**Project Report Format**

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Source Code

GitHub & Project Demo Link

1. INTRODUCTION
2. Project Overview:

Agriculture plays a significant role in the Indian economy. rainfall is necessary for agriculture; however, predicting rainfall has become a difficult problem in modern times. A reliable rainfall forecast enables farmers to take measures and formulate a more effective strategy for their crops.  
Today, precipitation has been a serious worry. The weather has been fluctuating for some time. Rainfall forecasting is crucial since failure to do so might result in several catastrophes. Unpredictable heavy precipitation may result in crop damage and life-threatening floods. For efficient use of water resources, crop yield, and pre-planning of water structures, it is essential to precisely determine the precipitation.  
This comparative analysis focuses on the following aspects: modeling inputs, data visualization, modeling approaches, and preprocessing strategies. By examining weather data, the results provide a comparison of several evaluation criteria for these machine-learning techniques and their accuracy in predicting precipitation.

1. We'll use classification algorithms like decision trees, random forests, KNN, and XGBoost. These methods will be used to train and validate the data. This model is chosen as the best and stored in PKL format. We connect the model to the Flask application and deploy it in IBM after saving it.  
   Rainfall continues to be one of the most influential meteorological variables in a variety of elements of our everyday lives. The socioeconomic repercussions of rainfall are notable, ranging from infrastructural damage in the event of a flood to disruptions in the transportation network.  
   Rainfall forecasting has existed for decades using conventional techniques that examine the link between precipitation, geographical coordinates (such as latitude and longitude), and other atmospheric variables (like pressure, temperature, wind speed, and humidity). However, the nonlinearity and complexity of precipitation make it difficult to anticipate Purpose Predicting rainfall is crucial since it is directly related to the conservation of water resources, the functioning of the reservoir, and the detection of flood levels in neighbouring bodies of water. The water level caused by precipitation affects human activities such as sewers and traffic. Predicting precipitation is crucial because severe and erratic precipitation can have devastating effects, such as the destruction of crops and farms.
2. LITERATURE SURVEY
3. **Existing Problem:**

Singh and Borah (2013) trained five designs of a Feed-forward Back- propagation Neural Network algorithm with only three layers (1 input, 1 hidden, and 1 output layer) to predict the monthly and seasonal mean rainfall of India's summer monsoon.

Kim and Bae suggested an LSTM-Nets model to predict rainfall one hour into the future (Kim & Bae, 2017). To train and validate the forecast model, Gangneung, Gangwon-do (Korea) weather data from 2012 was used. The weather dataset incorporated temperature, wind speed, humidity, and sea surface pressure as climatic characteristics.

Aswin, Geetha, and Vinayakumar (2018) suggested a method for predicting monthly precipitation using an LSTM-Networks model and a ConvNet model. Using microwave data, infrared data, and rain gauge measurements, precipitation estimation features were extracted. The models were trained and validated using Global Precipitation Climatology Project weather data from July 1979 to January 2018. The RMSE and Mean Absolute Percentage Error (MAPE) measures revealed that the ConvNet and LSTM-Networks models obtained comparable values.

Chao et al. (2018) subsequently examined five models based on Auto-regressive and Moving Average, Random Forest, Back-propagation Neural Networks, Support Vector Machines, and LSTM-Networks for predicting rainfall amounts five, ten, and fifteen minutes into the future.

1. ***References:***

Demeke Endalie, Getamesay Haile, and Wondmagegn Taye (2022): Rainfall estimation can be used for a variety of purposes, such as reducing traffic accidents and congestion, improving water management, and lowering the risk of flooding, among others. Meteorologists have long sought to provide accurate and timely weather forecasts. Traditional theory-driven numerical weatherprediction (NWP) approaches, on the other hand, face a number of issues, such as a lack of understanding of physical processes, difficulty extracting useful knowledge from a flood of observational data, and the need for powerful computational resources (Pu & Kalnay, 2018). ANN and KNN were used to create their rainfall prediction model. Maximum temperature, minimum temperature, and average rainfall were the three fundamental rainfall parameters considered.

Chalachew Muluken Liyew & Haileyesus Amsaya Melese (2021): The study by Arnav Garg and Kanchipuram demonstrates three machine learning algorithm experiments using the patterns of annual rainfall: supportvector machine (SVM), support vector regression (SVR), and K-nearest neighbor (KNN). Among the three machine learning algorithms, the SVM algorithm is the most effective. This research did not demonstrate experimentally which environmental factors influence the intensity of precipitation.

WanieM.Ridwan,MichelleSapitang,AwatifAziz,KhairulFaizalKushiar,AliNaja hAhmed,AhmedEl-Shafie(June 2021) conducted a comparative study focusing on developing and comparing several Machine Learning (ML) models, evaluating different scenarios and time horizon, and forecasting rainfall using two types of methods. The forecasting model employs four distinct ML algorithms, namely BayesianLinear Regression (BLR), Boosted DecisionTree Regression (BDTR), Decision Forest Regression (DFR), and Neural Network Regression (NNR) (NNR).

1. **Problem Statement Definition:**

Exploratory Analysis of Rainfall is very important because heavy and irregular rainfall can have many effects, such as crop and farm destruction, property damage, and the need for a better forecasting model that can minimize risks to life and property, as well as better management of agricultural farms.

Who is the issue affecting?

The problem primarily affects farmers because accurate rainfall forecasting is the most important factor in maximizing crop productivity. If it has been misled, the harvesting of crops could be impacted, which could lead to an increase in the cost of food resources.

What are the limitations of the issues?

a. Analysis of precipitation data could be challenging.

a. For the analysis section, we will need trustworthy data

b. Predictions of precipitation may fluctuate on occasion.

d. Optimizing pricing structure

What's the problem?

Inaccurate predictions will have a significant impact on crop productivity, and poor decision-making could have a significant impact on metropolitan areas.

When does the problem arise?

-Excessive or inadequate precipitation

As predictions are not always accurate: -Rainfall does not occur as predicted for a given time of crops; -Harvesting is impacted if there is excessive rain notwithstanding predictions.

Why is it essential to resolve the issue?

-It is vital to address concerns as soon as they are discovered since they produce unintended consequences. -When such problems arise, they have the greatest impact on cropping and harvesting.

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Occasionally, it may also result in a massive impact that results in loss of life or loss of food and shelter.

