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Submitted in partial fulfillment of the requirements
for the award of Bachelor of Engineering Degree in
Computer Science and Engineering

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SCHOOL OF COMPUTING

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TAMILNADU

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the Bonafide work of **PULUGURU KIRAN (38110433)** and **P VPSSSIVAKIRAN(38110380)** who carried out the project entitled "**RAINFALL PREDICTION WITH AGRICULTURAL SOIL ANALYSIS USING MACHINE LEARNING** " under my supervision from NOV 2021 to MAR 2022.

Internal Guide

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Head of the Department

Dr. S. VIGNESHWARI, M.E., Ph.D.,

Dr. LAKSHMANAN L, M.E., Ph.D.,

Submitted for Viva voce Examination held on _____

InternalExaminer

ExternalExaminer

DECLARATION

I **PULUGURU KIRAN** and **P V P S S SIVA KIRAN** here by declare that the project reportentitled **RAINFALL PREDICTION WITH AGRICULTURALSOIL ANALYSIS USING MACHINE LEARNING** done by me under the guidance of **Dr.A.Viji Amutha Mary,M.Tech., Ph.D** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering Degree in Computer Science and Engineering.

DATE:

PLACE:

SIGNATURE OF THECANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management** of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T. Sasikala M.E., Ph.D., Dean**, School of Computing, **Dr.S.Vigneshwari,M.E.,Ph.D.andDr.L.Lakshmanan,M.E.,Ph.D.,Heads of the Department of ComputerScience and Engineering** for providing me necessary support and details at the right time during the progressivereviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr.A.Viji Amutha Mary, M.Tech., ph.D** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my project work.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

TABLE OFCONTENTS

Chapter	Title Name	pg.no
	Abstract	3
1	Introduction	4
2	Literature Survey	5
3	Aim and scope of present investigation	7
	3.1:Module Implementation	7
	3.2:Data flow Diagrams	8
	3.3:UML Diagrams	10
4	Experimental or Scope of the present investigation Algorithm used	13
5	Results and discussion, performance analysis	15
6	Summary and Conclusion	19
	Plagiarism Report	20

RAINFALL PREDICTION WITH AGRICULTURAL SOIL ANALYSIS USING MACHINE LEARNING

Abstract

India is an agricultural country and its economy is largely based upon crop productivity and rainfall. For analyzing the crop productivity, rainfall prediction is require and necessary to all farmers. Rainfall Prediction is the application of science and technology to predict the state of the atmosphere. It is important to exactly determine the rainfall for effective use of water resources, crop productivity and pre planning of water structures. Using different data mining techniques it can predict rainfall. Data mining techniques are used to estimate the rainfall numerically. This paper focuses some of the popular data mining algorithms for rainfall prediction. Naive Bayes, K-Nearest Neighbour algorithm, Decision Tree are some of the algorithms compared in this paper. From that comparison, it can analyze which method gives better accuracy for rainfall prediction. Prediction of crops may be accurately through with the help of data mining techniques and considering the environmental parameters. During this work, the classifiers used area unit support vector machine and data processing.

CHAPTER 1

INTRODUCTION

Rainfall Prediction is one of the most challenging tasks. Though already many algorithms have being proposed but still accurate prediction of rainfall is very difficult. In an agricultural country like India, the success or failure of the crops and water scarcity in any year is always viewed with greatest concern. A small fluctuation in the seasonal rainfall can have devastating impacts on agriculture sector. Accurate rainfall prediction has a potential benefit of preventing casualties and damages caused by natural disasters. Under certain circumstances such as flood and drought, highly accurate rainfall prediction is useful for agriculture management and disaster prevention. In this paper, various algorithms have been analyzed. Data mining techniques are efficiently used in rainfall prediction

CHAPTER 2

LITERATURE SURVEY

Indian Summer Monsoon Rainfall (ISMR) Forecasting using Time Series Data: A Fuzzy-Entropy-Neuro based Expert System Pritpal Singh / 30 July 2018 Statistical analyzes reflect the dynamic nature of the ISMR, which couldn't be predicted efficiently by statistical and mathematical based models. Therefore, this study suggests the usage of three techniques, viz., fuzzy set, entropy and artificial neural network (ANN). Based on these techniques, a novel ISMR time series forecasting model is designed to deal with the dynamic nature of the ISMR. This model is verified and validated with training and testing data sets. Various statistical analyzes and comparison studies demonstrate the Less Severity.

An Extensive Evaluation of Seven Machine Learning Methods for Rainfall Prediction in Weather Derivatives Sam Cramer a,* , Michael Kampouridis a , Alex A. Freitas a , Antonis K. Alexandridis b / 2017 This work's main impact is to show the benefit machine learning algorithms, and more broadly intelligent systems have over the current state-of-the-art techniques for rainfall prediction within rainfall derivatives. We apply and compare the predictive performance of the current state-of-the-art (Markov chain extended with rainfall prediction) and six other popular machine learning algorithms one of the disadvantages of MCRP is that MCRP is purely driven off the historical data of each city and needs to be tuned according to the specific

