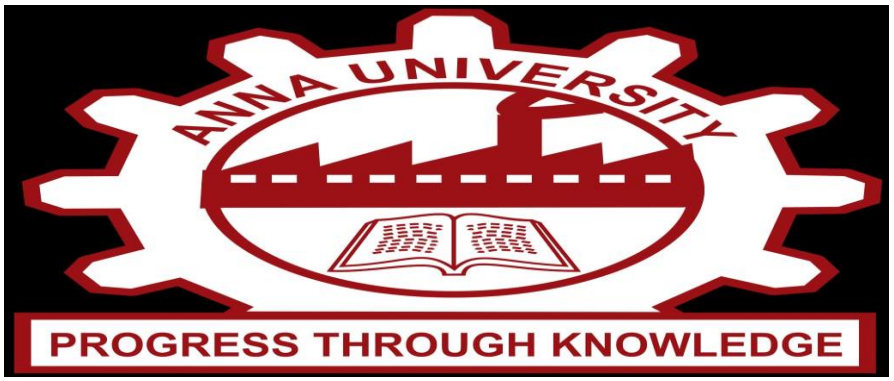
ESTIMATE THE CROP YIELD USING DATA ANALYTICS

A PROJECT REPORT
SUBMITTED BY

ANANTHI K
BRAGADESSWARI S
UDAYA GEETHA A
VIJAYALAKSHMI P

In partial fullfillment for the award of the degree of
Bachelor of Engineering(B.E.) in
COMPUTER SCIENCE AND ENGINEERING

Commented [BS1]:



ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our **Faculty Mentor** and **Industry Mentor** for their support and guidance in completing our project on Estimate the Crop Yield

We would like to extend our gratitude to the **IBM** for **Nalaiya Thiran** project for providing us with all the facility that was required.

It was a great learning experience. We would like to take this opportunity to express our gratitude.

DATE:
19/11/2022

TEAM MEMBERS:
DEEPAK K
BHUVANESWARI
YUVARAJ
DEVA DHARSHINI

PROJECT REPORT FORMAT

INTRODUCTION:

Agriculture forms the basis for food security and hence it is important. Agriculture forms the basis for food security and hence it is important. In the farm output, India ranks second considering the world widescenario. 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. 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, crop health monitoring etc.

Crop yield prediction helps the farmers in various ways by providing the record of previous crop yield. This is helpful to government inframing policies related to crops such as crop insurance policies, supply chainoperation policies. Knowing what crops has been grown, and how much areaof it had been shown

historically, combined with the prices at which it could have been sold at the nearest market-place provides the income-growth profile of the farmer.

Data Miningis widely appliedto agricultural problems. Data Miningis used to analyzelarge data sets and establish useful classifications and patters in the data sets. Yield prediction is an important agricultural problem. Every farmer is interested in knowing, how muchyield he is about expect. In the past, yield prediction was performed by considering farmer's previous experience on a particular crop. The volume of data is enormous in Indian agriculture. The data when become information is highly useful for many purposes.

LITERATURE SURVEY:

It expresses the large amount of data which is collected and stored for analysis. Making appropriate use of these data often leads to considerablegains in efficiency and therefore economic advantages. There are several applications of DataMining techniques in thefield of agriculture.

Soil profile descriptions were proposed by the researcher for classifying soils in combination with GPS based technologies. They were applied K-Means approach for the soil classification. In a similar approach, cropclassifications using hyper spectral data was carried out by adopting one of thedata mining approach i.e. Support Vector Machines they were applied K Meansapproach for the soil classification. Crop classifications using hyper spectral data was carried out by adoptingone of the data mining approach.

In the agricultural science,clustering techniques are found in grading apples before marketing. Weeds were detected on precision agriculture. The effect of observed seasonal climatic conditions such as rainfalland temperature variability on crop yield prediction was considered throughan empirical crop model.In these approaches, a given cluster continues to growas long as the number of objects in the neighbourhood which exceeds some parameter,this is considered to be different from the idea in partitioning algorithms that use iterative relocation of points that give a certain number of cluster.

CONCLUSION:

The statistical model Multiple Linear Regression technique is applied on existing data. The results so obtained were verified and analyzed using the Data Mining technique namely Density-based clustering technique. In the subsequent work a comparison of the crop yield prediction can be made withthe entire set of existing available data and will be dedicated to suitable approaches for improving the efficiency of theproposed technique.

REFERENCES:

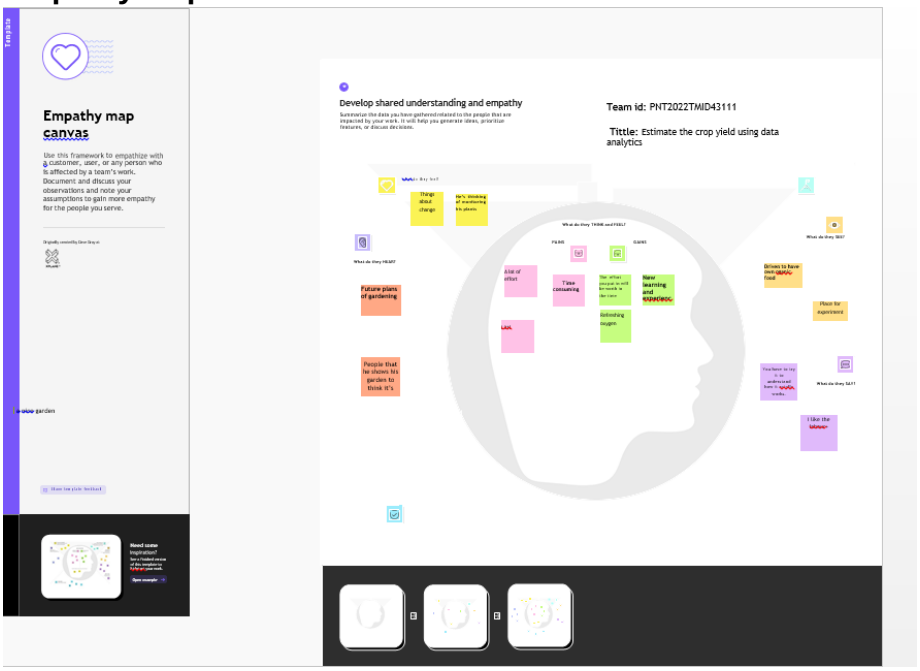
[1] Camps-Valls G, Gomez-Chova L, Calpe-MaravillaJ, Soria-Olivas E, Martin-Guerrero J D, Moreno J,"Support Vector Machines for Crop Classification using Hyper Spectral Data", Lect Notes Comp Sci 2652, 2003,pages : 134-141.

[2] G R Batts, "Effects Of CO2 And Temperature on Growth and Yield of Crops of Winter Wheat over Four Seasons", European Journal of Agronomy, vol.7, 1997, pages : 43-52.

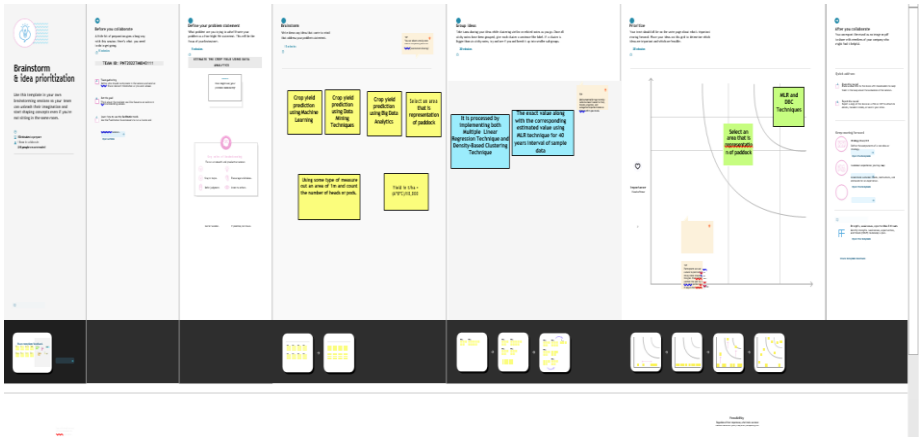
[3] G Ruß, "Data Mining of Agricultural Yield Data : AComparison of Regression Models", Conference Proceedings, Advancesin Data Mining– Applications and Theoretical Aspects, P Perner (Ed.), Lecture Notes in Artificial Intelligence 6171,Berlin, Heidelberg, Springer, 2009, pages: 24-37.

[4] M Trnka, "Projections of Uncertainties in Climate Change Scenarios into Expected Winter Wheat Yields", Theoretical and Applied Climatology, vol. 77, 2004, pages: 229-249

Empathy Map Canvas:



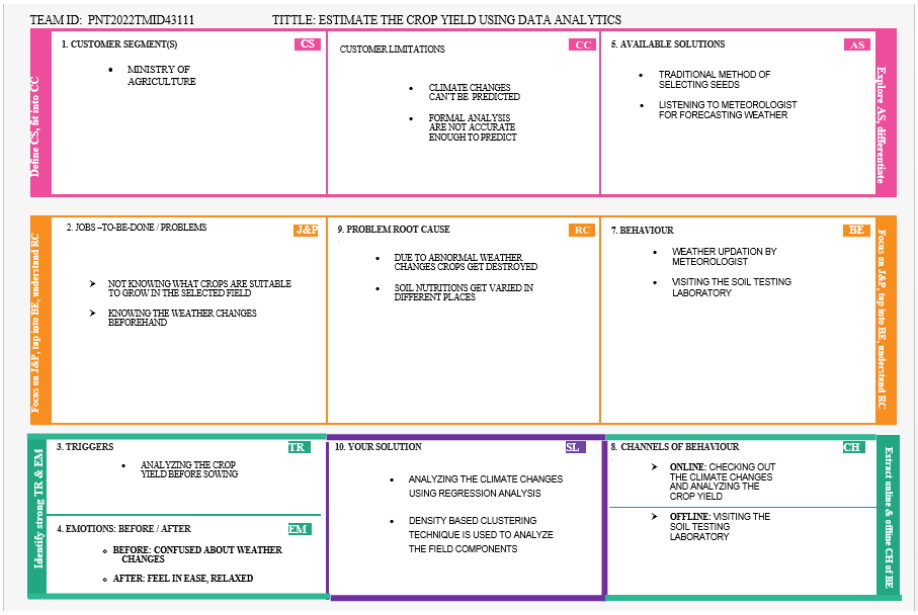
Brainstroming:



Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to besolved)	An essential issue for agricultural planning intentions is the accurate yield estimation for thenumerous crops involved in the planning.
2.	Idea / Solution description	Select an areathat is representative of thepaddock.
3.	Novelty / Uniqueness	The analysis of the agriculture data as well as decision mostfavorable parameters to capitalizeon the crop production usingdata.
4.	Social Impact / Customer Satisfaction	Agricultural based big data analytics is. one approach, believed to have a significant role andpositive impacton the increase of crop yield.
5.	Business Model (Revenue Model)	Predicting maximum crop yield is considered to bea major concept of all thesemethods.
6.	Scalability of the Solution	Prediction of crop yield is significant in order to accurately meet market requirements and properadministration of agricultural activities

Problem Solution Fit:



4.REQUIREMENT ANALYSIS:

4.1 Functional Requirement:

Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	29 October 2022
Team ID	PNT2022TMID43111
Project Name	Estimate the crop yield using data analytics
Maximum Marks	

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Visiting website	Visiting website to view different crop yield countries.
FR-2	Analyzing	Analyzing production of the crops. An analyzing monetary detail of the crops. Analyzing technique to use estimate the crops.

4.2 Non-Functional Requirement:

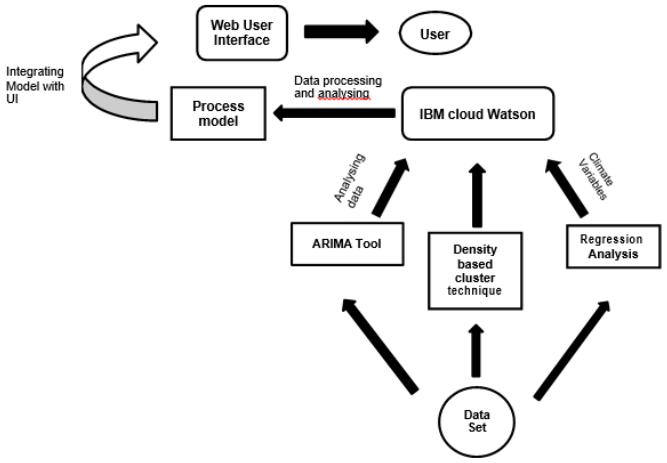
Non-functional Requirements:

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

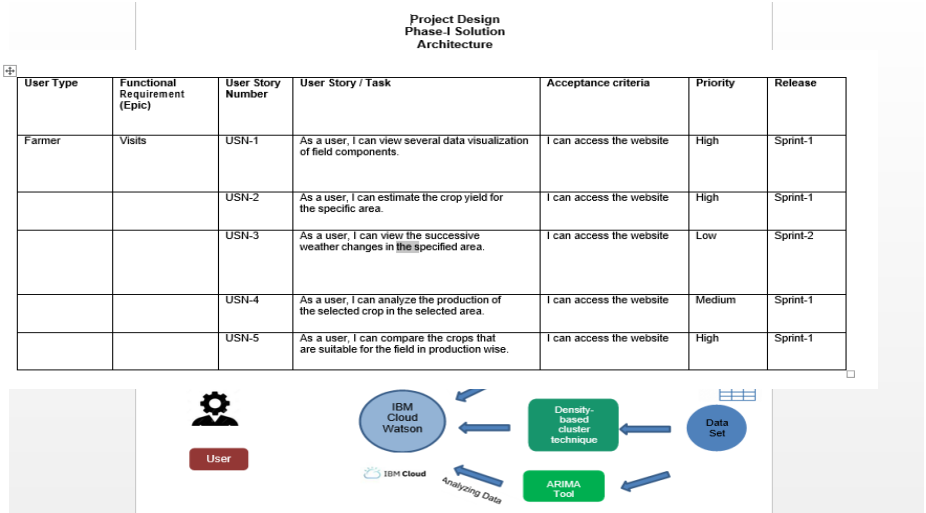
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The UI should be simple enough for everyone to understand.
NFR-2	**Reliability**	The UI should be able to withstand any errors in the data.
NFR-3	**Performance**	Estimation of the crop yield is visualized
NFR-4	**Availability**	The UI should respond to the users within 2 seconds.
NFR-5	**Scalability**	Best algorithms are used to analyze the multiple field component.