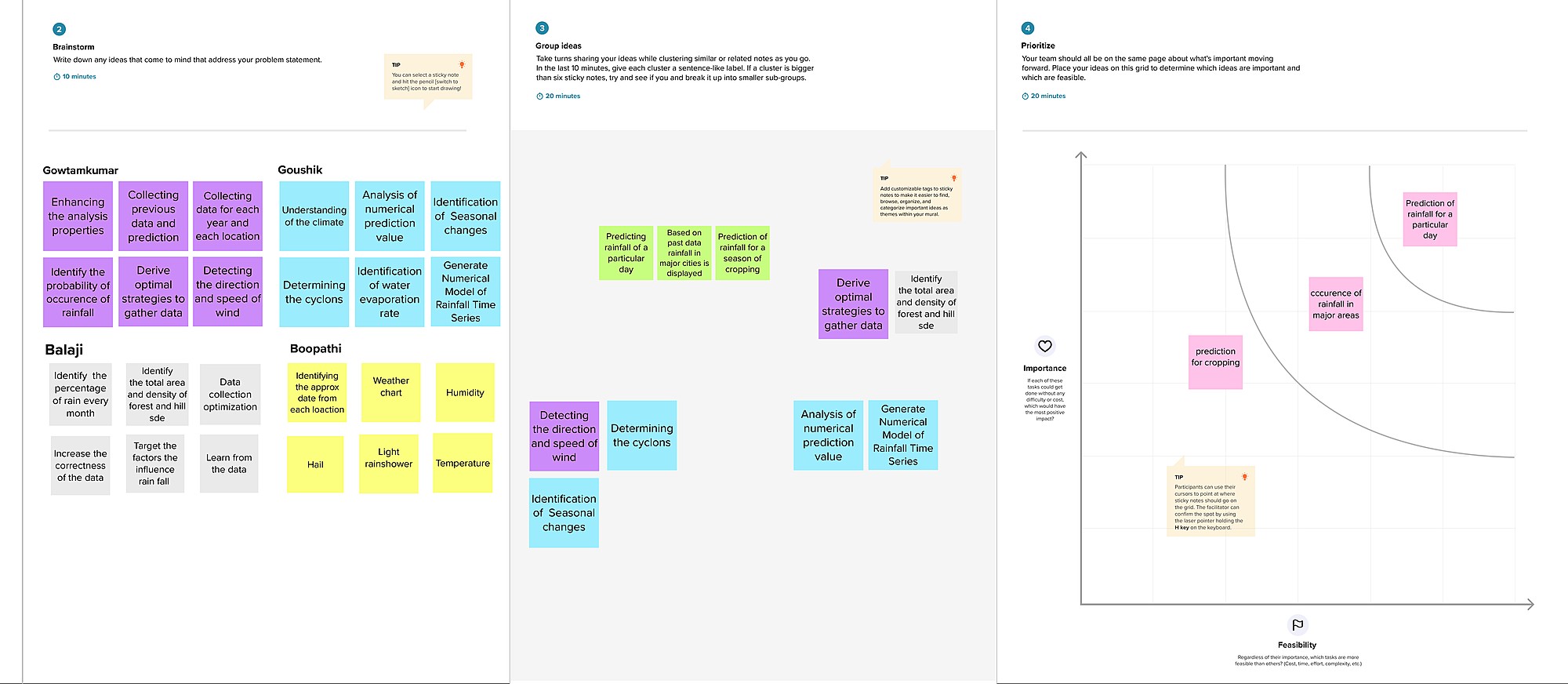
Where does the issue arise?

-Improper data collecting may result in incorrect rainfall forecasts.

1. **IDEATION & PROPOSED SOLUTION:**
2. **Empathy Map Canvas**

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1. **Ideation & Brainstorming**



## Proposed Solution

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Parameter** | **Description** |
| 1. | Problem Statement (Problem to besolved) | Analysing the rainfall based on past data. It is important to exactly determine the rainfall for effective use of waterresources, crop productivity, and pre-planning of water structures. |
| 2. | Idea / Solution description | The most widely use empirical approaches used for climate prediction are Regression, artiﬁcial neural network, fuzzy logic and group method of data handling. The dynamical approach, predictions are generated by physical models based on system of equations that predict the  future Rainfall. |
| 3. | Novelty / Uniqueness | We plan to add a new feature that helps the farmers to plant right crops In the right time. i.e. rainfall  prediction for a particular duration. |
| 4. | Social Impact/ Customer Satisfaction | It helps the farmers to crop the right crops at the right time. Also, it helps  people to plan their trips and events. |

1. **Problem Solution Fit:**



# 4.REQUIREMENT ANALYSIS

1. **Functional requirements:**

|  |  |  |
| --- | --- | --- |
| **FR**  **No.** | **Functional Requirement**  **(Epic)** | **Sub Requirement (Story / Sub-Task)** |
| FR-1 | Registration Process | Registration through Phone Number |
| FR-2 | Conﬁrmation | Conﬁrmation via OTP message |
| FR-3 | Updating Proﬁle | Enter the personal details |
| FR-4 | Home Page | Able to view the   * Proﬁle * Crop details * Rainfall prediction |
| FR-5 | Rainfall Prediction | * Enter the month * Enter the Year * Click on predict |
| FR-6 | ML Model | The user data is sent to the  Machine learning model. |
| FR-7 | Preprocessing data | * Data exploration * Feature selection * Missing values * Feature scaling * Splitting of train and test data |
| FR-8 | Building ML Model | * Random forestalgorithm is applied * Train the model usingtraining data * The model is evaluated with the testdata. |
| FR-9 | Result | Shows the predicted rainfall data. |

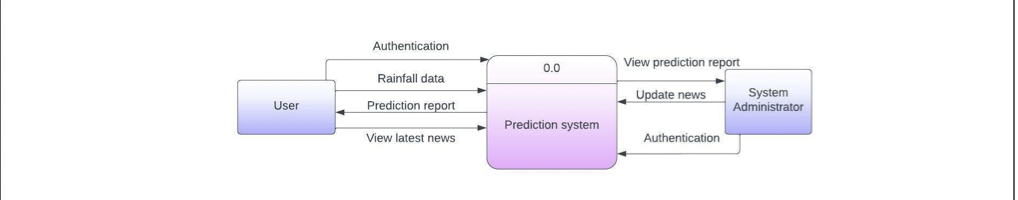
1. **Non- Functional requirements**

|  |  |  |
| --- | --- | --- |
| **FR**  **No.** | **Non-Functional Requirement** | **Description** |
| NFR-1 | **Usability** | It’s a user-friendly application which enable people to use without  Technical knowledge. |
| NFR-2 | **Security** | User data will be protected from unauthorised access and the data  are secured. |
| NFR-3 | **Reliability** | The application will operate effectively without causing any failure and errors, so maintance won't be big problem. |
| NFR-4 | **Performance** | Overall performance of system is eﬃcient to predict the rainfall with much speed without delay. |
| NFR-5 | **Availability** | The availability of the application is that it will be active and available to all the  users. |
| NFR-6 | **Scalability** | The scalability of our systemis one that can handlerapid changes to workloads  and user demands. |