A Hybrid Model for Statistical Downscaling of Daily Rainfall Sahar Hadi Poura , Shamsuddin Shahida , Eun-Sung Chungb / The RF was used to predict whether rain will occur in a day or not and SVM was used to predict amount of rainfall in rainfall occurring days. The capability of proposed hybrid model was verified by downscaling daily rainfall at three rain-gauge locations in the east coast of peninsular Malaysia. The hybrid model was also found to replicate the variability, number of consecutive wet days, 95-percentile rainfall amount in each months as well as distribution of SVM considers a kernel-based ANN to overcome the disadvantages of the traditional ANN and therefore, able to develop relationship among highly non-linear variables

: A REVIEW 2021 In India ,0Agriculture is the0key point0for survival. For agriculture, rainfall is most important. These days rainfall prediction0has become0a major problem. Prediction of rainfall gives7awareness to people7and know in advance7about rainfall to7take certain7precautions to protect7their crop from7rainfall. Many techniques7came into existence7to predict7rainfall. Machine7Learning algorithms are7mostly useful in Forecasts are never 100% accurate.

CHAPTER 3

Aim and Scope of the present investigation

3.1: Module Implementation

- Data Collection
- Data Cleaning
- Data Selection
- Data Transformation
- Data Mining Stage

Data Collection

The data used for this work was collected from meteorologist's centre. The case data covered the period of 2012 to 2015. The following procedures were adopted at this stage of the research: Data Cleaning, Data Selection, Data Transformation and Data Mining.

Data Cleaning

In this stage, a consistent format for the data model was developed which is search missing data, finding duplicated data, and weeding out of bad data. Finally system cleaned data were transformed into a format suitable for data mining

Data Selection

At this stage, data relevant to the analysis like decision tree was decided on and retrieved from the dataset. The Meteorological dataset had ten attributes in that were using two attributes for future prediction. Due to the nature of the Cloud Form data where all the values are the same and the high percentage of missing values in the sunshine data both were not used in the analysis.

Data Transformation

“This is also known as data consolidation”. It is the stage in which the selected data is transformed into forms appropriate for data mining. The data file was saved in Comma Separated Value (CSV) file format and the datasets were normalized to reduce the effect of scaling on the data.

Data Mining Stage

The data mining stage was divided into three phases. At each phase all the algorithms were used to analyse the meteorological datasets. The testing method adopted for this research was percentage split that train on a percentage of the dataset, cross validate on it and test on the remaining percentage. There after interesting patterns representing knowledge were identified

