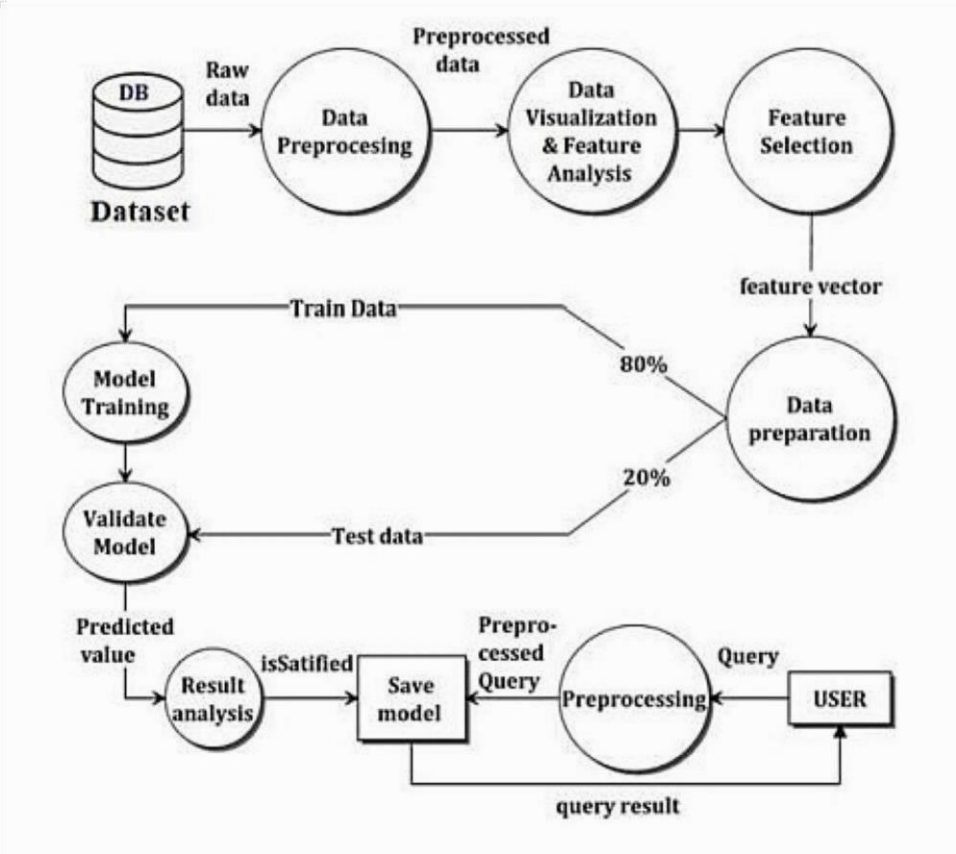


Fig.5.1.2 DFD Level 1

Solution & Technical Architecture

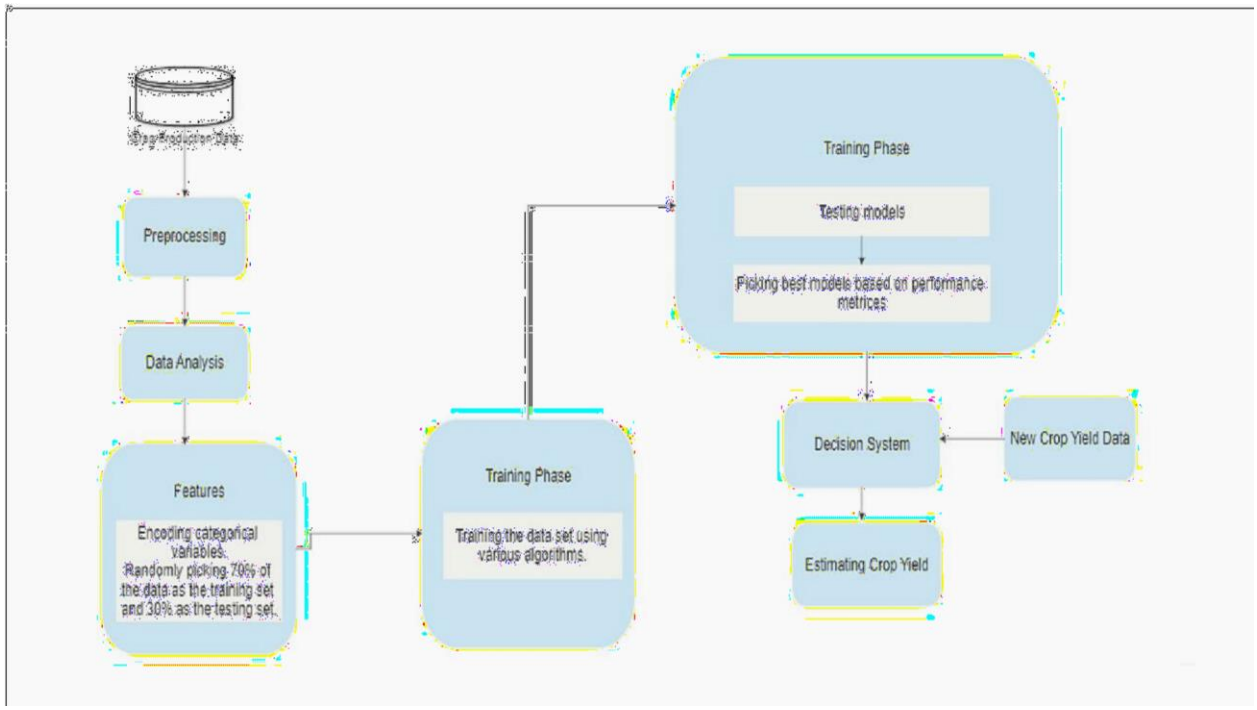


Fig.5.2.1 Solution Architecture Diagram

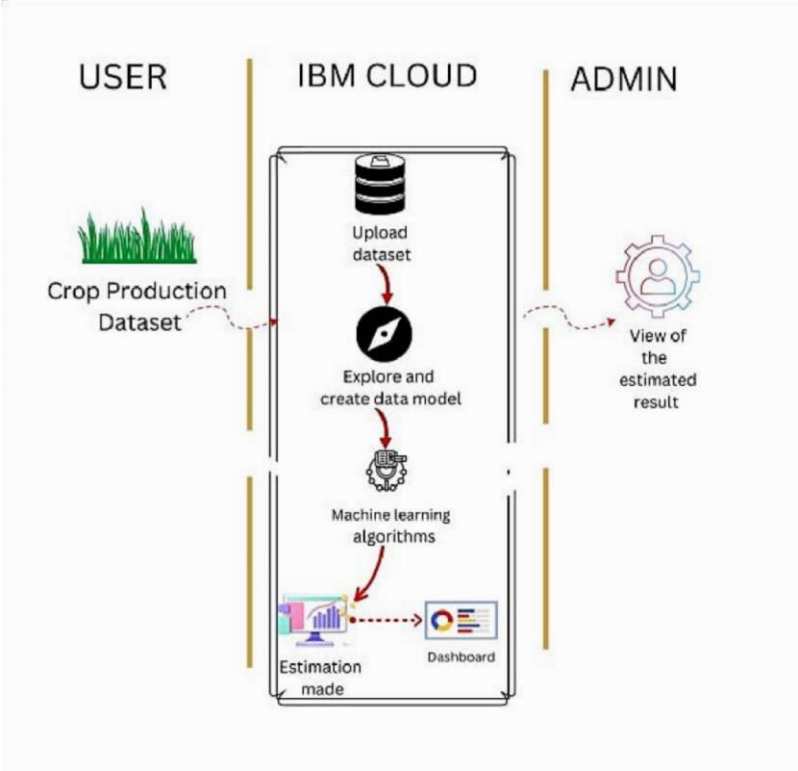


Fig.5.2.2 Technology Architecture Diagram **User Stories**

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance cr teria i	Priority	Release
Tester	Domain Expertise	USN-1	The data set is pre processed and trained	Introduction and data Processing	High	Sprint 1
		USN-2	Login Page is created for user interaction	Login page	High	Sprint 2
Developer	Data analysis tools	USN-3	The data set is classified and modelled using various tools	Data Modelling	High	Sprint 3
End User	Data visualization tools	USN-4	The output is analysed using big data tools and the outcome is visualized	Data Visualization	High	Sprint 4