# PROJECT DESIGN

## 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.

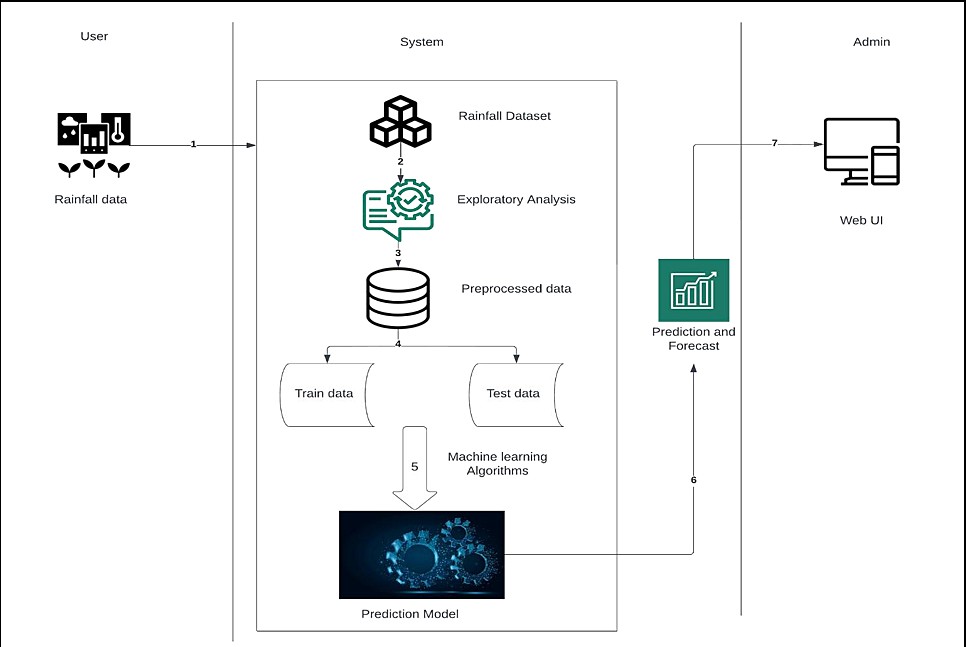


1. **Solution & Technical Architecture**

**Solution Architecture Diagram:**

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**Technical Architecture:**



1. **User Stories**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **User Type** | **Function al Requirem**  **ent(Epic)** | **User Story Number** | **User Story/ Task** | **Acceptance criteria** | **Priority** | **Release** |
| Farmers (webprofle user) | Registration | USN-1 | As a user, I can register for the applicati on by using phonenu  mber | I can access the proﬁle and homepage | High | Sprint-1 |
|  |  | USN-2 | As a user, I will receiveOTP message, Once I haveregistered for  the application | I can receive conﬁrm ation message | High | Sprint-1 |
|  | Proﬁle | USN-3 | As a user, I have to enter my personal details | I can access my homepage | High | Sprint-1 |
|  | Home page | USN-4 | As a user, I can either click on rainfallprediction or crops button | I can go to thedesi  red page | Medium | Sprint-2 |
|  |  | USN-5 | As a user, I can click on the “moreaction” button | I can view my personal information | Medium | Sprint-2 |
|  | Rainfa ll predcti on | USN-6 | As a user, I have to enter the desired month and the year | To know the rainfall on the  given month | High | Sprint-3 |
|  | Crops | USN-7 | As a user, I can view the details ofthecrops | To know more aboutthe crop cultivations | Medium | Sprint-3 |

# PROJECT PLANNING & SCHEDULING

## Sprint Planning & Estimation

**Project Tracker, Velocity & Burndown Chart:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sprint** | **Total Story Poin ts** | **Duration** | **Sprint Start Date** | **Sprint End Date(Planned)** | **Story Points Completed (as on Planned**  **End Date)** | **Sprint Release Date (Actual)** |
| Sprint-  1 | 8 | 6 Days | 24 Oct  2022 | 29 Oct 2022 | 6 | 29 Oct 2022 |
| Sprint-  2 | 14 | 6 Days | 31 Oct  2022 | 05 Nov 2022 | 12 | 05 Nov 2022 |
| Sprint- 3 | 16 | 6 Days | 07  Nov20  22 | 12 Nov 2022 | 11 | 12 Nov 2022 |
| Sprint- 4 | 12 | 6 Days | 14  Nov20  22 | 19 Nov 2022 | 12 | 19 Nov 2022 |

## Velocity:

Imagine we have a 10-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)

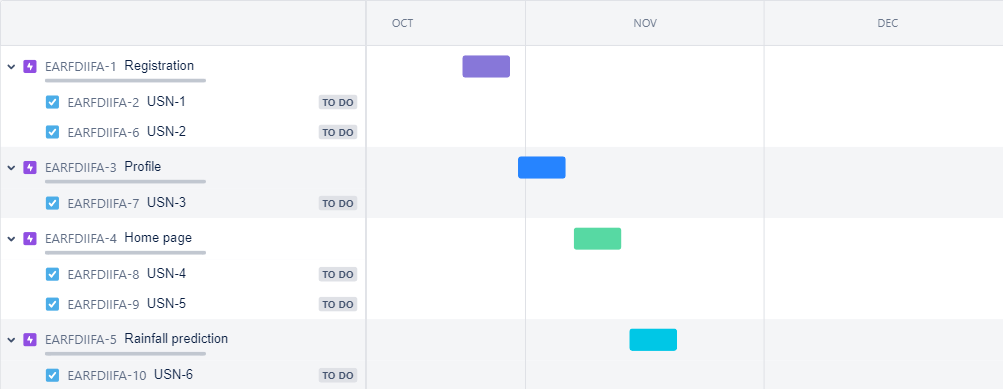
Sprint-1 the Average Velocity (AV) is: AV = Sprint Duration / velocity = 8 / 6 = 1.3V Sprint-2 the Average Velocity (AV) is: AV = Sprint Duration / velocity = 14 / 6 = 2.3V Sprint-3 the Average Velocity (AV) is: AV = Sprint Duration / velocity = 16 / 6 = 2.6V Sprint-4 the Average Velocity (AV) is: AV = Sprint Duration / velocity = 12/ 6 = 2.0V TOTAL TEAM AVERAGE VELOCITY = 2.08