3.2: DATA FLOW DIAGRAM

LEVEL - 0

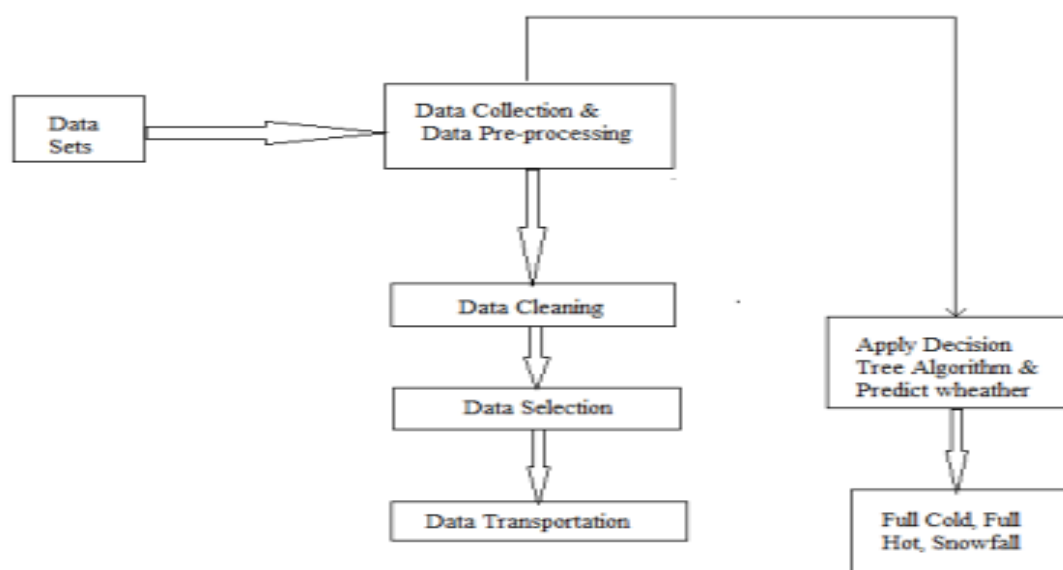


Fig a: Data Flow Diagram

LEVEL - 1

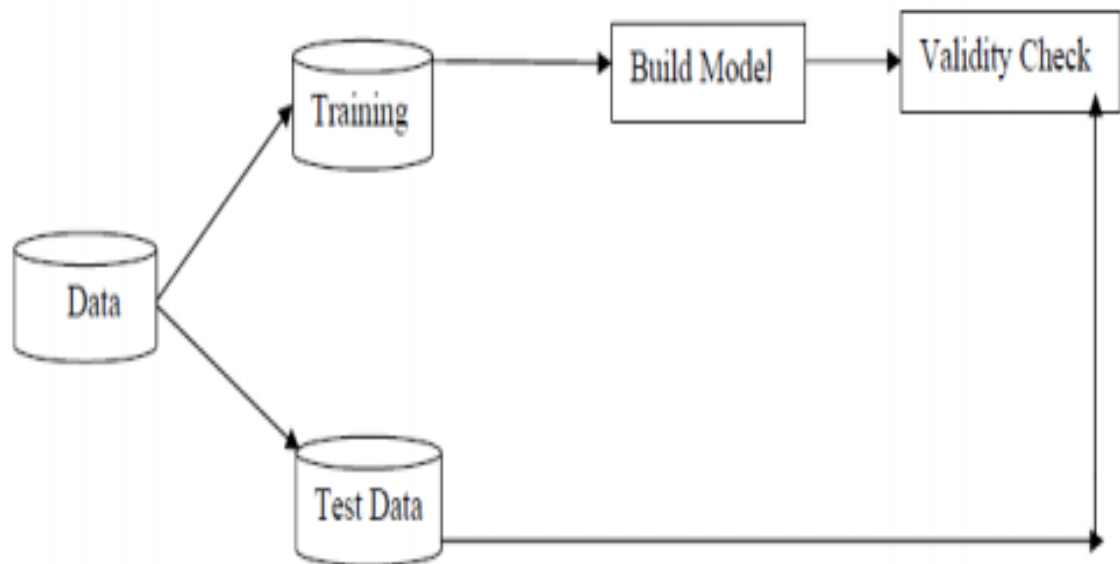


Fig a.1: Level 1

LEVEL2

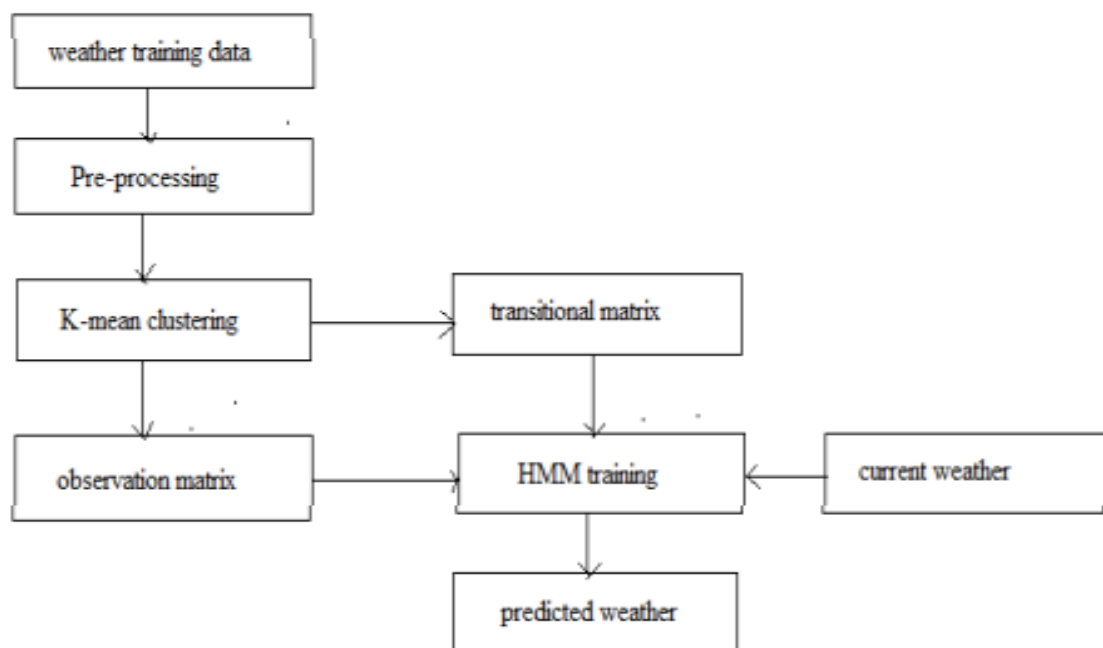


Fig a.2: Level 2

3.3: UML DIAGRAMS

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group. The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: a Meta-model and a notation. In the future, some form of method or process may also be added to; or associated with, UML. The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems. The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

GOALS:

The Primary goals in the design of the UML are as follows:

Provide users a ready-to-use, expressive visual modeling Language so that they can develop and exchange meaningful models. Provide extendibility and specialization mechanisms to extend the core concepts. Be independent of particular programming languages and development process. Provide a formal basis for understanding the modeling language. Encourage the growth of OO tools market. Support higher level development concepts such as collaborations, frameworks, patterns and components. Integrate best practices.