5. Project Design:

5.1 Data Flow Diagrams:



5.2 Solution & Technical Architecture:



Project Design
Phase-I Solution
Architecture

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Farmer	Visits	USN-1	As a user, I can view several data visualization of field components.	I can access the website	High	Sprint-1
		USN-2	As a user, I can estimate the crop yield for the specific area.	I can access the website	High	Sprint-1
		USN-3	As a user, I can view the successive weather changes in the specified area.	I can access the website	Low	Sprint-2
		USN-4	As a user, I can analyze the production of the selected crop in the selected area.	I can access the website	Medium	Sprint-1
		USN-5	As a user, I can compare the crops that are suitable for the field in production wise.	I can access the website	High	Sprint-1

5.3 User Stories:

6.PROJECT PLANNING & SCHEDULING:

6.1Sprint Planning & Estimation:

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
			Build a visualization to show case top 10 States in Crop Yield Production by Area.	4	Medium	Deepak Devadharshini
			Build the required Visualization to showcase the Crop Production by State.	4	Medium	Bhuvaneswari Deepak
			Build Visual analytics to represent the Sates with Seasonal Crop Production using a Text representation.	4	Medium	Deepak Bhuvaneswari
Sprint-3	Creating The dashboard	USN-8	Create the Dashboard by using the created visualizations.	20	High	Yuvaraj Deepak
Sprint-4	Export The Analytics	USN-9	Export the created Dashboard	20	High	Devadharshini Yuvaraj

Project Tracker, Velocity & Burn down Chart: (4 Marks)

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

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 (story points per day)

Project Planning Phase

Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	5 November2022
Team ID	PNT2022TMID43111
Project Name	Estimate The Crop Yield Using Data Analytics

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Template to create product backlog and sprint schedule

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 by entering my Agri - id card andrequest.	2	High	Deepak Yuvaraj Bhuvaneswari Devadharshini
		USN-3	As a user, I can register for the application through Gmail	2	Medium	Deepak Yuvaraj
	Login	USN-4	As a user, I can Call and request or Approach for dataset	4	High	Deepak Devadharshini
	Working with the Dataset	USN-5	To work on the given dataset, Understand the Dataset.	2	High	Bhuvaneswari Devadharshini Deepak Yuvaraj
		USN-6	Load the dataset to Cloud platform then Build the required Visualizations.	10	High	Bhuvaneswari Devadharshini
Sprint-2	Data Visualization Chart	USN-7	Using the Crop production in Indian dataset, create various graphsand charts to highlight the insights and visualizations. *Build a Visualization to showcase Average Crop Production by Seasons.	4	Medium	Deepak Yuvaraj
			*Showcase the Yearly usage of Area in Crop Production.	4	Medium	Yuvaraj Devadharshini

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 (story points per day)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
			Build a visualization to show case top 10 States in Crop Yield Production by Area.	4	Medium	Deepak Devadharshini
			Build the required Visualization to showcase the Crop Production by State.	4	Medium	Bhuvaneswari Deepak
			Build Visual analytics to represent the Sates with Seasonal Crop Production using a Text representation.	4	Medium	Deepak Bhuvaneswari
Sprint-3	Creating The dashboard	USN-8	Create the Dashboard by using the created visualizations.	20	High	Yuvaraj Deepak
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Project Tracker, Velocity & Burn down Chart: (4 Marks)

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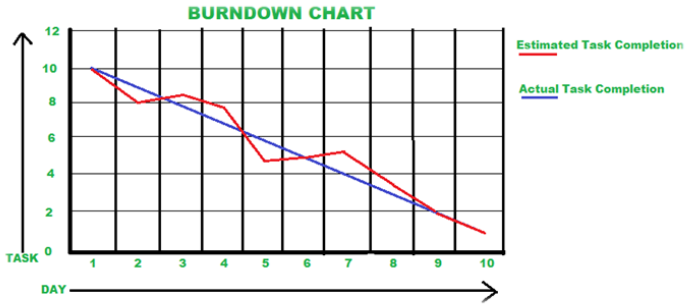
Sprint-4	20	6 Days	14 Nov 2022	19 Nov 2022	20	19 Nov 2022

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 (story points per day)

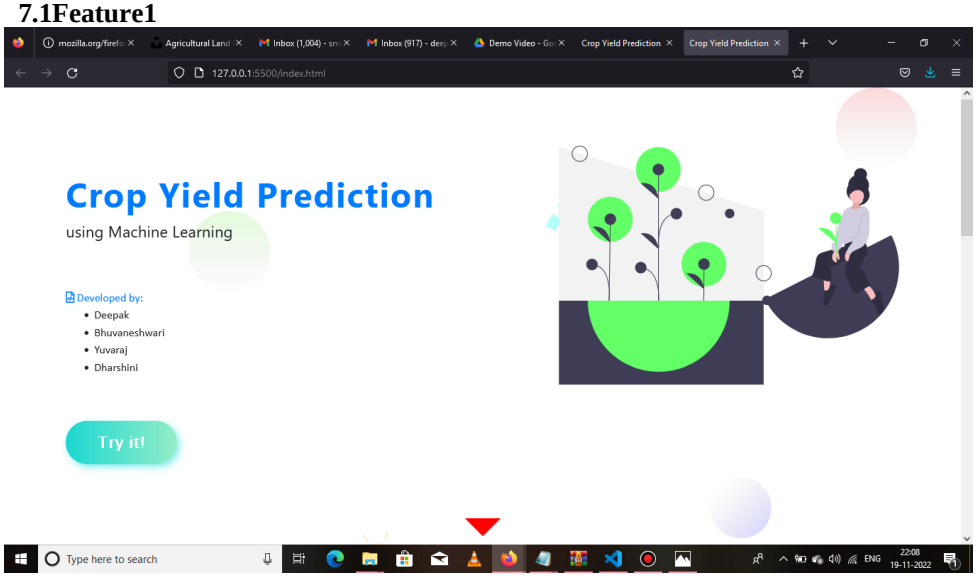
AV = Sprint Duration / Velocity = 24 / 20 = 1.2