## Sprint Delivery Schedule

**Product Backlog, Sprint Schedule, and 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 Phone number/Gmail,Username  password, and conﬁrmingmy  password. | 2 | High | Immaneul L |
| Sprint-1 | Registration | USN-2 | As a user, I will receive conﬁrmation in phone or gmail once I have registered  for the application | 1 | High | Charan K |
| Sprint-1 | Login | USN-3 | As a user, I can log into the application by entering email &  password | 1 | High | Bharathwaj N |
| Sprint-2 | Dataset Collect | USN-4 | Collect number of datasets and get accuracy | 2 | Medium | Aashik Mathew P |
| Sprint-2 | Pre-processing | USN-5 | The dataset is extracted | 2 | High | Harish M |
| Sprint-2 | Train the model | USN-6 | Train the model. | 4 | High | Aashik Mathew P |
| Sprint-2 | Test the model | USN-7 | Test the model | 6 | High | Bharathwaj N |
| Sprint-3 | Detection | USN-8 | Load the trained model. | 3 | High | Aashik Mathew P  S |
| Sprint-3 | Detection | USN-9 | Prediction of rain fall using trained model | 5 | Medium | Bharathwaj N |
| Sprint-3 | Detection | USN-10 | classify it by using a trained model to predict  the output | 8 | High | Immaneul L |
| Sprint-4 | Detection | USN-11 | Alerts the user about the condition of Rainfall | 7 | High | Harish M |
| Sprint-4 | Detection | USN-12 | As a User,I can detect the rainfall. | 3 | Medium | Charan K |
| Sprint-4 | Logout | USN-13 | As a User,I can logout the application. | 2 | Low | Immanuel L |

## Reports from JIRA



**Reference link:** https://giushik11.atlassian.net/jira/software/projects/EARFDIIFA/boards/1/roadmap?share d=&atlOrigin=eyJpIjoiMDQ0ZGVkNDA3MTE2NDA4ZmEyMzJjNGE4NzE5YmM5Yj ciLCJwIjoiaiJ9

# CODING & SOLUTIONING

## a.    Feature 1

Rainfall has been a major concern these days. Weather conditions have been changing for the time being. Rainfall forecasting is important; otherwise, it may lead to many disasters. Irregularly heavy rainfall may lead to the destruction of crops and heavy floods that can cause harm to human life. It is important to precisely determine the rainfall for effective use of water resources, crop productivity, and pre-planning of water structures.

 This comparative study is conducted by concentrating on the following aspects: modeling inputs, visualizing the data, modeling methods, and pre-processing techniques. The results provide a comparison of various evaluation metrics of these machine learning techniques and their reliability to predict rainfall by analyzing weather data.

 We will be using classification algorithms such as decision trees, random forests, KNN, and XGBoost. We will train and test the algorithms with the data. The best model is chosen, and the dataset is saved in PKL format.After saving the model, we integrate it with the Flask application and deploy it in IBM.

## Software Requirements:

1. Python flask
2. MongoDB
3. Jupyter Notebook
4. WebBrowser (Chrome, edge)

## Hardware Requirements:

1. RAM -4GB
2. Harddisk -10GB

## Feature 2

To design a system the predicts rainfall occurences in major areas and rainfall for crops so that the farmers can plan their crops and users can plan their trips accordingly.

This system is more suited for farmers because rainfall plays an important role in agriculture.

## TESTING

1. **Test Cases**

|  |  |
| --- | --- |
| **Test Scenario** | **Expected Results** |
| Verify User is Login by entering email,password and conﬁrming  password | Login/registering for the application. |
| verify the can access the dashboard with the linked in login | Application should show below UI elements:  a.email text box b.password text box c.join now button  d.shows the dashboard page. |
| Verify user is able to log into application with Valid credentials and  get the conforming mail | Application should be send the conformation mail. |
| Verify user is able to log into  application with InValid credentials | User should nevigate to the  homepage. |
| Verify user is able to log into application with InValid credentials | Application should show 'Incorrect  email or password ' validation message. |
| Verify user is able to log into application with InValid credentials | Application should show 'Incorrect email or password ' validation  message. |

## User Acceptance Testing

**Purpose of Document**

The purpose of this document is to briefly explain the test coverage and open issues of the Exploratory AnalysisOf Rainfall Data In India For Agriculture project at the time ofthe 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