6. **PROJECT PLANNING & SCHEDULING**

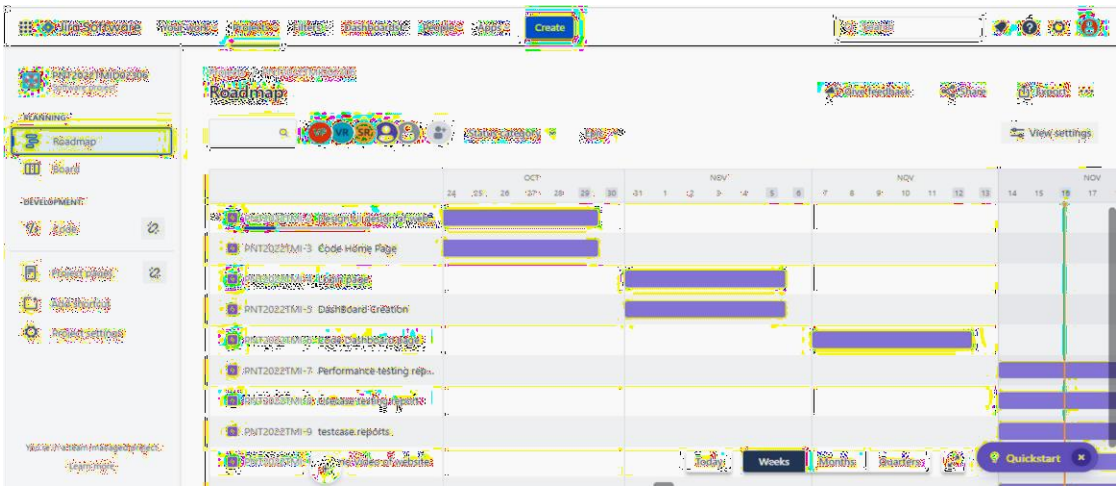
Sprint Planning & Estimation

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 mypassword.	10	High	Thejha B
Sprint-1		USN-2	As a user, I will receive confirmation email once I haveregistered for the application	1	High	Susmitha R
Sprint-2		USN-3	As a user,I can register for the application through Facebook	2	Low	Varsha P
Sprint-1		USN-4	As a user, I can register for the application through Gmail	4	Medium	Varshini R
Sprint-1	Login	USN-5	As a user, I can log into the application by entering email & password	5	High	Susmitha , Thejha
Sprint-2	Dashboard	USN-6	Loading the dataset	2	Low	Varsha , Varshini
Sprint-3		USN-7	Exploring the dataset	10	High	Susmitha , Varsha
Sprint-3	Visualisation	USN-8	Visualising the dataset	10	High	Thejha , Varshini
Sprint-4		USN-9	Plot different graphs for variouscase studies	5	Medium	Susmitha,Thejha, Varsha,Varshini
Sprint-4		USN-10	Combine into awebsite with all theresults	15	High	Susmitha,Thejha, Varsha,Varshini

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	5 Days	24 Oct 2022	28 Oct 2022	20	29 Oct 2022
Sprint-2	20	5 Days	31 Oct 2022	04 Nov 2022	20	05 Nov 2022
Sprint-3	20	5 Days	07 Nov 2022	11 Nov 2022	20	12 Nov 2022
Sprint-4	20	5 Days	14 Nov 2022	18 Nov 2022	20	19 Nov 2022

Reports from JIRA



7. **CODING & SOLUTIONING**

1. Dashboard Design

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

The design is incorporated along with login page and provides excellent insights on various data regarding crops.

```
<!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+QkPxCAFlNEevoEH3Sl0sibVcOQVnN"
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="#"><i class="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. Utilization of Data Filters

The filters used for classifying different paramteres of the dataset can be efficiently done using the cognos tool .

The particular state with the specific crop can be visualised in the map.

```
<html>

  <style>

body
```

```
        {
        background-
image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-crop-green-ricelight-effect-
wallpaper-image_571433.jpg");
background-repeat:            no-repeat;
background-attachment:            fixed;
background-size: 100% 100%;

    }
    .btn-group button {
      background-color: #04AA6D; /* Green background */
      border: 1px solid green; /* Green border */
color: white; /* White text */        padding: 10px
24px; /* Some padding */

      cursor: pointer; /* Pointer/hand icon */
      float: center; /* Float the buttons side by side */
    }

    /* Clear floats (clearfix hack) */
    .btn-group:after {
content: "";
clear: both;
display: table;

    }

    .btn-group button:not(:last-child) {        border-
right: none; /* Prevent double borders */

    }
```

```
      /* Add a background color on hover */
      .btn-group button:hover {          background-
color: #3e8e41;

      }
      </style>
<body>
   <h1><center> With Years of Area and Production</h1></center></h1>
   <center>
   <div class="btn-group">
      <a href ="first.html"><button>Home</button></a>
      <a href ="dashboard.html"><button>Dashboard</button></a>
      <a href ="chart1.html"><button>Seasons with Average Productions</button></a>
      <a href ="chart3.html"><button>Top 10 States with Most Area</button></a>
      <a href ="chart4.html"><button>State with Crop Production</button></a>
      <a href ="chart5.html"><button>States with Crop Production Along with Season</button></a>
    </div>
   </center>
     <br>
    <br>
     <center>
          <iframe
src="https://eu2.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FCrop%
2BProduction&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;
shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000001841d3b5
022_00000000" width="1200" height="800" frameborder="0" gesture="media" allow="encrypted-media"
allowfullscreen=""></iframe>