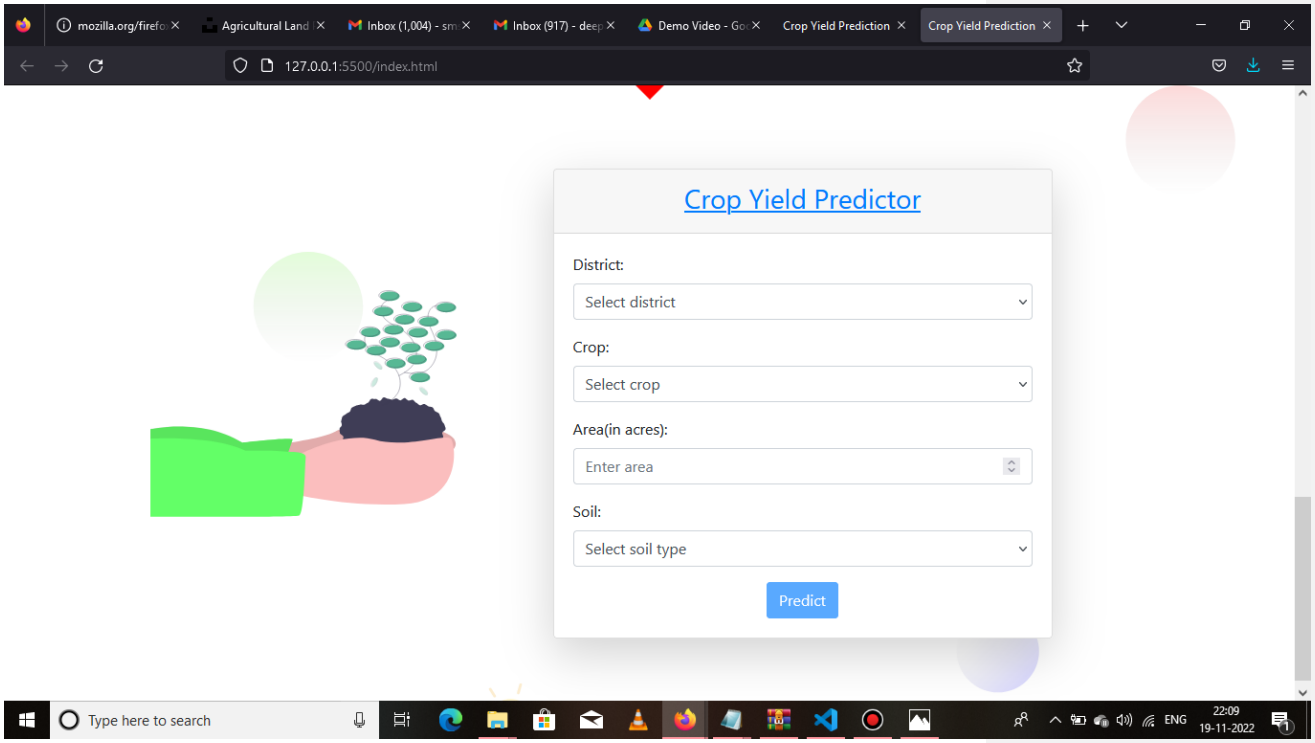
Burndown Chart: A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.



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

7.1Feature1





7.2 Features

```
<!DOCTYPE html>
<html lang="en">
<head>
  <title>Login</title>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1">
  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/css/bootstrap.min.css"
rel="stylesheet">
  <script
src="https://cdn.jsdelivr.net/npm/bootstrap@5.2.2/dist/js/bootstrap.bundle.min.js"></sc
ript>
  <style>
    body{
                        background-size: cover;
                }
                h2{
                        font-size:40px;
                        color:white;
                }
                div.mt-3{
                        font-size:20px;
```