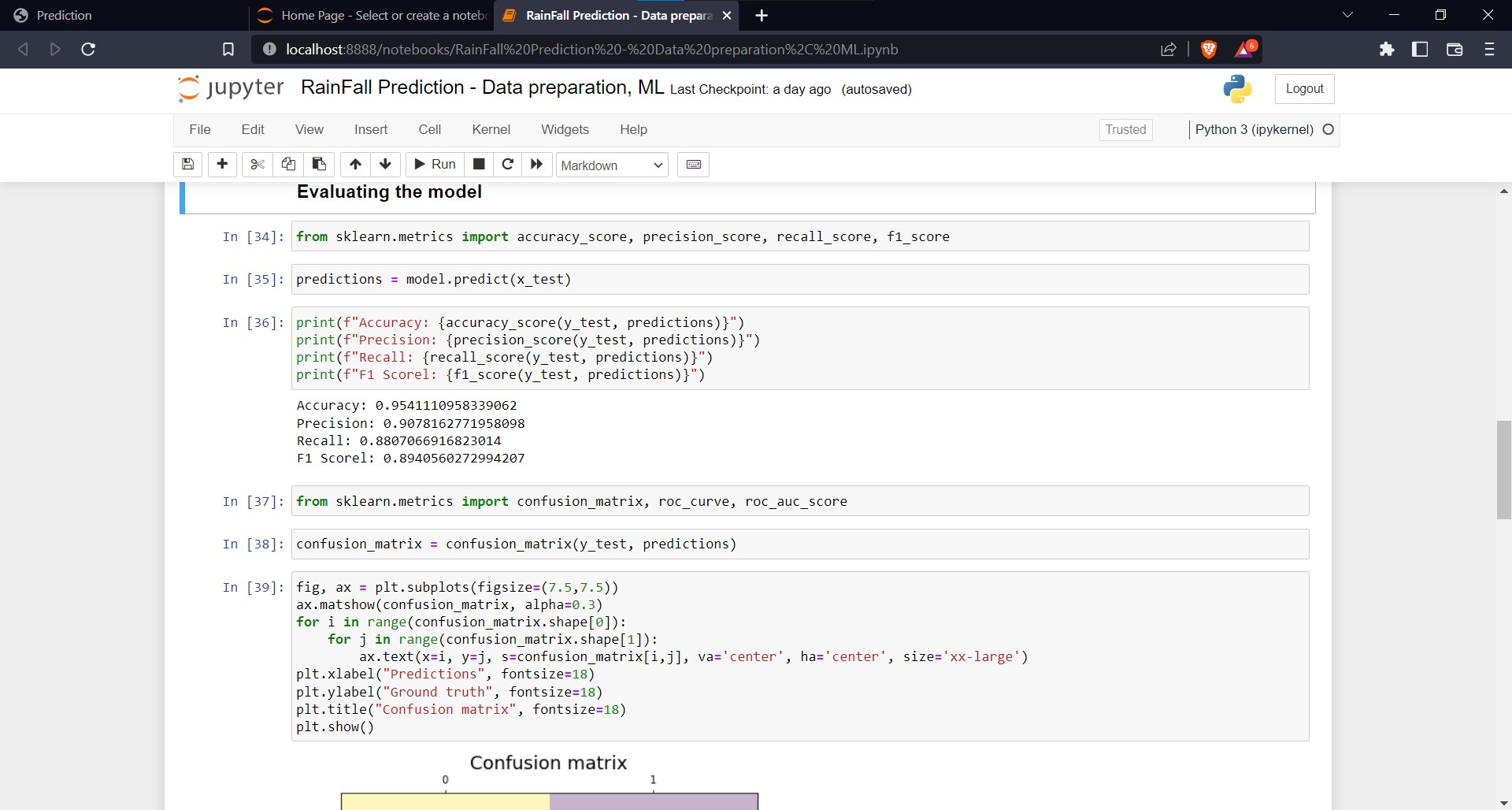
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Resolution** | **Severi**  **ty1** | **Severity 2** | **Severi**  **ty3** | **Severity 4** | **Subtot al** |
| By Design | 10 | 4 | 2 | 3 | 20 |
| Duplicate | 1 | 0 | 3 | 0 | 4 |
| External | 2 | 3 | 0 | 1 | 6 |
| Fixed | 11 | 2 | 4 | 20 | 37 |
| Not Reproduced | 0 | 0 | 1 | 0 | 1 |
| Skipped | 0 | 0 | 1 | 1 | 2 |
| Won't Fix | 0 | 5 | 2 | 1 | 8 |
| Totals | 24 | 14 | 13 | 26 | 77 |