     </center>
</body>
```

```
</html>
```

8. **TESTING**

Test Cases

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Result	Status

HomePage_ TC_OO1	Functional	Home Page	Verify u s er is able to see the Login/Signup popup when user on clicked Login in the Button Homepag e	1.Enter URL and click go 2.Click on Login Button 3.Verify login/Singup popup displayed or not	Login page should pop up as soon as the Login button is clicked	Pass
LoginPage_ TC_OO2	UI	Login Page	Verify the UI elements in Login/Signup popup	1.Enter URL and click go 2.Click on Login Button 3.Verify login/Singup popup with below UI elements: a.email text box b.password text box c.Login button d.New customer? Create account link e.Last password? Recovery password link	Application should show below UI elements: a.login with twitter & facebook b.password text box c.Login button with orange colour d.Last password? Recovery password link	Fail
				3 . T he em b e d d e d l i nk w i l l be ab l e to di s pl ay th e c ha r t s f ro m c og no s		

LoginPage_ TC_OO3	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 Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	User should navigate to user account homepage	Pass
Dashboard_ TC_OO4	Functional	Dashboard page	Verify user is able to view the dashboard and see the charts	1.Enter URL(dashboard.html) 2.Click on the different charts that the user wants.	Application should show theexpected charts from cognos	Pass

User Acceptance Testing

Purpose of Document:

The purpose of this document is to briefly explain the test coverage and open issues of Estimate The Crop Yield Using Data Analytics project at the time of the release to User Acceptance Testing (UAT). Defect Analysis: This report shows the number of 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

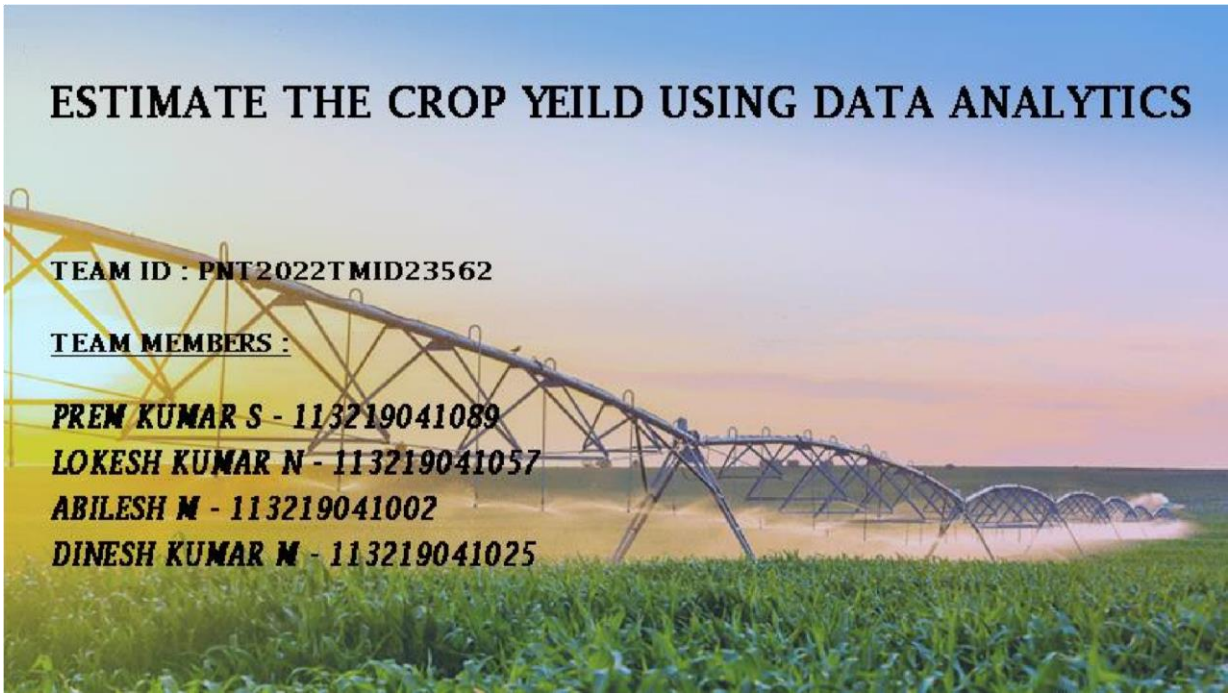
Test Case Analysis

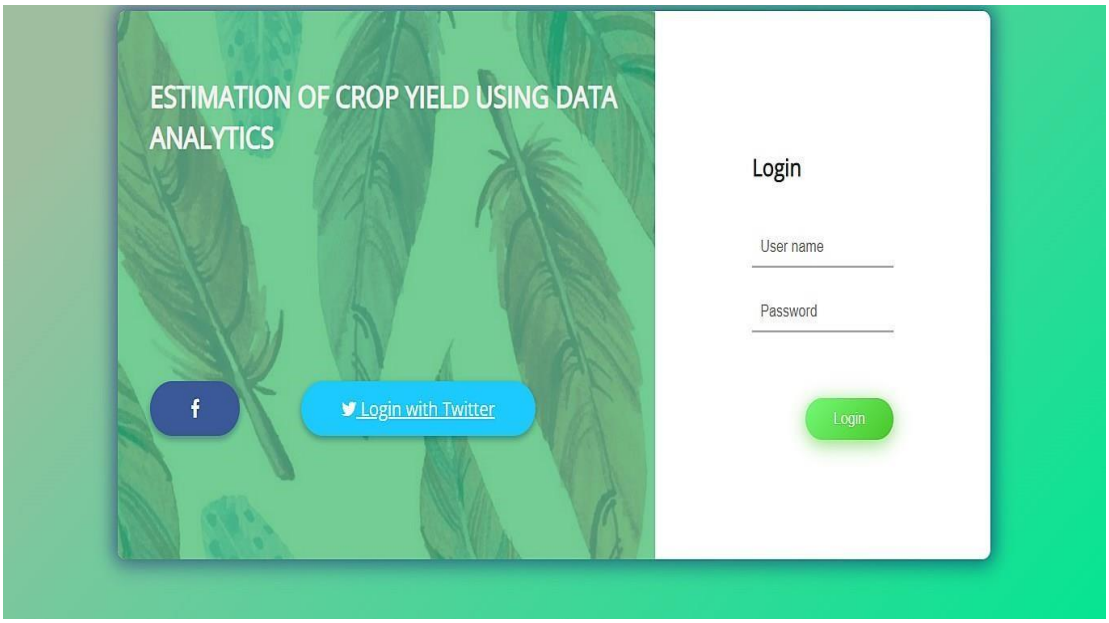
This report shows the number of test cases that have passed, failed, and untested

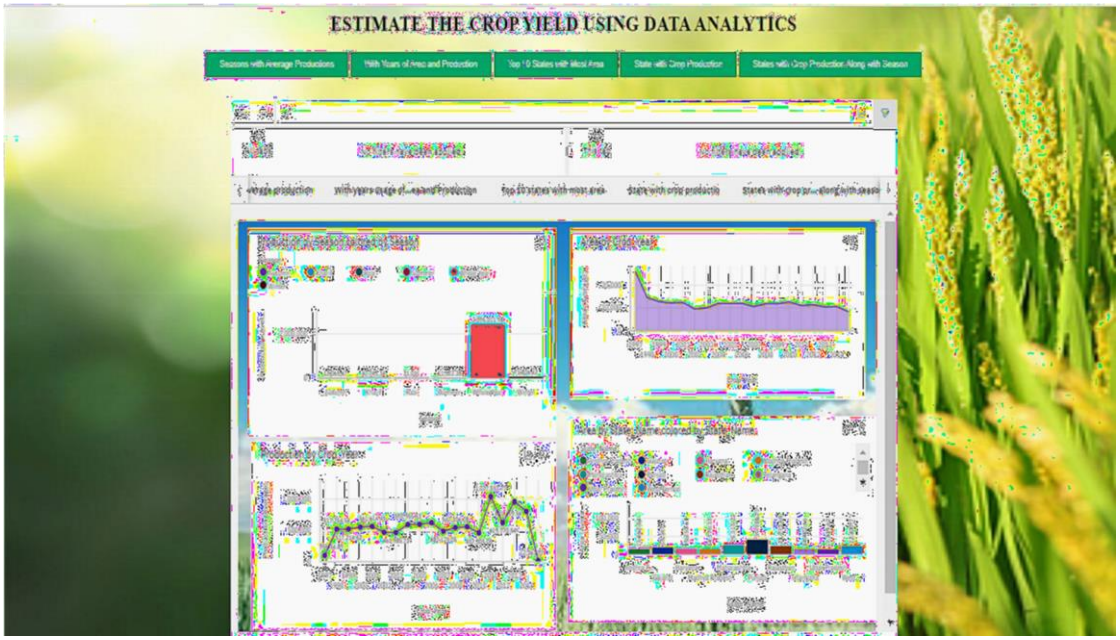
Section	Total Cases	Not Tested	Fail	Pass
Print Engine	7	0	0	7
Client Application	51	0	0	51
Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	4	0	0	4
Version Control	2	0	0	2

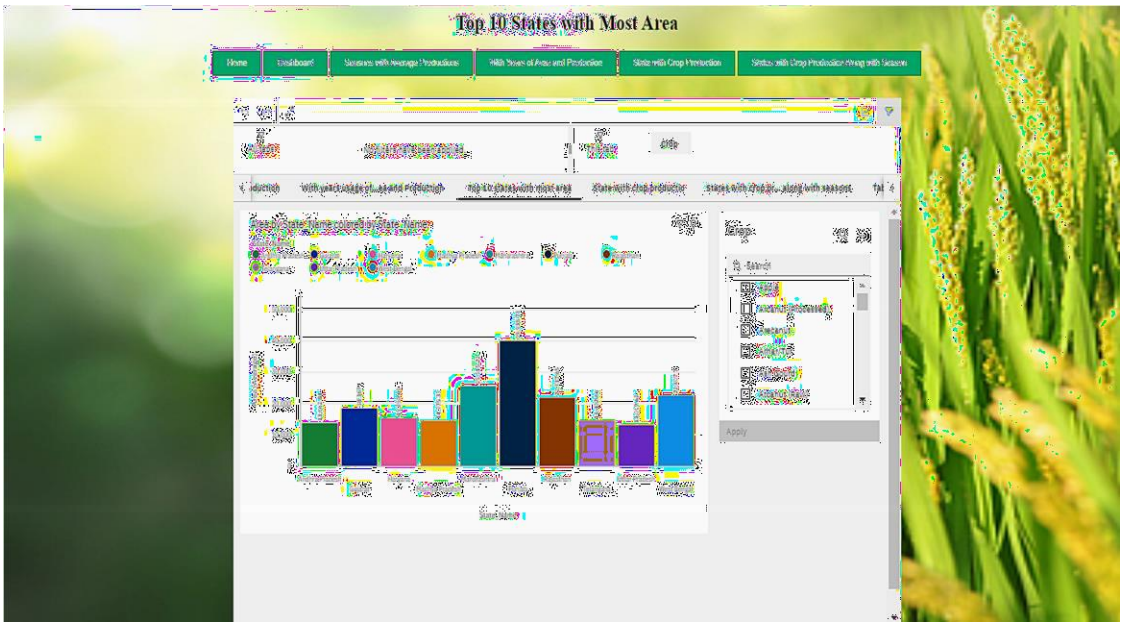
9. **RESULTS**

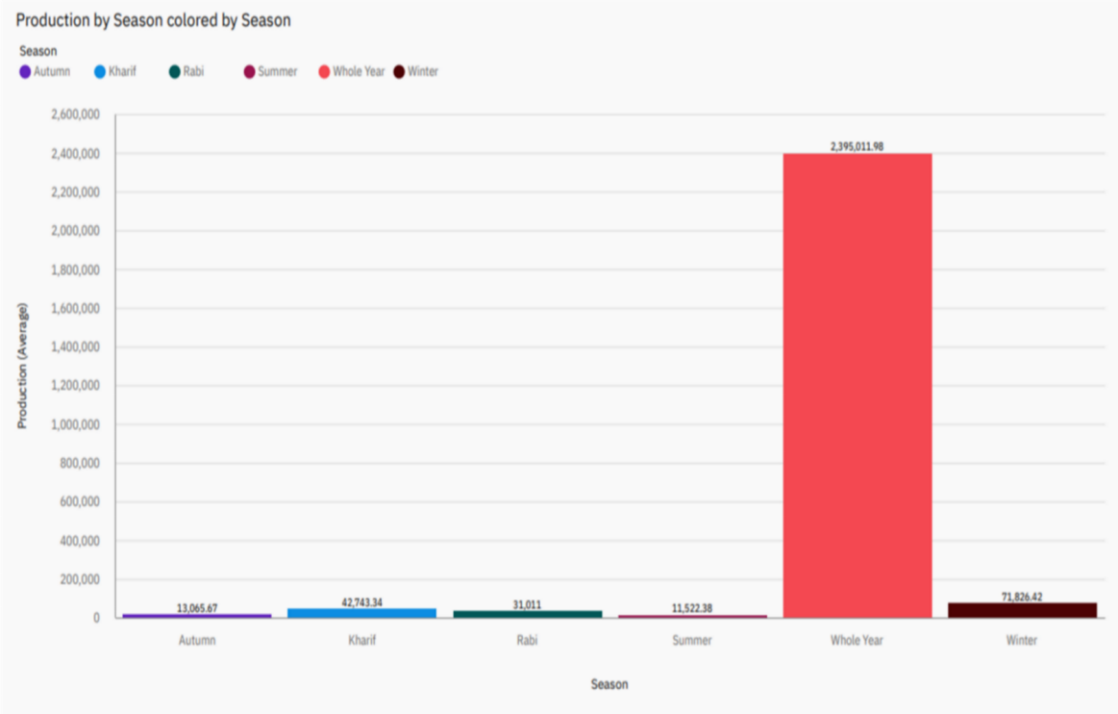
1.Performance Metrics

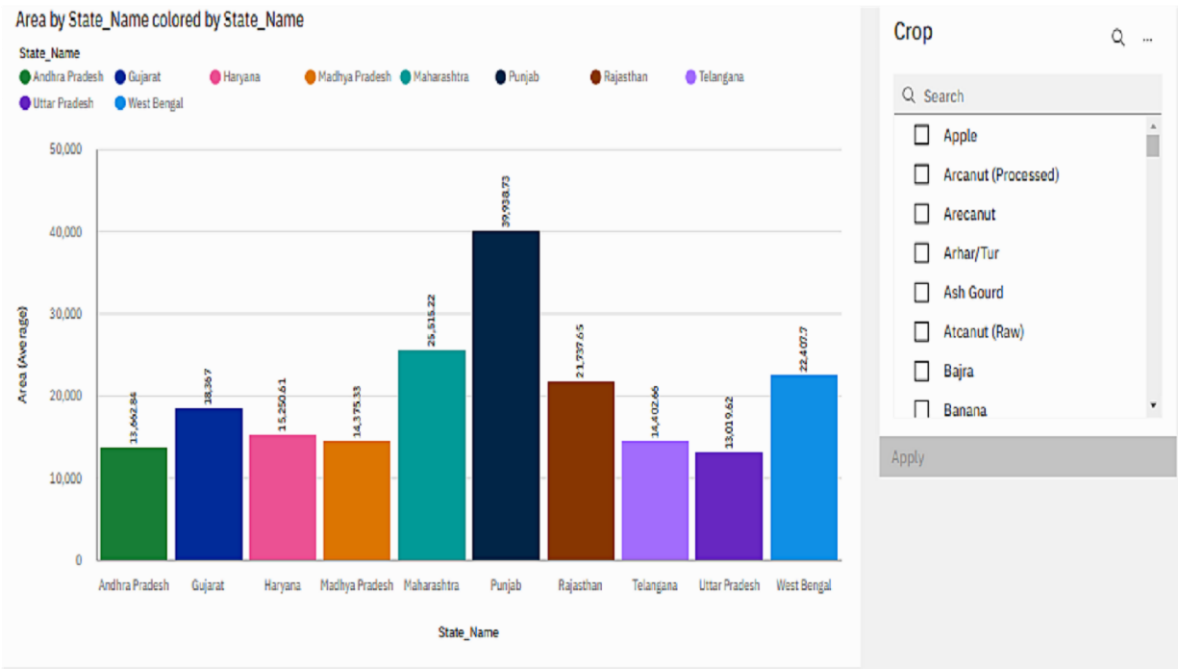



ESTIMATION OF CROP YIELD USING DATA ANALYTICS
Login with Twitter
Login
User name
Password
Login

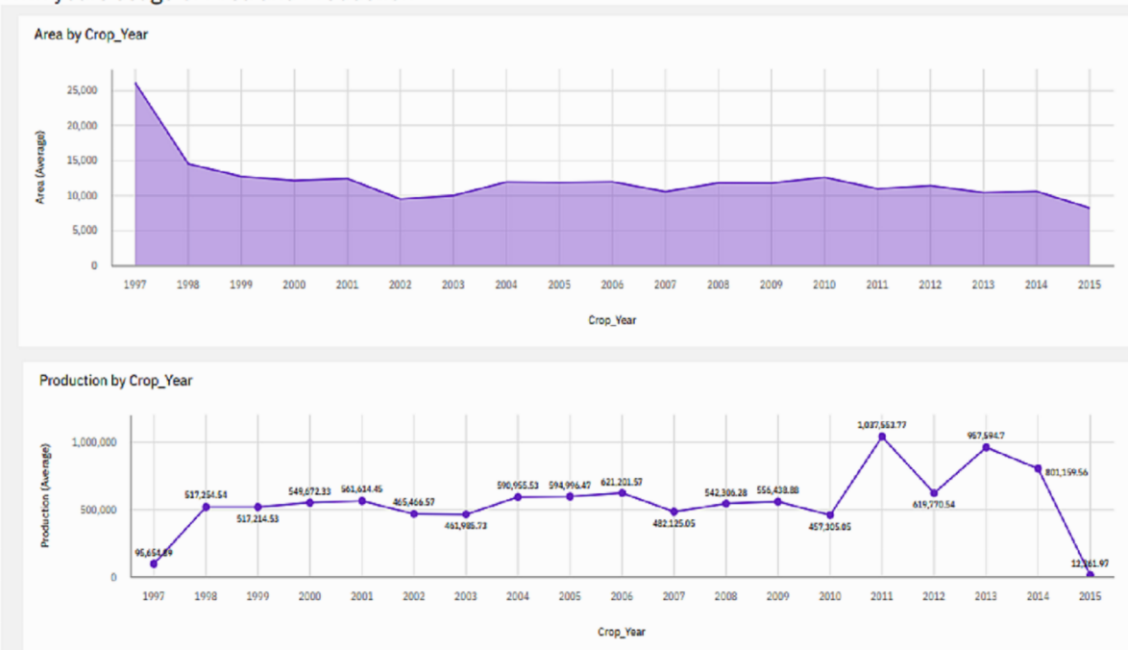

ESTIMATE THE CROP YIELD USING DATA ANALYTICS


Top 10 States with Most Area
Home
Dashboard
Seasons with Average Productions
With Years of Area and Production
State with Crop Production
States with Crop Production Along with Seasons
Apply


Production by Season colored by Season
Season
Autumn
Kharif
Rabi
Summer
Whole Year
Winter
Production (Average)
2,600,000
2,400,000
2,200,000
2,000,000
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
13,065.67
42,743.34
31,011
11,522.38
2,395,011.98
71,826.42
Autumn
Kharif
Rabi
Summer
Whole Year
Winter
Season



With years usage of Area and Production



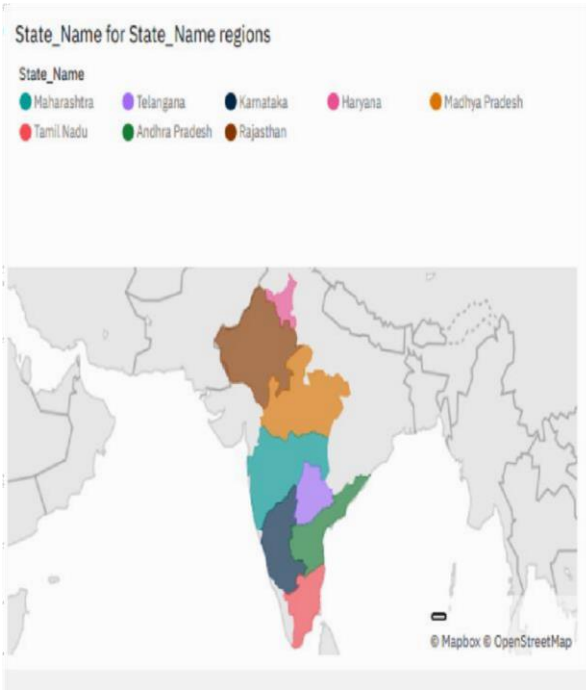
States with crop production along with seasons