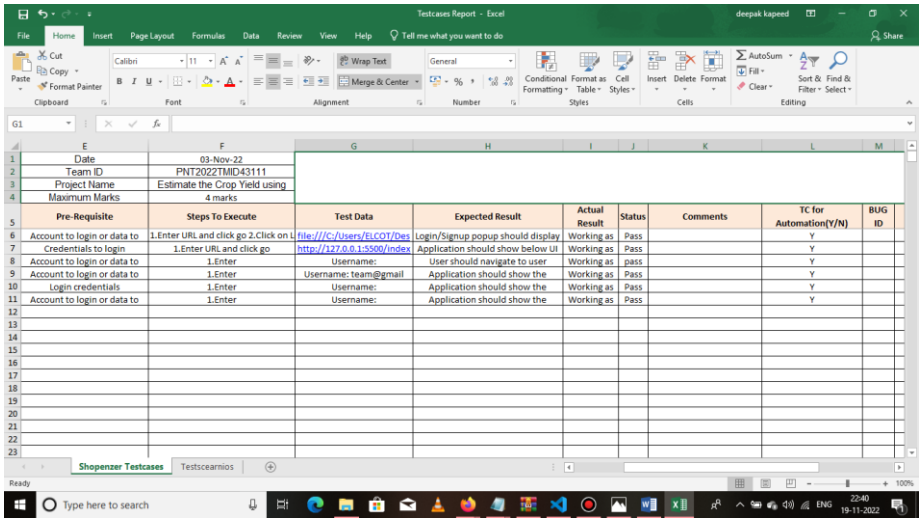
```
                    }
                    p{
                        font-size:25px;
                        color:white;
                    }

  </style>
</head>
<body background="2.jpg">
                        <br><br>
    <h2><center>LOG IN</h2>
        <form>
            <div class="d-flex align-items-center justify-content-center">
                <div class="mb-3 mt-3 p-5 text-dark" >
                    <div class="p-5">
                        <div class='mt-3'>
                            <label for="username" class="form-label">Username</label>
                            <input type="text" class="form-control" id="username"
placeholder="Enter your username" required>
                        </div>
                        <div class="mt-3" >
                            <label for="password" class="form-label" required>Password</label>
                            <input type="password" class="form-control" id="password"
placeholder="Enter your password">
                        </div>
                        <div>
                            <br>
                            <button type="button" onclick="login()" class="btn btn-
primary">Submit</button> 
                            <input type="reset" class="btn btn-primary">
                        </div>
                                                                <br>
                        <p>New user? <a href="Registration.html"
style="color:white">Register</a></p>

                    </div>
                </div>
            </div>
        </form>
    </div>
    </div>
    <script src="javascript.js"></script>
</body>
</html>
```

8. TESTING

8.1 Test Cases



	E	F	G	H	I	J	K	L	M
1	Date	03-Nov-22							
2	Team ID	PNT2022TMID43111							
3	Project Name	Estimate the Crop Yield using							
4	Maximum Marks	4 marks							
5	**Pre-Requisite**	**Steps To Execute**	**Test Data**	**Expected Result**	**Actual Result**	**Status**	**Comments**	**TC for Automation(Y/N)**	**BUG ID**
6	Account to login or data to	1.Enter URL and click go 2.Click on L	file:///C:/Users/ELCOT/Des	Login/Signup popup should display	Working as	Pass		Y	
7	Credentials to login	1.Enter URL and click go	http://127.0.0.1:5500/index	Application should show below UI	Working as	Pass		Y	
8	Account to login or data to	1.Enter	Username:	User should navigate to user	Working as	pass		Y	
9	Account to login or data to	1.Enter	Username: team@gmail	Application should show the	Working as	Pass		Y	
10	Login credentials	1.Enter	Username:	Application should show the	Working as	Pass		Y	
11	Account to login or data to	1.Enter	Username:	Application should show the	Working as	Pass		Y	

8.2 User Acceptance Testing

Acceptance Testing
UAT Execution & Report Submission

Date	03 November 2022
Team ID	PNT2022TMID43111
Project Name	Project - Estimate The Crop Yield Using Data Analytics
Maximum Marks	4 Marks

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the [Estimate The Crop Yield Using Data Analytics] project at the time of the release to User Acceptance Testing (UAT).

2. 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 3	Severity 4	Subtotal
By Design	10	4	2	3	19
Duplicate	1	0	3	0	4

External	2	3	0	1	6
Fixed	11	2	4	18	35
Not Reproduced	1	0	0	0	1
Skipped	0	0	1	1	2
Won't Fix	0	0	2	1	3
Totals	25	9	12	24	70

3. 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
Security	3	0	0	3

Outsource Shipping	3	0	0	3
Exception Reporting	9	0	0	9
Final Report Output	5	0	0	4
Version Control	2	0	0	2

9. RESULTS

9.1Performance Metrics

- Crop Performance analytics quantify the yield potential and

environmental impact of food production at field, farm and catchment scales.

- Crop Performance works with growers, food companies

and retailers to improve productivity, conserve resources, and monitor the environmental impact of food production.

The food and agriculture industry benefits with more accurate supply forecasts, an enhanced visibility to source commodities, assess risk and monitor the impact of climate change on agriculture:

- Crop Performance analytics forecast crop yields with accuracy

in advance of harvest.

- The data is used to inform in-season yield, water & nutrient

status of crops at the field scale.

- Customers of growers in the supply chain benefit from an

integrated view of supply to inform sourcing, harvest planning and logistics.

10. ADVANTAGES & DISADVANTAGES

Advantages:

1. Increases Soil Fertility

Prolonged planting of the same crop type leads to the depletion of specific nutrients in the soil. Each crop type has a different nutrient interaction with the soil, and each of them releases and absorbs different types of nutrients.

2. Increases Crop Yield

Crop rotation increases the harvest obtained from a single seasonal harvest. Because of the incorporation of different crop types, one gets not only a variety of crops after each season but also a general bounty harvest. Some scientific evidence proves a 10 to 25% increase in crop yield in crop rotation rather than monoculture.

2. Improper Implementation Can Cause Much More Harm Than Good

Improper implementation of this technique causes much more harm than good. If one lacks the technical know-how of crop rotation, there is no need experiment because there can be nutrient buildup that will take a longer time to correct.