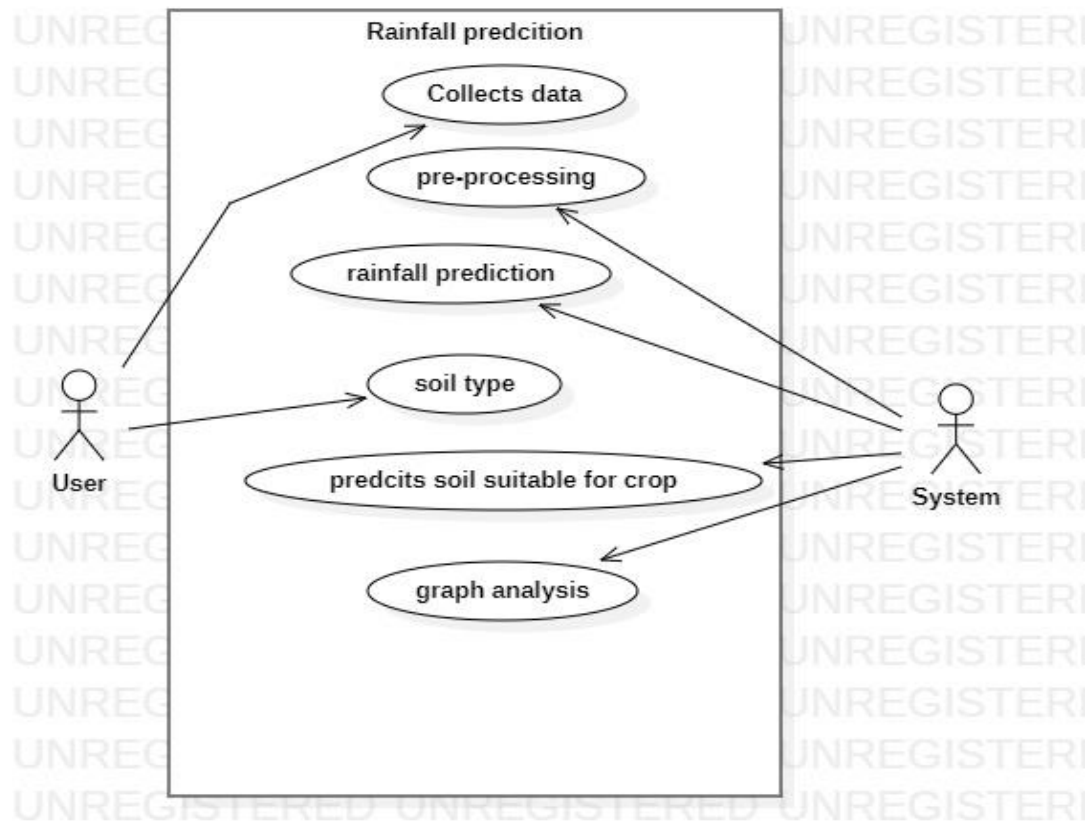


Fig b: Usecase Diagram

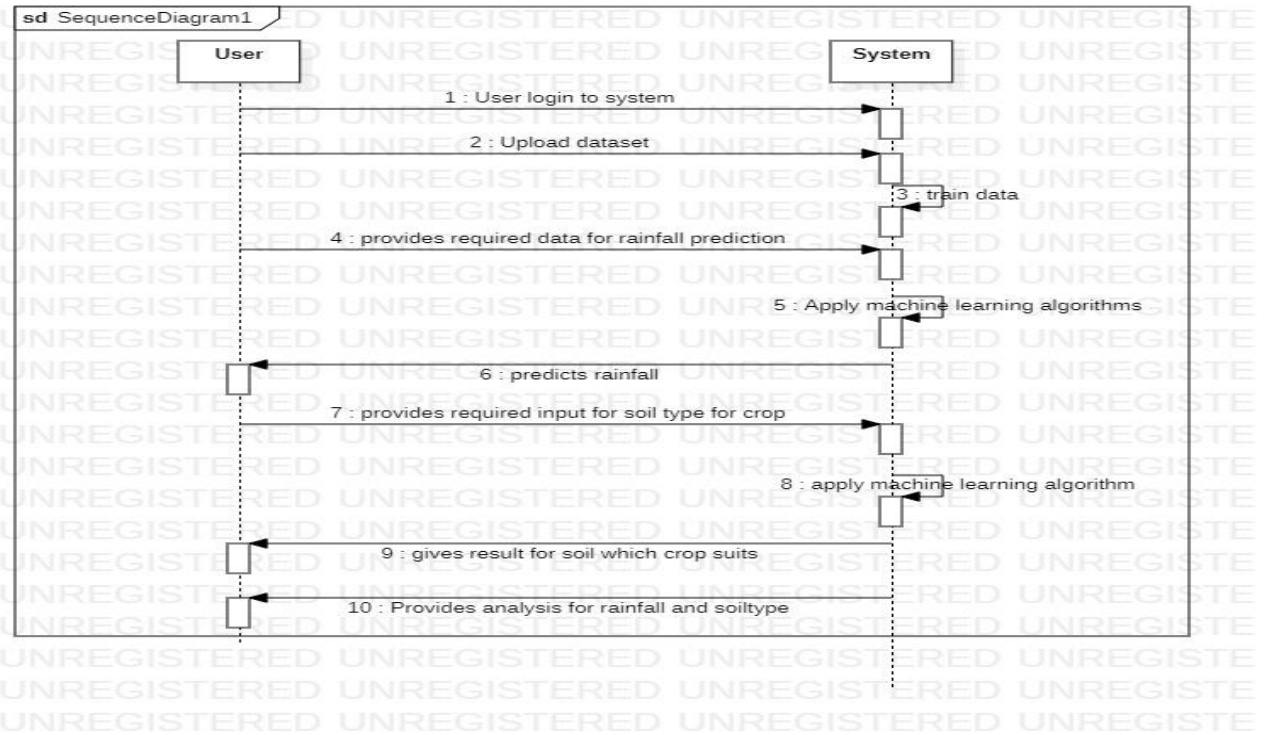


Fig c: Sequence Diagram

CHAPTER 4

Experimental or Scope of the present investigation Algorithm used

- Rainfall is important for food production plan, water resource management and all activity plans in the nature.
- The occurrence of prolonged dry period or heavy rain at the critical stages of the crop growth and development may lead to significant reduce crop yield.
- India is an agricultural country and its economy is largely based upon crop productivity.
- Thus rainfall prediction becomes a significant factor in agricultural countries like India.