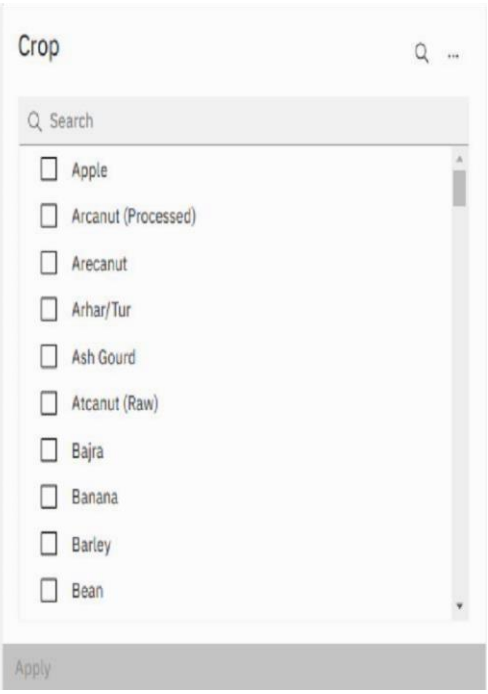
State_Name and Crop

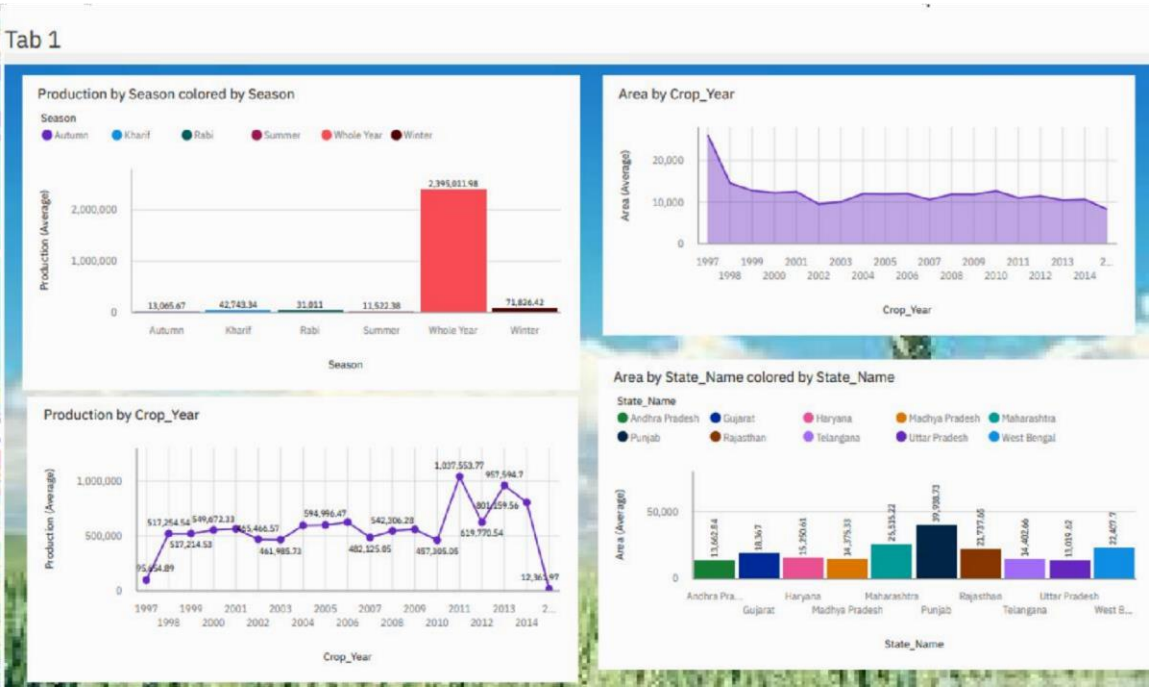
Crop	State_Name
Grapes	Andhra Pradesh
	Haryana
	Karnataka
	Madhya Pradesh
	Maharashtra
	Rajasthan
	Tamil Nadu
	Telangana

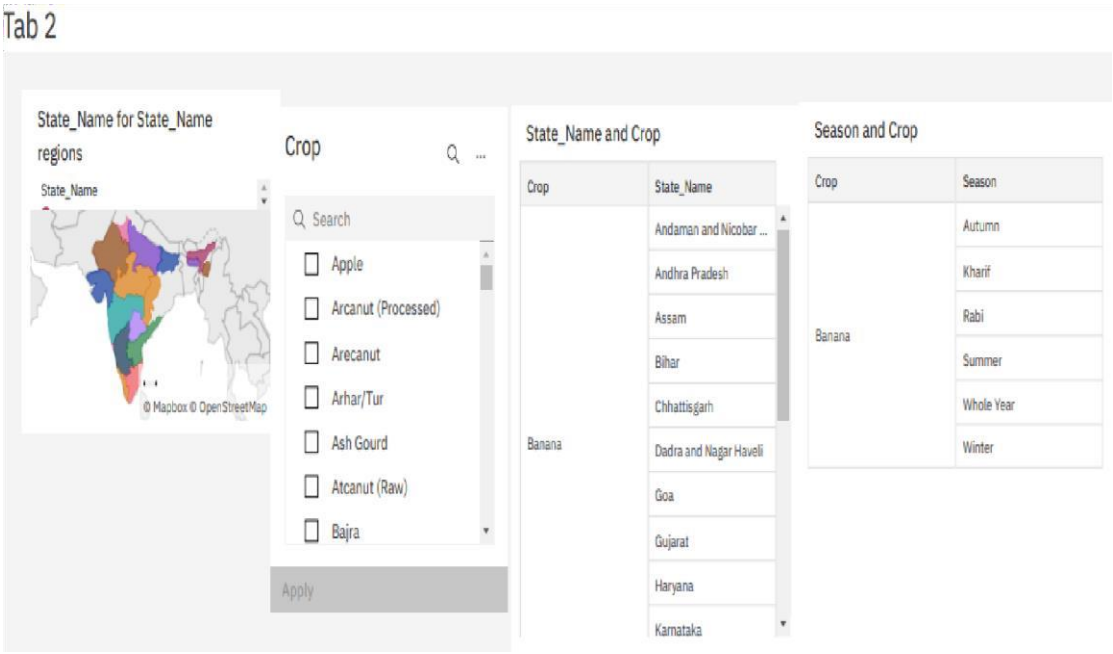
Season and Crop

Crop	Season
Grapes	Kharif
	Whole Year









10. **ADVANTAGES & DISADVANTAGES**

The advantage of this Crop yield estimation it is relatively less time-consuming and inexpensive. We can able to know the average productions of the crop, the amount of crop produced in different year and in

different districts and in different area. And it is also used by farmers to make decisions about when to plant and harvest crops based on soil moisture content and weather conditions.

The disadvantage of the system is number of data used for the estimation are less. This method is highly subjective, as the informations are collected from the farmers' knowledge and experience.

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 patterns discovery using data set related to 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 aware of 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 and it is deployed into an website.

12. **FUTURE SCOPE**

As a future work, the results of the analysis can be improved, using the large number of crop datasets and more weather parameters. This can be also implemented in machine learning model to build in a strong yield prediction model and analysis of all the crops with different climatic conditions and different areas.

13. **APPENDIX**

Source Code

First.html(Landing_p age)