3. Increases Soil Nutrients

As earlier stated, crop rotation allows the land to regenerate and rejuvenate its own nutrients without having to apply more nutrients through the use of fertilizers. Leaving the land bare for a season enables the land to restore the soil nutrients lost through absorption by plants harvested in the previous season.

4. Reduces Soil Erosion

Soil erosion is the carrying away of the most important topsoil layer by wind or water. When the soil is constantly covered by plants, the topsoil layer is not carried away by water during heavy rainfall.

5. Limits the Concentration of Pests and Diseases

Similar plants tend to have the same pathogens; therefore, crop rotation interrupts the pest life cycle and their habitat.

Disadvantages:

1. It Involves Risk

In crop rotation, investing in a season involves the input of a lot of money to buy different seedlings of the different types of crops to be planted.

2. Improper Implementation Can Cause Much More Harm Than Good

Improper implementation of this technique causes much more harm than

good. If one lacks the technical know-how of crop rotation, there is no need to experiment because there can be nutrient buildup that will take a longer time to correct.

3. Obligatory Crop Diversification

For crop rotation to work, one has to plant different crops every time. Nonetheless, it does not allow a farmer to specialize in a single type of crop. The farmer is not able to produce a single crop on a large scale over a long period of time because of the damage it will do to the soil.

4. Requires More Knowledge and Skills

Crop rotation means a variety of crops; therefore, it requires a deeper set of skills and knowledge regarding each type of crop harvested. It also requires different types of machinery, and operating them also requires knowledge. This means farmers will have to invest more time and resources in learning and mastering this agricultural practice.

5. The Difference in Growing conditions

Certain locations and their climates are more favorable for monoculture, meaning a certain kind of crop. Other crops, other than that specific type of crop, cannot grow well in that specific type of temperature and soil conditions.

11. Conclusion

Based on these articles on the main crop yield changes in China due to climate change, this paper evaluates the level of consensus on the reliability of the results in space and time. The high-consensus conclusions are as follows:

The crop yield change in China will be negative from the 2020s. Take 2012 as the baseline, the yield will decrease by 5% in the 2030s, and the decrease will be greater than 25% in the 2070s. The decline in the second half of this century will be greater than that in the first half.

Different crops respond differently to climate change. Maize yield will decrease more than 10% in the 2050s and approximately 19% in the 2070s. Rice yield will decrease faster in the second half, with its yield change decreasing from 5% to 25% after the 2060s. The fluctuations in wheat yield in upcoming decades will be less volatile, and the yield decrease will be approximately 10% in the 2090s.

12. FUTURE SCOPE

Crop yield prediction systems provide for better planning and decision-making to increase production. The proposed system involves a prediction module based on data mining classification algorithm namely Random Forest used to forecast the yield of major crops based on historical data.

Predicting encourages children to actively think ahead and ask questions. It also allows students to understand the story better, make connections to what they are reading, and interact with the text. Making predictions is also a valuable strategy to improve reading comprehension.

Diversification of crops reduces risk of financial loss due unfavorable conditions. Diversification of crops means variety of crops can be grown for meeting the domestic needs of farmers and livestock, to reduce risk of market fluctuations, mechanism of farming, growing expensive crops.