Rainfall forecasting has been one of the most scientifically and technologically challenging problems around the world in the last century.

System Architecture

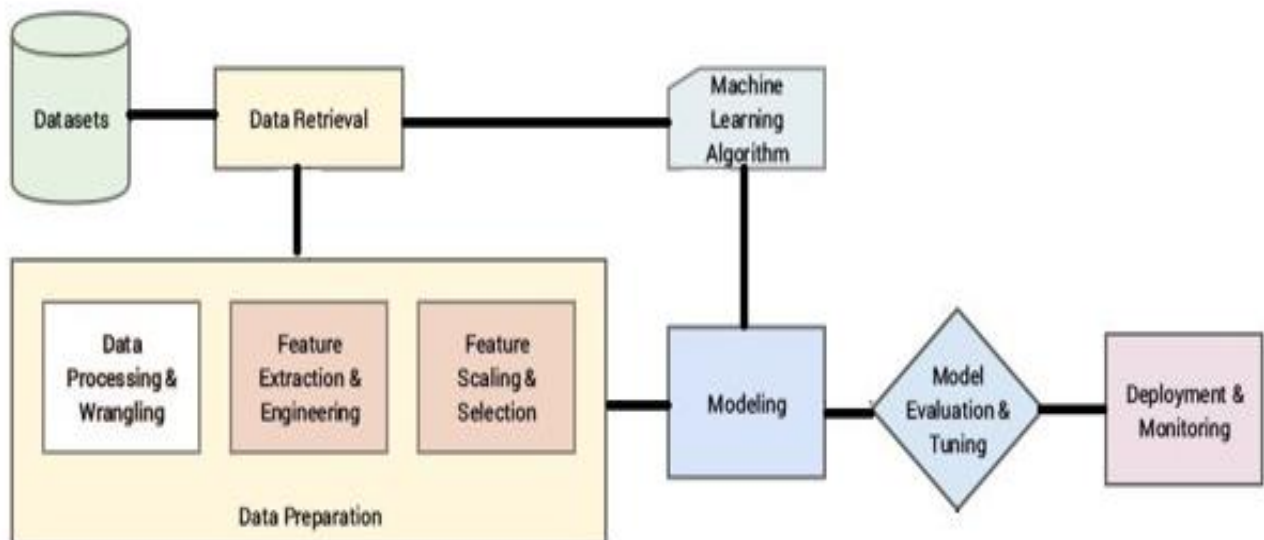


Fig d: System Architecture

SystemRequirements

➤ SOFTWARE REQUIREMENTS

Operating System - Windows XP

Coding language - PYTHON

IDE - PYCHARM

➤ HARDWARE REQUIREMENTS

System - Windows 7/10

Speed - 2.4GHZ

Hard disk - 40GB

Monitor - 15VGA color

RAM - 4GB

CHAPTER 5

RESULTS AND DISCUSSION, PERFORMANCE ANALYSIS

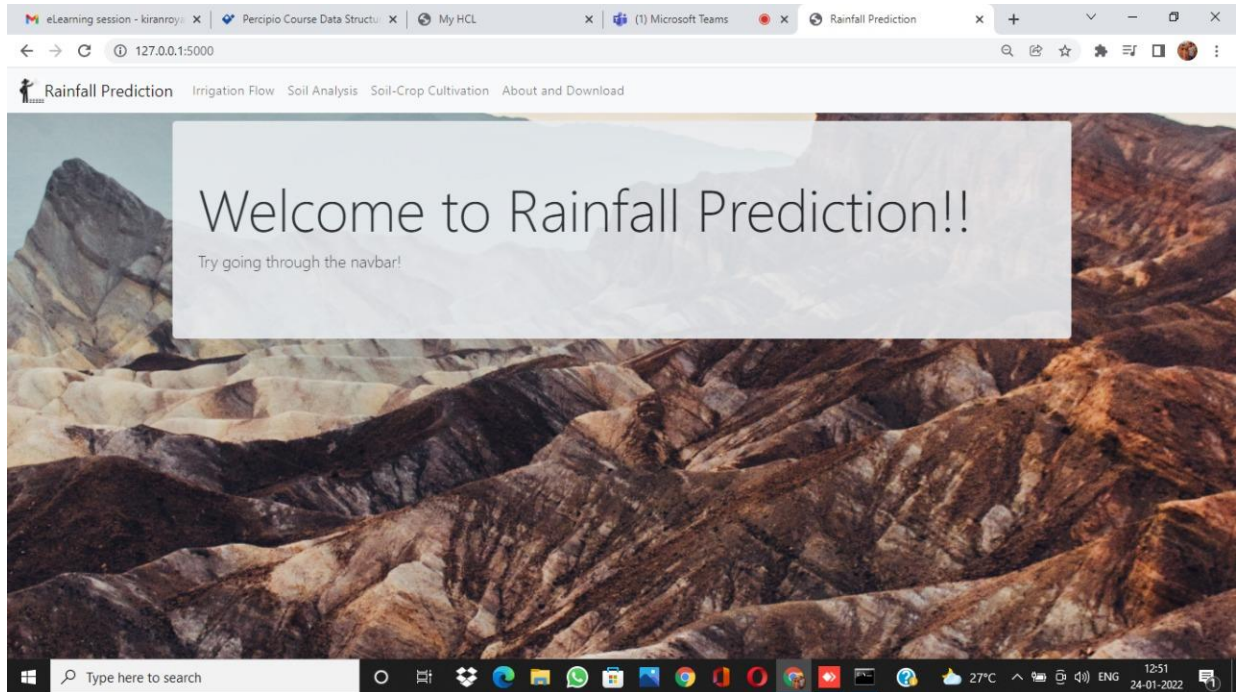


Fig1:Main page

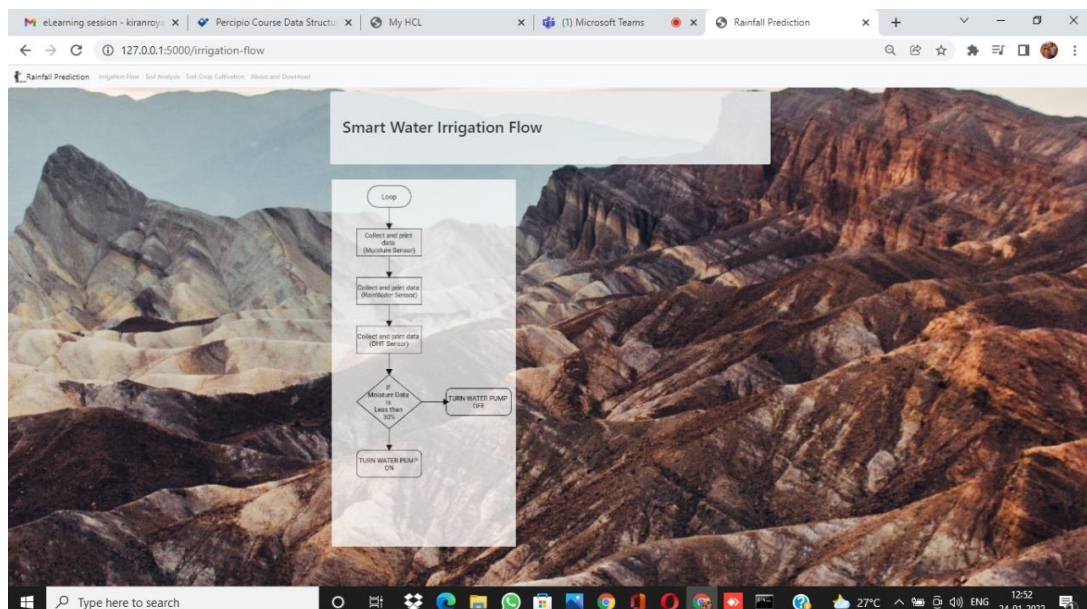


Fig2:Flowchart

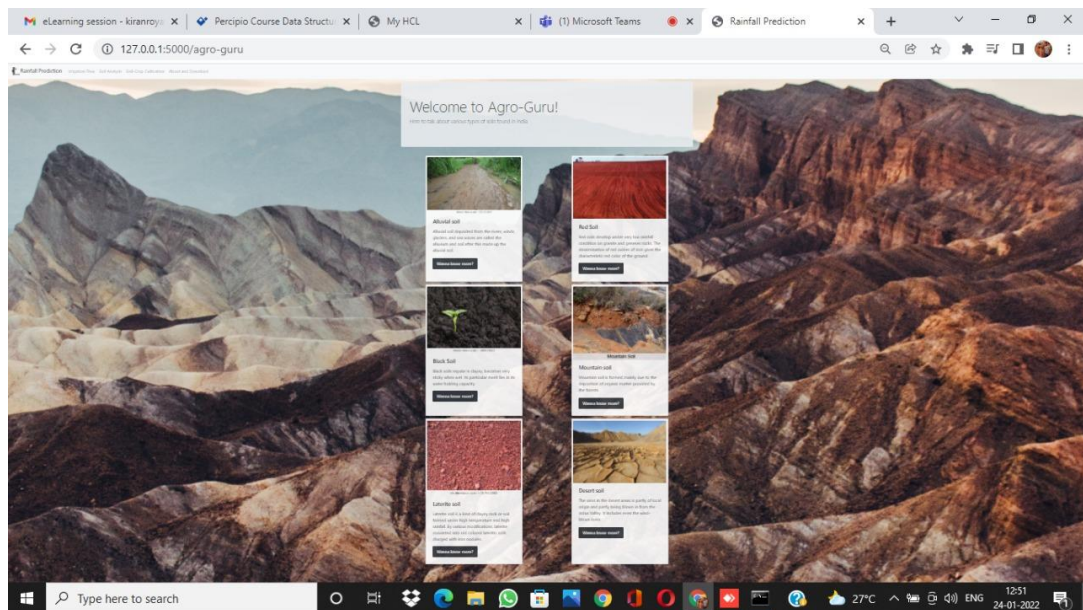