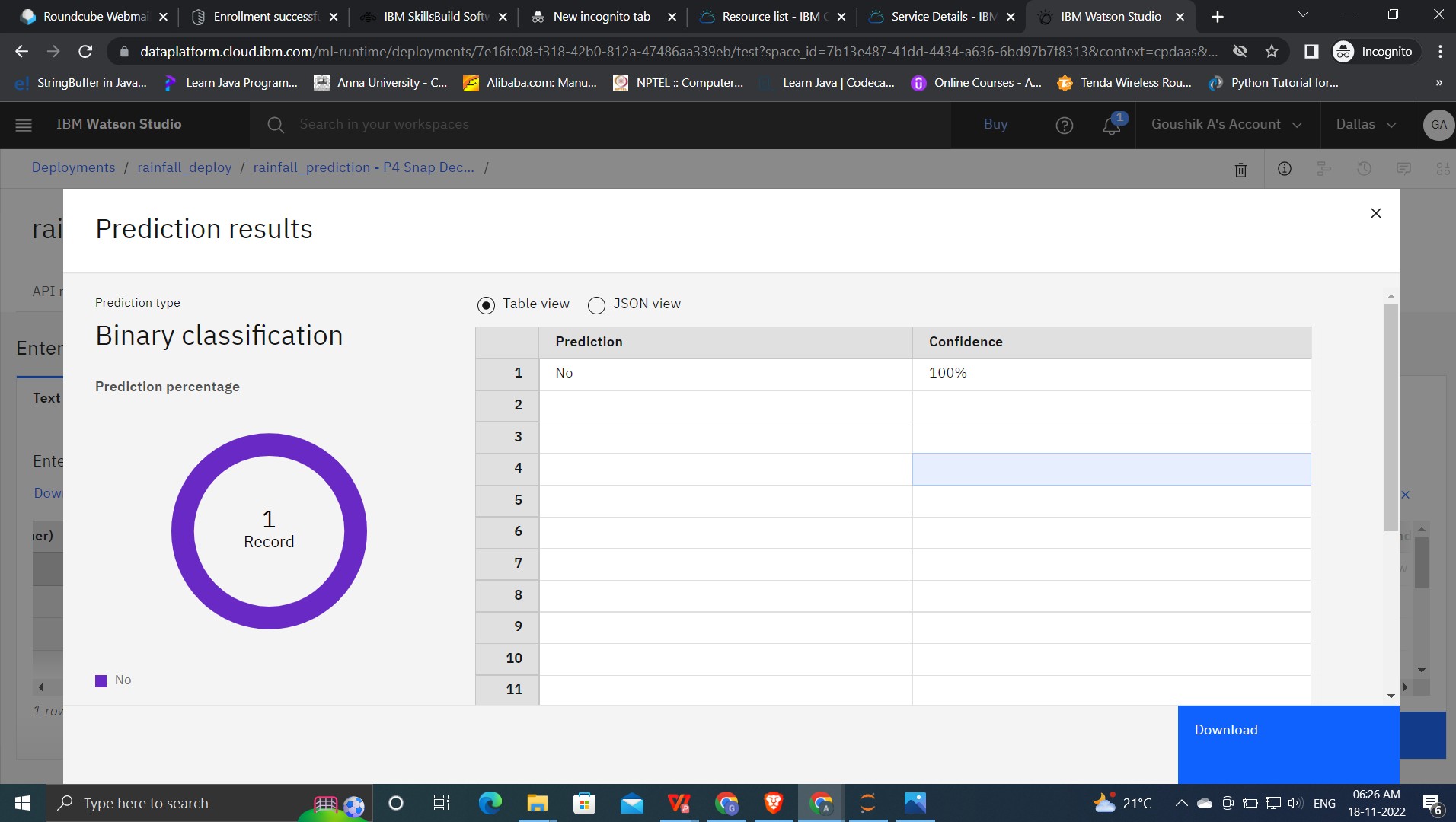
**Test Case Analysis**

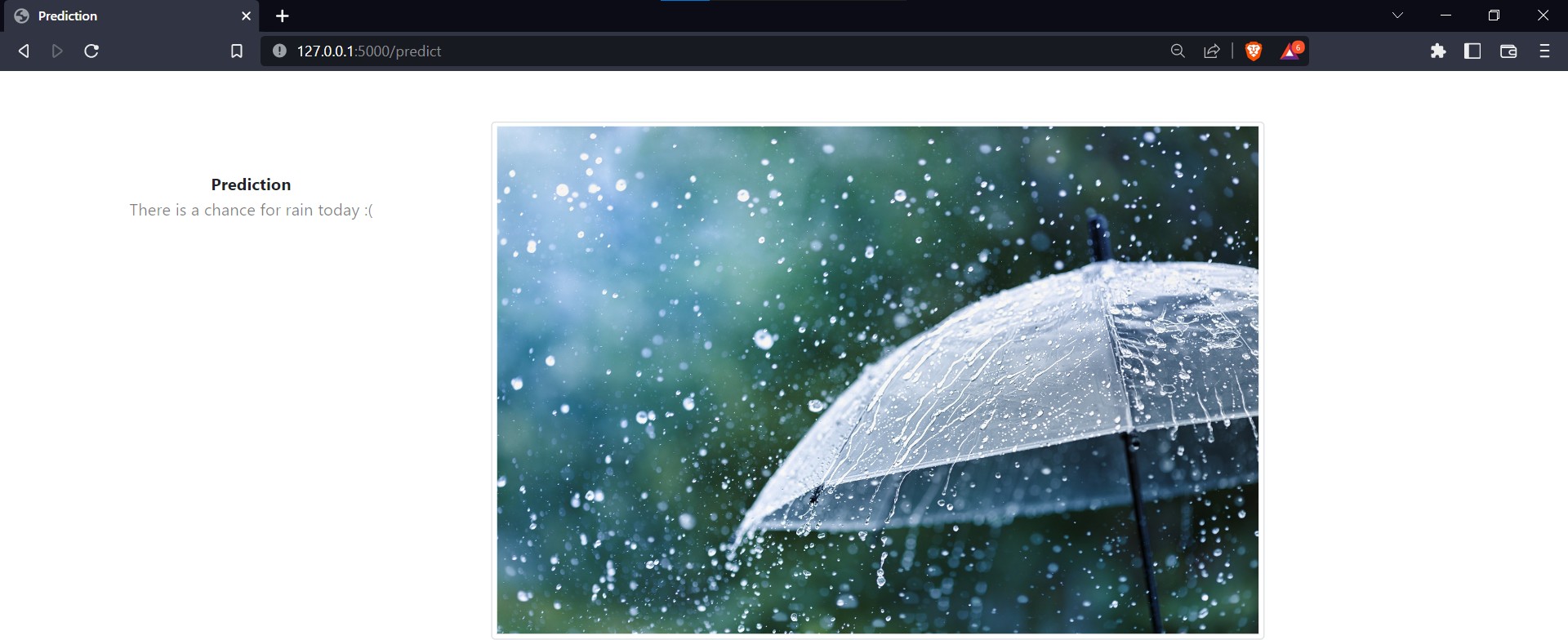
This report shows the number of test cases that have passed, failed,and untested.

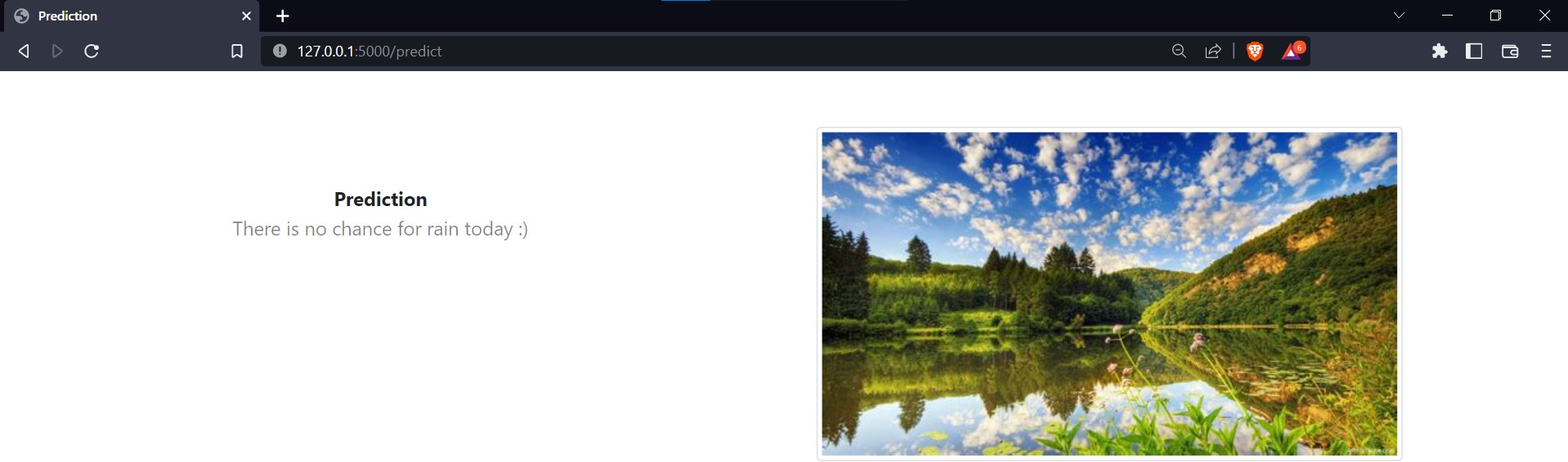
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Section | Total Cases | Not Tested | Fail | Pass |
| Print Engine | 7 | 0 | 0 | 7 |
| Client Application | 30 | 0 | 0 | 30 |
| Security | 2 | 0 | 0 | 2 |
| Outsource Shipping | 3 | 0 | 0 | 3 |
| Exception Reporting | 9 | 0 | 0 | 9 |
| Final Report Output | 4 | 0 | 0 | 4 |

* 1. **RESULTS**









* 1. **ADVANTAGES & DISADVANTAGES**

## Advantages:

Rainfall forecasting is very important because heavy and irregular rainfall can have many impacts like destruction of crops and farms, damage of property so a better forecasting model is essential for an early warning that can minimize risks to life and property and also managing the agricultural farms in better way.