```
<!DOCTYPE html>
<html>

<head>
    <meta name="viewport" content="width=device-width,
        initial-scale=1">
  <title>Text alignment</title>
  <style>
    body
    {
    background-
  image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-cropgreen-rice-
  lighteffect-wallpaper-image_571433.jpg");
```

```
        background-repeat:   no-repeat;
background-attachment:          fixed;
background-size: 100% 100%;

    }
        h1{text-align: center;
font-size: 40px;
color: black;



         }
        .button {
top:25%;          left:45%;
width:100px;
height:40px;
position: absolute;          z-
index: 2;          background:
orange;

        }

      #left { text-align: left;
font-size: 35px;          top:
70px; right:
```

```
        20;       width:
300px;        height:
100px;




   }
   #left1 { text-align: left;
font-size: 35px;
color: aliceblue;

   }
   #v1 { text-align: left;
font-size: 35px;
color: aliceblue;

   }
   #v2 { text-align: left;
font-size: 35px;
color: aliceblue;

   }
   #t { text-align: left;
font-size: 35px;
color: aliceblue;

   }
```

```
   #s { text-align: left;

font-size: 35px;

color: aliceblue;


   }



      </style>
</head>


<body>

        <div class="bg-img">

                                <h1>ESTIMATE THE CROP YIELD USING DATA ANALYTICS</h1>



                <form action="index.html">

                        <button type="submit" class="button">Login</button>

                </form>




      <p id="left">TEAM ID : PNT2022TMID23562

      </p>

      <p id="left1"><u>TEAM MEMBERS :</u> </p>

      <p id="v1">PREM KUMAR S - 113219041089</p>

      <p id="v2">DINESH KUMAR M - 113219041025</p>

      <p id="t">LOKESH KUMAR N - 113219041057</p>
```

```
      <p id="s">ABILESH M – 113219041002</p>


        </div>

</body>


</html>
```

Index.html(Login p age)

```
<!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+QkPxCAFlNEevoEH3Sl0sibVcOQVnN"

     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="#"><i class="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>

Style.css(CSS file for login page) body { background-image: linear-gradient(135deg, #9dbfa0 10%, #04e592 100%); background-size: cover; background-repeat: no-repeat; background-attachment: fixed; font-family: "Open Sans", sans-serif; color: #333333;

}

.box-form { margin: 0 auto; width:

80%; background:

#FFFFFF;

borderradius:

10px;

overflow: hidden; display: flex; flex: 1 1 100%; align-items: stretch; justify-content: space-between; box-shadow: 0 0 20px 6px #090b6f85;