13. APPENDIX

SOURCE CODE

```
<!DOCTYPE html>
<html>

<head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">

    <title>Crop Yield Prediction</title>

    <link rel="stylesheet" href="style.css">

    <!-- Bootstrap CSS CDN -->
    <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/bootstrap/4.1.0/css/bootstrap.min.css"
integrity="sha384-
```

```
9gVQ4dYFwwWSjIDZnLEWnxCjeSWFphJiwGPXr1jddIhOegiu1FwO5qRGvFXOdJZ4"
crossorigin="anonymous">

    <!-- Font Awesome JS -->
    <script src="https://kit.fontawesome.com/728d1d3dec.js" crossorigin="anonymous"></script>

    <!-- jQuery CDN -->
    <script src="https://code.jquery.com/jquery-3.3.1.min.js"></script>
    <!-- Popper.JS -->
    <script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.0/umd/popper.min.js"
integrity="sha384-cs/chFZiN24E4KMATLdqdvsezGxaGsi4hLGOzlXwp5UZB1LY//20VyM2taTB4QvJ"
crossorigin="anonymous"></script>
    <!-- Bootstrap JS -->
    <script src="https://stackpath.bootstrapcdn.com/bootstrap/4.1.0/js/bootstrap.min.js" integrity="sha384-
uefMccjFJAIv6A+rW+L4AHf99KvxDjWSu1z9VI8SKNVmz4sk7buKt/6v9KI65qnm"
crossorigin="anonymous"></script>
</head>

<body>
    <div class="svgs">
        <img src="imgs/bg_svg.svg">
    </div>
    <div class="page" id="part1">
        <div class="info">
            <div class="heading">
                <div class="title text-primary">Crop Yield Prediction</div>
                <div class="title-support">using Machine Learning</div>
            </div>
            <div class="dev">
                <div class="text-primary">
                    <i class="far fa-file-code"></i> Developed by:
                </div>
                <ul>
                    <li>Sachin Sahil</li>
                    <li>Shubham Katte </li>
                    <li>Vaibhav Saini</li>
                </ul>
            </div>
            <div class="btn-grp">
                <a href="#part3" class="try">
                    Try it!
                </a>
            </div>
        </div>
        <div class="imgContainer">
            <!-- <img src="imgs/farm1.jpg" alt=""> -->
            <img src="imgs/flowers.svg" alt="">
        </div>
        <div class="scrollIndicator"></div>
    </div>
    <div class="page" id="part2">
```

```
        <div class="card myCard">
            <div class="myCard-img">
                <img src="imgs/input.svg" alt="">
            </div>
            <div class="myCard-title text-blue">Enter details</div>
            <div class="myCard-body ">Provide information for the crop like its type, the area of the farm,
the soil category and the district in which it is to be grown</div>
        </div>
        <div class="card myCard">
            <div class="myCard-img">
                <img src="imgs/weather.svg" alt="">
            </div>
            <div class="myCard-title text-green">Live weather Fetch</div>
            <div class="myCard-body ">Current weather details like the temperature, humidity, and
precipitaion are fetched automatically from the internet to be used for prediction</div>
        </div>
        <div class="card myCard">
            <div class="myCard-img">
                <img src="imgs/model.svg" alt="">
            </div>
            <div class="myCard-title text-orange">Prediction</div>
            <div class="myCard-body ">A Random Forest ML model, trained on past 20 years of data, is
used to predict the approximate crop yield</div>
        </div>
        <div class="scrollIndicator"></div>
    </div>
    <div class="container p-5 page" id="part3">
        <div class="imgContainer">
            <img src="imgs/plant.svg" alt="">
        </div>
        <div class="card shadow-lg col-6 p-0 mx-auto">
            <div class="card-header text-primary text-center">
                <h3><u>Crop Yield Predictor</u></h3>
            </div>
            <div class="card-body">
                <div class="form-group">
                    <label for="district">District:</label>
                    <select class="form-control" name="district" id="district"><option value="Select
district">Select district</option>
<option value="SATARA">SATARA</option>
<option value="PUNE">PUNE</option>
</select>
                </div>
                <div class="form-group">
                    <label for="crop">Crop:</label>
                    <select class="form-control" name="crop" id="crop"><option value="Select Crop">Select
Crop</option>
<option value="Jowar">Jowar</option>
<option value="Bajra">Bajra</option>
</select>
                </div>
```

```
            <div class="form-group">
                <label for="area">Area(in acres):</label>
                <input type="number" min="100" max="10000000" class="form-control" id="area"
placeholder="Enter area">
            </div>
            <div class="form-group">
                <label for="soil">Soil:</label>
                <select class="form-control" name="soil" id="soil"><option value="Select Soil">Select
Soil</option>
<option value="clay">clay</option>
<option value="sandy">sandy</option>
</select>
            </div>
            <div class="row">
                <button class="btn btn-primary mx-auto" id="submit">Predict</button>
            </div>
        </div>
        <div class="card-footer" id="prediction">
        </div>
    </div>
  </div>

  <script>
    $(document).ready(()=>{
        $('#submit').prop('disabled', true);
        $('#prediction').hide();
        var input_lists;
        $.get('input_lists.txt', (data, status)=>{
            input_lists = JSON.parse(data);
        }).done(()=>{
            let opts = '<option value="" selected hidden disabled>Select district</option>';
            let dists = input_lists['districts'];
            for(let i=0; i<dists.length; i++)
                opts += '<option value="'+dists[i]+'">'+dists[i]+'</option>';
            $('#district').html(opts);

            opts = '<option value="" selected hidden disabled>Select crop</option>';
            let crops = input_lists['crops'];
            for(let i=0; i<crops.length; i++)
                opts += '<option value="'+crops[i]+'">'+crops[i]+'</option>';
            $('#crop').html(opts);

            opts = '<option value="" selected hidden disabled>Select soil type</option>';
            let soils = input_lists['soils'];
            for(let i=0; i<soils.length; i++)
                opts += '<option value="'+soils[i]+'">'+soils[i]+'</option>';
            $('#soil').html(opts);
        });
    });
    $('select').change(()=>{
        var flag = 0;
```

```
        if(!$('#district').val()){ flag = 1; }
        if(!$('#crop').val()){ flag = 1; }
        if($('#area').val() == ""){ flag = 1; }
        if(!$('#soil').val()){ flag = 1; }
        $('#submit').prop('disabled', flag);
      })
      $('input').keyup(()=>{
        var flag = 0;
        if(!$('#district').val()){ flag = 1; }
        if(!$('#crop').val()){ flag = 1; }
        if($('#area').val() == ""){ flag = 1; }
        if(!$('#soil').val()){ flag = 1; }
        $('#submit').prop('disabled', flag);
      })
      $('#submit').click(()=>{
        var paras = 'district='+$('#district').val()+ '&crop='+$('#crop').val() + '&area='+$('#area').val() +
'&soil='+$('#soil').val();
        var res;
        $.get('predict.php?'+paras, (data, status)=>{
          // alert(data);
          res = data;
        }).done(()=>{
          $('#prediction').html(res);
          $('#prediction').show();
        });
      })
  </script>
</body>

</html>
```