**Disadvantages:**

1. Forecasts are never 100% accurate
2. It can be time-consuming and resource-intensive
3. It can also be costly

# CONCLUSION

The objective of this study was to evaluate the prediction performance of rainfall forecasting models based on LSTM-Networks topologies to that of contemporary Machine Learning methods. 2 models based on LSTM-Networks, 3 models based on Stacked-LSTM, and 1 model based on Bidirectional-LSTM Networks were compared with an XGBoost (baseline model) and an ensemble model resulting from an Automated Machine Learning technique.

# FUTURE SCOPE

The development of advanced nowcasting systems for severe weather events is ongoing in several countries. Researchers are exploring several approaches to the problem of very short-range forecasts that are highly speciﬁc in time and space. These approaches vary widely, ranging from extrapolation to expert systems to explicit numerical modeling of storm cells. They all share three common needs: data, data and even more data! The observational data must be suﬃcient to characterize the storm and its environment in great detail.

# 13. APPENDIX

**Source Code**

**app.py**

from ﬂask import Flask, render\_template, url\_for,request,session , redirect import random

import smtplib

import db

import numpy as np import pickle import joblib

import time import pandas import os import warnings

warnings.ﬁlterwarnings('ignore')

app = Flask( name ) app.secret\_key = 'RainfallPrediction'

model = pickle.load(open("models/model.pkl", "rb")) scaler = pickle.load(open("models/scaler.pkl", "rb"))

@app.route('/login') def login():

return render\_template('login.html')

return render\_template('prediction\_Data.html')

@app.route('/proﬁle') def proﬁle():

return render\_template('proﬁle.html',name = session['realname'],email = session['realemail'])

@app.route('/register') def register():

return render\_template('register.html')

@app.route('/forgetpassword') def forgetpassword():

return render\_template('forgetpassword.html')

@app.route('/resulttoday') def resulttoday():

return render\_template('resultYes.html')

@app.route('/verify',methods=['POST']) def verify():

otp = "".join([str(random.randint(0,9)) for i in range(4)]) session['current\_otp']=otp

name=request.form['name'] email=request.form['email'] password = request.form['password'] session['user']=name session['email']=email session['password']=password

datacheck = db.check\_ifavailable(email) print(datacheck)

if(datacheck==1):

server = smtplib.SMTP('smtp.gmail.com',587) server.starttls() server.login('rainfallpproject@gmail.com','ikqqssrlvqnjutgu') message = "Your OTP for the site is : "+otp

message = 'Subject: {}\n\n{}'.format("Rainfall Prediction", message) server.sendmail('rainfallpproject@gmail.com',email,message) server.quit()

return render\_template('verify.html') else:

return '<script> alert("You are registering again so PLEASE LOGIN "); window.location.href="/login";</script>'

@app.route('/validate',methods=['POST']) def validate():

user\_otp=request.form['otp'] otp = session['current\_otp']

if otp==(user\_otp): db.insert\_database(session['user'],session['email'],session['password']) return '<script> alert("Registration SUCCESSFULL login");

window.location.href="/login";</script>'

return '<script> alert("Mismatchh OTP Try Again");</script>'+render\_template('verify.html')

@app.route('/sendpassword',methods=['POST'] ) def sendpassword():

email=request.form['email']

password = db.check\_for\_password(email) if(password==0):

return '<script> alert("There is no such email registered \'SORRY\'"); window.location.href="/login";</script>'

else:

server = smtplib.SMTP('smtp.gmail.com',587) server.starttls() server.login('rainfallpproject@gmail.com','ikqqssrlvqnjutgu') message = "Your PASSWORD for the site is : "+password

message = 'Subject: {}\n\n{}'.format("Rainfall Prediction(Forget Password", message) server.sendmail('rainfallpproject@gmail.com',email,message)

server.quit()

return '<script> alert("Please Check your mail for Password"); window.location.href="/login";</script>'

@app.route('/userlogin',methods=['POST']) def userlogin():

email=request.form['email'] password=request.form['password']

checkava = db.check\_ifavailable(email) if(checkava==0):

realpassword = db.check\_for\_password(email) if(realpassword==password):

session['realemail'] = email session['realname'] = db.get\_userame(email)

return '<script> window.location.href="/proﬁle";</script>' else:

return '<script> alert("Invalid Passsword"); window.location.href="/login";</script>' else:

return '<script> alert("There is no such user Please check your email or Register"); window.location.href="/login";</script>'

@app.route('/predict', methods=["POST"]) def predict():

column\_names = ['MinTemp', 'MaxTemp', 'Rainfall', 'WindGustSpeed', 'WindSpeed9am', 'WindSpeed3pm', 'Humidity9am', 'Humidity3pm', 'Pressure9am',

'Pressure3pm', 'Temp9am', 'Temp3pm', 'WindGustDir', 'WindDir9am', 'WindDir3pm']

feature\_values = [int(request.values.get(name)) for name in column\_names] print(f"input: {feature\_values}")

feature\_values = [np.array(feature\_values)]

data = pandas.DataFrame(feature\_values, columns=[column\_names]) data = scaler.ﬁt\_transform(data)

data = pandas.DataFrame(data, columns=[column\_names]) prediction = model.predict(data)

print(f"prediction: {prediction}")

if (prediction == 0):

return render\_template("resultNo.html") else:

return render\_template("resultYes.html")

if name == ' main ': app.run(debug=True)

**db.py**

from pymongo import MongoClient, cursor CONNECTION\_STRING = "mongodb://127.0.0.1:27017/"

client = MongoClient(CONNECTION\_STRING) mydb = client['user']

information = mydb.userinformation

def check\_ifavailable(email): query={'email':email}

a = information.ﬁnd(query) l=0

for i in a: print(i) l=l+1

if(l==0): return 1

else:

return

def insert\_database(name,email,password): records = {

'name':name, 'email':email, 'password':password

}

information.insert\_one(records)

def check\_for\_password(email): query={'email':email}

a = information.ﬁnd(query) t = ""

for i in a:

t = i['password']

if(t==""):

return 0 else:

return t

def get\_userame(email):

query={'email':email}

a = information.ﬁnd(query) t = ""

for i in a:

t = i['name'] return t

## index.html

<!DOCTYPE html>

<html>

<head>

<title>RainFall Prediction</title>

<meta name="description" content="Page Description Here" />

<!--<meta http-equiv="X-UA-Compatible content="IE=edge">-->

<meta name="viewport" content="width=device-width, initial-scale=1">

<meta charset="UTF-8">

## <!-- CSS File-->

<link rel="stylesheet" hr[ef="https:](https://cdn.jsdelivr.net/npm/bootstrap%405.0.0-)/[/cdn.jsdelivr.net/npm/bootstrap@5.0.0](https://cdn.jsdelivr.net/npm/bootstrap%405.0.0-)- alpha1/dist/css/bootstrap.min.css">