}

@media (max-width: 980px) {

.box-form { flex-flow: wrap; text-align:

```
center;       align-content:
center;       align-items:
center;
   }
 }
 .box-form div {
height: auto;

 }
 .box-form .left {      color: #f6efef;
background-size: cover;
background-repeat: no-repeat;
font-size: 20px;      background-
image:

      url("https://i.pinimg.com/736x/5d/73/ea/5d73eaabb25e3805de1f8cdea7df4a42--tumblrbackgrounds-
iphonephone-wallpapers-iphone-wallaper-tumblr.jpg");    overflow: hidden;

 }
 .box-form .left .overlay {
padding: 40px;      width:
100%;      height: 100%;
background: #31b662ad;
overflow: hidden;      box-
sizing: border-box;
```

```
 }
 .box-form .left .overlay h1 {      font-
size: 10vmax;  line-height: 1;      font-
weight: 900;      margin-top: 40px;
margin-bottom: 20px;

 }
 .box-form .left .overlay span p {
margin-top: 100px;      font-
weight: 900;

 }
 .box-form .left .overlay span a {
background: #3b5998;      color:
#FFFFFF;      margin-top:200px;
padding:

    14px 50px; border-radius:
    100px;                  display:
    inlineblock;

   box-shadow: 0 3px 6px 1px #042d4657;
 }
 .box-form .left .overlay span a:last-child {
background: #1dcaff;      margin-left: 70px;
```

```
 }
 .box-form .right {
padding: 120px;
overflow: hidden;    }

 @media (max-width: 980px) {
   .box-form .right {
width: 100%;

   }
 }
 .box-form .right h5 {      font-
size: 6vmax;      line-height: 0;

 }
 .box-form .right p {
font-size: 14px;
color: #B0B3B9;

 }
 .box-form .right .inputs {
  overflow: hidden;

 }
 .box-form .right input {      width:
100%;      padding: 10px;      margin-
top: 25px;      font-size: 16px;
```

```
border: none;      outline: none;
border-bottom: 2px solid #B0B3B9;    }

 .box-form .right .remember-me--forget-password {
   display: flex;      margin: 30;
justify-content: space-between;
align-items: center;

 }
 .box-form .right .remember-me--forget-password input {
margin: -10;      margin-right: 7px;      width: auto;

 }
 .box-form .right button {
float: right;      color: #fff;
font-size: 16px;      padding:
12px 35px; borderradius:
50px; display: inlineblock;
border: 0;

   outline: 0;
   box-shadow: 0px 4px 20px 0px #49c628a6;      background-image: linear-
gradient(135deg, #70F570 10%, #49C628 100%);

 }
```

```
 label {
   display: block;

position: relative;

margin-left: 30px;


 }


 label::before {     content: '

\f00c';     position: absolute;

font-family: FontAwesome;

background: transparent;

border: 3px solid #70F570;

border-radius: 4px;     color:

transparent;     left: -30px;

transition: all 0.2s linear;


 }


 label:hover::before {    font-

  family: FontAwesome;


   content: ' \f00c';
   color: #fff;     cursor:

pointer;     background:

#70F570;


 }
```

```
 label:hover::before .text-checkbox {      background: #70F570;

 }


 label span.text-checkbox {

display: inline-block;

height: auto;      position:

relative;      cursor: pointer;

transition: all 0.2s linear;


 }


 label input[type="checkbox"] {

display: none;


 }
```

Dashboard.html(IBM c ognos d ashboard)

```
<html>

   <style>

body


        {

                                                                                background-

image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-cropgreen-rice-light-effect-wallpaperimage_571433.jpg");
```

```
        background-repeat:   no-repeat;
background-attachment:            fixed;
background-size: 100% 100%;
    }
    .btn-group button {          background-color: #04AA6D;
/* Green background */          border: 1px solid green; /*
Green border */          color: white; /* White text */
padding: 10px 24px; /* Some padding */          cursor:
pointer; /* Pointer/hand icon */          float: center; /*
Float the buttons side by side */

    }

    /* Clear floats (clearfix hack) */
.btn-group:after {          content: "";
clear: both;          display: table;

    }

    .btn-group button:not(:last-child) {          border-
right: none; /* Prevent double borders */

    }

    /* Add a background color on hover */
```

```
      .btn-group button:hover {          background-
color: #3e8e41;

      }

      </style>
<body>

   <h1><center> ESTIMATE THE CROP YIELD USING DATA

      ANALYTICS</h1></center></h1>

   <center>

   <div class="btn-group">


      <a href ="chart1.html"><button>Seasons with Average Productions</button></a>

      <a href ="chart2.html"><button>With Years of Area and Production</button></a>

      <a href ="chart3.html"><button>Top 10 States with Most Area</button></a>

      <a href ="chart4.html"><button>State with Crop Production</button></a>

      <a href ="chart5.html"><button>States with Crop Production Along with Season</button></a>


    </div>

   </center>

    <br>

    <br>

     <center>

          <iframe

     src="https://eu2   .ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders

     %  2FCrop%2BProduction&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_

     navbar=false&amp;shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;s u
```

```
bView=model000001841d3b5022_00000000"  width="1200"  height="800"  frameborder="0"
gesture="media" allow="encrypted-media" allowfullscreen=""></iframe>

</center>
</body>

</html>
```

Charts

Chart1.html

```
<html>
  <style>
body

{
background-
image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-crop-green-ricelight-
effectwallpaper-image_571433.jpg");

background-repeat:  no-repeat;
background-attachment:  fixed;
background-size: 100% 100%;

}
.btn-group button {  background-color: #04AA6D;
/* Green background */  border: 1px solid green; /*
Green border */  color: white; /* White text */
```

```
padding: 10px 24px; /* Some padding */           cursor:
pointer; /* Pointer/hand icon */           float: center; /* Float
the buttons side by side */

      }


      /* Clear floats (clearfix hack) */


  b



    . tn-group:after {
content: "";
clear: both;
display: table;

      }


      .btn-group button:not(:last-child) {           border-
right: none; /* Prevent double borders */

      }


      /* Add a background color on hover */
      .btn-group button:hover {           background-
color: #3e8e41;
```

```
      }
      </style>
<body>
   <h1><center> Seasons With Average Productions</h1></center></h1>
   <center>
   <div class="btn-group">
     <a href ="first.html"><button>Home</button></a>
     <a href ="dashboard.html"><button>Dashboard</button></a>
     <a href ="chart2.html"><button>With Years of Area and Production</button></a>     b


     <a href ="chart3.html"><button>Top 10 States with Most Area</button></a>
     <a href ="chart4.html"><button>State with Crop Production</button></a>
     <a href ="chart5.html"><button>States with Crop Production Along with Season</button></a>
     </div>
   </center>


   < r>
   <br>
     <center>
           <iframe
src="https://eu2.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FCrop
%
```

2BProduction&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&
shareMode=embedded&action=view&mode=dashboard&subView=model000001841d3b 5
022_00000000" width="1200" height="800" frameborder="0" gesture="media" allow="encryptedmedia"
allowfullscreen=""></iframe>