Fig3:Types of soil

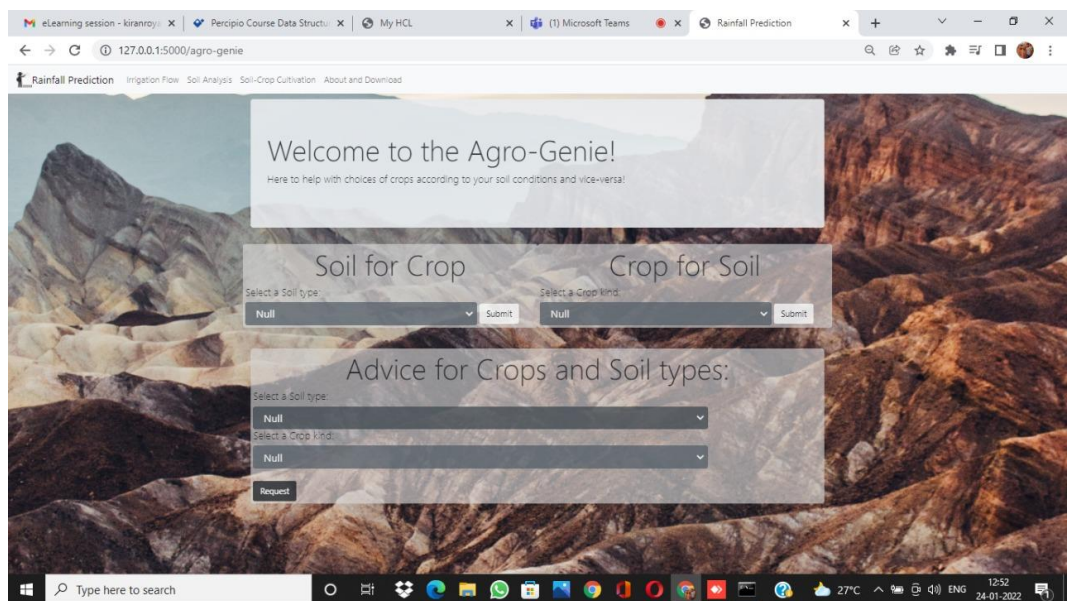


Fig4:Prediction of soil analysis

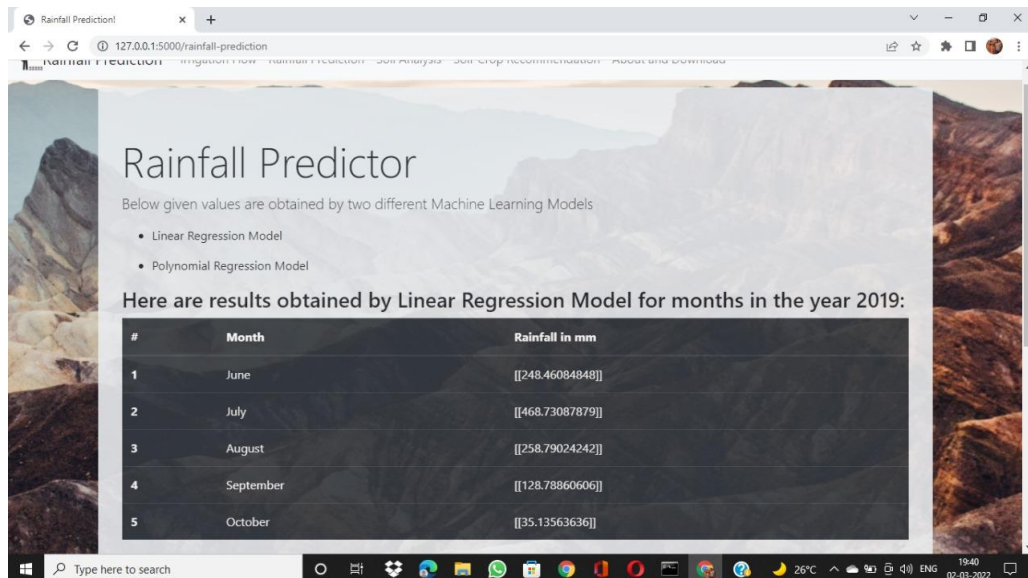


Fig5: Rainfall prediction with linear regression model

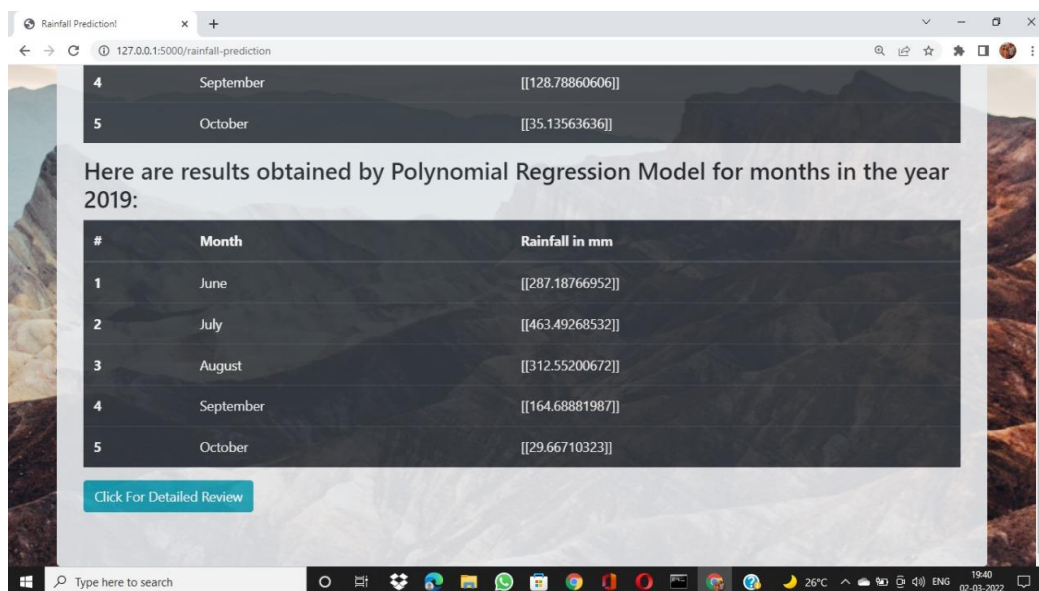


Fig6: Rainfall prediction with polynomial regression model

Rainfall Prediction (January - December)

Enter a year between 1949-2030

Fig7: Rainfall predicting with year

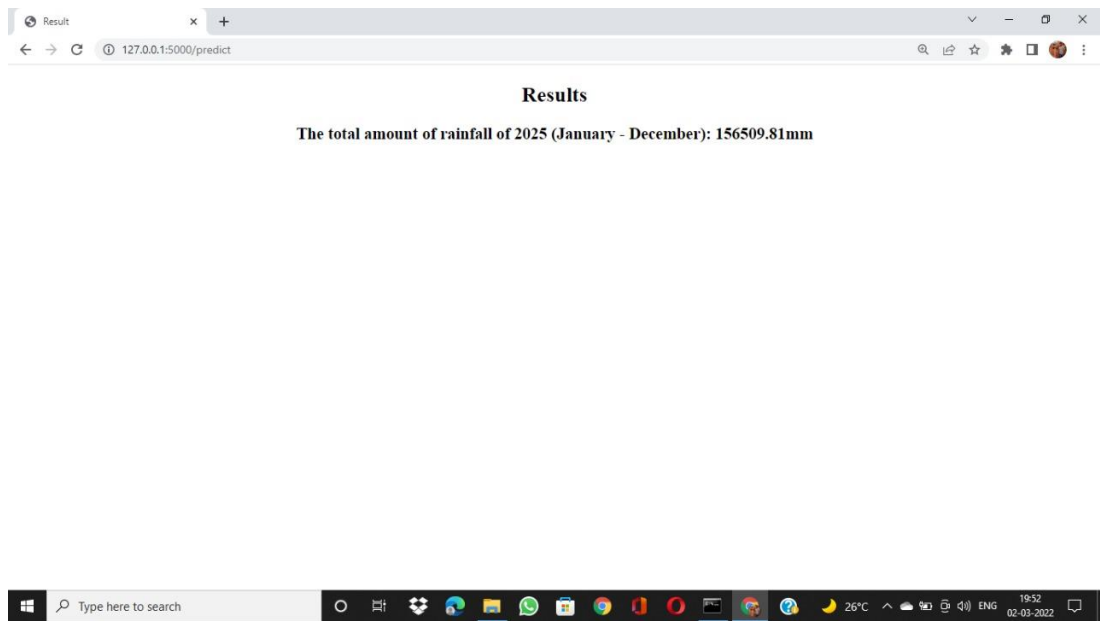


Fig8:Final result

CHAPTER 6

SUMMARY AND CONCLUSIONS

Weather forecasting is a meteorological work that easy to modify researcher work by applying the numerical weather prediction method. weather forecasted by using various data mining techniques especially classification clustering and neural network, decision tree. the key aim for improving the classification and prediction performance for the traditional; weather prediction model is designed and developed in this work. but some limitation of the model is also observed, thus in near future need to be review before use of the proposed technique. and also soil there are some issues and challenges in which better implement of data mining technique should be implemented in field of weather forecasting.

PLAGIARISM REPORT

RAINFALL PREDICTION USING MACH...

ORIGINALITY REPORT

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SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

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4	Sahar Hadi Pour, Shamsuddin Shahid, Eun-Sung Chung. "A Hybrid Model for Statistical Downscaling of Daily Rainfall", Procedia Engineering, 2016 Publication	1%
5	R. Senthil Kumar, C. Ramesh. "A study on prediction of rainfall using datamining technique", 2016 International Conference on Inventive Computation Technologies (ICICT), 2016 Publication	1%
6	Neelam Mishra, Hemant Kumar Soni, Sanjiv Sharma, A K Upadhyay. "Development and Analysis of Artificial Neural Network Models	<1%

for Rainfall Prediction by Using Time-Series Data", International Journal of Intelligent Systems and Applications, 2018
Publication