<link rel="stylesheet" hr[ef="https:](https://cdn.jsdelivr.net/npm/bootstrap%405.0.0-)/[/cdn.jsdelivr.net/npm/bootstrap@5.0.0](https://cdn.jsdelivr.net/npm/bootstrap%405.0.0-)- alpha1/dist/js/bootstrap.bundle.min.js">

<link rel="stylesheet" href="https://cdnjs.cloudﬂare.com/ajax/libs/jquery/3.2.1/jquery.min.js">

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

<script src="https://cdnjs.cloudﬂare.com/ajax/libs/axios/0.18.0/axios.js"></script>

</head>

<body>

<div class="container rounded bg-white mt-5 mb-5">

<div class="col-md-10">

<div class = "card">

<div class="p-3 py-5">

<div class="d-ﬂex justify-content-between align-items-center mb-3">

<h4 class="text-right">Enter the required parameters for Rainfall Prediction</h4>

</div>

<form action="{{ url\_for('predict')}}" method="POST">

<div class="row mt-1">

<div class="col-md-6"><label class="labels">MinTemp</label><input name="MinTemp" type="text" class="form-control" placeholder="" value="" id="MinTemp" required></div>

<div class="col-md-6"><label class="labels">MaxTemp</label><input name="MaxTemp" type="text" class="form-control" value="" placeholder="" id="MaxTemp" required></div>

</div>

<div class="row mt-3">

<div class="col-md-6"><label class="labels">WindGustSpeed</label><input name="WindGustSpeed" type="text" class="form-control" placeholder="" value="" id="WindGustSpeed" required></div>

</div>

<div class="row mt-4">

<div class="row mt-4-0">

<div class="col-md-6"><label

class="labels">WindSpeed9am</label><input name="WindSpeed9am" type="text" class="form-control" placeholder="" value="" id="WindSpeed9am" required></div>

<div class="col-md-6"><label class="labels">WindSpeed3pm</label><input name="WindSpeed3pm" type="text" class="form-control" value="" placeholder="" id="WindSpeed3pm" required></div>

</div>

<div class="row mt-4-1">

<div class="col-md-6"><label class="labels">Humidity9am</label><input name="Humidity9am" type="text" class="form-control" placeholder="" value="" id="Humidity9am" required></div>

<div class="col-md-6"><label class="labels">Humidity3pm</label><input name="Humidity3pm" type="text" class="form-control" value="" placeholder="" id="Humidity3pm" required></div>

</div>

<div class="row mt-4-2">

<div class="col-md-6"><label class="labels">Pressure9am</label><input name="Pressure9am" type="text" class="form-control" placeholder="" value="" id="Pressure9am" required></div>

<div class="col-md-6"><label class="labels">Pressure3pm</label><input name="Pressure3pm" type="text" class="form-control" value="" placeholder="" id="Pressure3pm" required></div>

</div>

<div class="row mt-4-3">

<div class="col-md-6"><label class="labels">Temp9am</label><input name="Temp9am" type="text" class="form- control" placeholder="" value="" id="Temp9am" required></div>

<div class="col-md-6"><label class="labels">Temp3pm</label><input name="Temp3pm" type="text" class="form- control" value="" placeholder="" id="Temp3pm" required></div>

</div>

</div>

<div class="row mt-5">

<div class="col-md-6"><label class="labels">WindGustDir</label>

<select name="WindGustDir" class="form-control" id="WindGustDir" required>

<option value="0">N</option>

<option value="1">E</option>

<option value="2">S</option>

<option value="3">W</option>

<option value="4">NE</option>

<option value="5">NW</option>

<option value="6">SE</option>

<option value="7">SW</option>

<option value="8">NNE</option>

<option value="9">NNW</option>

<option value="10">ENE</option>

<option value="11">ESE</option>

<option value="12">SSE</option>

<option value="13">SSW</option>

<option value="14">WNW</option>

<option value="15">WSW</option>

</select></div>

required>

required>

<div class="col-md-6"><label class="labels">WindDir9am</label>

<select name="WindDir9am" class="form-control" id="WindDir9am"

<option value="0">N</option>

<option value="1">E</option>

<option value="2">S</option>

<option value="3">W</option>

<option value="4">NE</option>

<option value="5">NW</option>

<option value="6">SE</option>

<option value="7">SW</option>

<option value="8">NNE</option>

<option value="9">NNW</option>

<option value="10">ENE</option>

<option value="11">ESE</option>

<option value="12">SSE</option>

<option value="13">SSW</option>

<option value="14">WNW</option>

<option value="15">WSW</option>

</select></div>

<div class="col-md-6"><label class="labels">WindDir3pm</label>

<select name="WindDir3pm" class="form-control" id="WindDir3pm"

<option value="0">N</option>

<option value="1">E</option>

<option value="2">S</option>

<option value="3">W</option>

<option value="4">NE</option>

<option value="5">NW</option>

<option value="6">SE</option>

<option value="7">SW</option>

<option value="8">NNE</option>

<option value="9">NNW</option>

<option value="10">ENE</option>

<option value="11">ESE</option>

<option value="12">SSE</option>

<option value="13">SSW</option>

<option value="14">WNW</option>

<option value="15">WSW</option>

</select></div>

</div>

<div class="mt-5 text-center"><button class="btn btn-primary proﬁle- button" type="submit">Predict</button></div>

</div></form></div>

</div>

<div class="mt-5 text-center"><button class="btn btn-primary proﬁle- button" type="submit">Predict</button></div>

</div></form></div>

</div>

</div>

</div>

</body>

</html>

## chance.html

<!DOCTYPE html>

<html>

<head>

<title>Proﬁle</title>

</head>

<body>

<div class="prediction">

<center><h2>There is a chance for rain today</h2></center>

</div>

</body>

## Nochance.html

<!DOCTYPE html>

<html>

<head>

<title>Proﬁle</title>

</head>

<body>

<div class="prediction">

<center><h2>No chances of rain today</h2><center>

</div>

</body>

## GitHub & Project Demo Link:

**GitHub Link:**

https://github.com/IBM-EPBL/IBM-Project-18940-1659691472