</body>

</html>

Chart2.html

```
<html>

  b



  <style>
body

        {
        background-
image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-crop-greenricelight-effect-
wallpaper-image_571433.jpg");
```

```
        background-repeat:   no-repeat;
background-attachment:              fixed;
background-size: 100% 100%;

      }
      .btn-group button {
        background-color: #04AA6D; /* Green background */
     order: 1px solid green; /* Green border */
color: white; /* White text */          padding: 10px
24px; /* Some padding */          cursor: pointer; /*
Pointer/hand icon */          float: center; /* Float the
buttons side by side */

      }

      /* Clear floats (clearfix hack) */
      .btn-group:after {
content: "";

           b

        clear: both;
display: table;

      }
```

```
        .btn-group button:not(:last-child) {           border-
right: none; /* Prevent double borders */

        }

        /* Add a background color on hover */
        .btn-group button:hover {           background-
color: #3e8e41;

        }
        </style>
<body>
    <h1><center> With Years of Area and Production</h1></center></h1>
    <center>
    <div class="btn-group">



        <a href ="first.html"><button>Home</button></a>
        <a href ="dashboard.html"><button>Dashboard</button></a>
        <a href ="chart1.html"><button>Seasons with Average Productions</button></a>
        <a href ="chart3.html"><button>Top 10 States with Most Area</button></a>
        <a href ="chart4.html"><button>State with Crop Production</button></a>
        <a href ="chart5.html"><button>States with Crop Production Along with Season</button></a>
```

```
    </div>
  </center>
    <br>
    <br>
     <center>
          <iframe
src="https://eu2.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FCrop
%
2BProduction&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;
shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000001841d3b 5
022_00000000" width="1200" height="800" frameborder="0" gesture="media" allow="encryptedmedia"
allowfullscreen=""></iframe>

     </center>
</body>

  </html>
```

Chart3.html

```
<html>
  <style>
```

```
    body
        {
          background-
image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-crop-greenricelight-effect-
wallpaper-image_571433.jpg");

          background-repeat:   no-repeat;
background-attachment:             fixed;
background-size: 100% 100%;

       }
       .btn-group button {          background-color: #04AA6D;
/* Green background */          border: 1px solid green; /*
Green border */          color: white; /* White text */
padding: 10px 24px; /* Some padding */          cursor:
pointer; /* Pointer/hand icon */          float: center; /* Float
the buttons side by side */

       }


       /* Clear floats (clearfix hack) */
       .btn-group:after {
content: "";
clear: both;
display: table;
```

```
        }


        .btn-group button:not(:last-child) {           border-
right: none; /* Prevent double borders */









        }


        /* Add a background color on hover */
        .btn-group button:hover {           background-
color: #3e8e41;

        }
        </style>
<body>
   <h1><center> Top 10 States with Most Area</h1></center></h1>
   <center>
   <div class="btn-group">
     <a href ="first.html"><button>Home</button></a>
     <a href ="dashboard.html"><button>Dashboard</button></a>
     <a href ="chart1.html"><button>Seasons with Average Productions</button></a>       <a href
="chart2.html"><button>With Years of Area and Production</button></a>
     <a href ="chart4.html"><button>State with Crop Production</button></a>
     <a href ="chart5.html"><button>States with Crop Production Along with Season</button></a>
```

```
    </div>
  </center>
    <br>
    <br>
     <center>
          <iframe
src="https://eu2.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FCrop
%
2BProduction&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;
shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000001841d3 b
5
022_00000000" width="1200" height="800" frameborder="0" gesture="media" allow="encryptedmedia"
allowfullscreen=""></iframe>
     </center>
</body>

  </html>
```

Chart4.html

```
<html>
  <style>
body
        {
        background-
```

```
image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-crop-greenricelight-effect-wallpaper-image_571433.jpg");

        background-repeat:   no-repeat;
background-attachment:          fixed;
background-size: 100% 100%;

    }
    .btn-group button {        background-color: #04AA6D;
/* Green background */        border: 1px solid green; /*
Green border */        color: white; /* White text */
padding: 10px 24px; /* Some padding */        cursor:
pointer; /* Pointer/hand icon */        float: center; /* Float
the buttons side by side */

    }

    /* Clear floats (clearfix hack) */
```

```
    . tn-group:after {
content: "";
clear: both;
display: table;

        }


        .btn-group button:not(:last-child) {           border-
right: none; /* Prevent double borders */

        }


        /* Add a background color on hover */
.btn-group button:hover {           background-
color: #3e8e41;

        }
        </style>
<body>
   <h1><center> State with Crop Production</h1></center></h1>
            n
```

```
b




 <center>

 <div class="btn-group">


        b



  <a href ="first.html"><button>Home</button></a>

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

  <a href ="chart1.html"><button>Seasons with Average Productions</button></a>

  <a href ="chart2.html"><button>With Years of Area and Production</button></a>

  <a href ="chart3.html"><button>Top 10 States with Most Area</button></a>

  <a href ="chart5.html"><button>States with Crop Production Along with Season</button></a>

  </div>

 </ce ter>
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 <br>

   <center>

         <iframe



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```

src="https://eu2.ca.analytics.ibm.com/bi/?perspective=dashboard&pathRef=.my_folders%2FCrop

%

2BProduction&closeWindowOnLastView=true&ui_appbar=false&ui_navbar=false&

shareMode=embedded&action=view&mode=dashboard&subView=model000001841d3

b 5 022_00000000" width="1200" height="800" frameborder="0" gesture="media"

allow="encryptedmedia" allowfullscreen=""></iframe>

</body>

</html>

Chart_5 .html

<html>

<style>

body

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{

background-

image:url("https://png.pngtree.com/thumb_back/fh260/background/20210302/pngtree-crop-greenricelight-effect-wallpaper-image_571433.jpg");

background-repeat: no-repeat;
background-attachment: fixed;
background-size: 100% 100%;

}

.bt -group button { ackground-color: #04AA6D;
/* Green background */ border: 1px solid green; /*
Green border */ color: white; /* White text */

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```
        padding: 10px 24px; /* Some padding */
cursor: pointer; /* Pointer/hand icon */          float:
center; /* Float the buttons side by side */

      }


      /* Clear floats (clearfix hack) */
.btn-group:after {          content: "";
clear: both;          display: table;

      }


      .btn-group button:not(:last-child) {          border-
right: none; /* Prevent double borders */

      }


      /* Add a background color on hover */
.btn-group button:hover {          background-
color: #3e8e41;




           n
```

```
  b



      }

      </style>

<body>

      <h1><center>States with Crop Production Along with Seasons</h1></center></h1>

    <ce ter>

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```

```
<div class="btn-group">
  <a href ="first.html"><button>Home</button></a>
  <a href ="dashboard.html"><button>Dashboard</button></a>
  <a href ="chart1.html"><button>Seasons with Average Productions</button></a>
  <a href ="chart2.html"><button>With Years of Area and Production</button></a>
  <a href ="chart3.html"><button>Top 10 States with Most Area</button></a>
  <a href ="chart4.html"><button>State with Crop Production</button></a>

  </div>
</center>
  <br>
  <br>
   <center>
        <iframe
src="https://eu2.ca.analytics.ibm.com/bi/?perspective=dashboard&amp;pathRef=.my_folders%2FCrop
%
2BProduction&amp;closeWindowOnLastView=true&amp;ui_appbar=false&amp;ui_navbar=false&amp;
shareMode=embedded&amp;action=view&amp;mode=dashboard&amp;subView=model000001841d3b
5 022_00000000" width="1200" height="800" frameborder="0" gesture="media"
allow="encryptedmedia" allowfullscreen=""></iframe>
```

```
    </center>
</body>
  </html>
```

GitHub & Project Demo Link

GitHub: https://github.com/IBM-EPBL/IBM-Project-23017-1659864406