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A Project Report on

Surakhsha Kavach : ML based Cross Platform Application for Covid-19 Vulnerability Detection

Submitted in partial fulfillment of the degree of
Bachelor of Engineering(Sem-8)
in
INFORMATION TECHNOLOGY

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1.Project Conception and Initiation

1.1 Abstract

- The sector is facing a major health crisis due to the rapidity of Coronavirus transmission (covid-19). According to international health organization rules, the strongest anti-covid-19 protective measure carries a mask in public places and Crowded places. These days, RT-PCR is only one way to detect the COVID-19 infection, it is limited by the lack of time-consuming.
- So in this project, we predict the vulnerability of peoples according to their age and states. In this project, we used the four prediction models using four different classifiers (i.e Logistic regression, Naive byers, Random forest, SVM) for detecting the vulnerability of peoples from their age and state.
- We create all of four models with all the classifiers. The results showed that the Random forest classifier is the most accurate classifier for predicting the vulnerability of COVID-19 cases based on the age and state. The results could help in the early diagnosis of COVID-19, specifically when the RT-PCR kits are not sufficient for testing the infection and assist countries, specifically the developing ones that suffer from the shortage of RT-PCR tests and specialized laboratories.

1.2 Objectives

- To get the meaning of vulnerability to older persons themselves.

- To detect the vulnerability of a person based on age and state by using machine learning and various classification algorithms.

1.3 Literature Review

-|	Authors	Advantages	Disadvantages	Result
Predicting the COVID-19 infection with fourteen clinical features using machine learning classification algorithms	Ibrahim Arpaci & Shigao Huang & Mostafa Al-Emran & Mohammed N. Al-Kabi & Minfei Peng	The Precision, F-Measure, Recall, and Receiver-Operating-Characteristic (ROC) area metrics were used to evaluate the performance of the classifiers.	The problem of how to differentiate between positive and negative cases of COVID-19 is still a challenge that needs to be solved in order to curb the pandemic.	In line with these arguments and drawing on the bibliometric analysis results, no diagnostic model has been proposed to identify the positive and negative cases of COVID-19 using several clinical features.
Vulnerability Prediction From Source Code Using Machine Learning	MEHMET AKIF ERSOY, ELIF USTUNDAG SOYKAN	ML model for different vulnerability categories, which is an advantage in terms of training time, processing power, and memory requirements.	Another difficulty in vulnerability prediction is the class imbalance problem, arising from the fact that the number of vulnerable code samples is far less than the number of healthy code samples.	The true positive and false positive ratio for different binary AST depths that are used as a threshold to cut complete binary ASTs.

1.4 Problem Definition

- The overall global economy has been affected by this pandemic along with the health, safety and hygiene of individuals all over the world. People should know the overall rate of rising,death,recovery, etc all over the world.
- People should know how much vulnerable they are by the attack of covid-19 to take precautionary measures as early as possible.
- In the existing system architecture, nowadays people are not much aware of the disease they are suffering from and with the flow they come up with a measure disease like Covid.

1.5 Scope

- In this paper we generate the model based on age and state. If we get the proper dataset we developed for rural and urban areas.
- For that we have to generate the model on a rural areas dataset and we try to increase the accuracy of the prediction model.

1.6 Technology stack

Software Requirements:

1. Operating System : Windows 10.
2. Python.
3. Anaconda.
4. Spyder, Jupyter notebook, Flask.
5. MYSQL.
6. Flutter.

1.7 Benefits for environment & Society

- Users check the vulnerability level before traveling in another state according to their age.
- We will be able to ban the high vulnerability peoples to prevent them from COVID-19 infection.
- This model helps the government to utilize the rules according to the vulnerability level.

2. Project Design

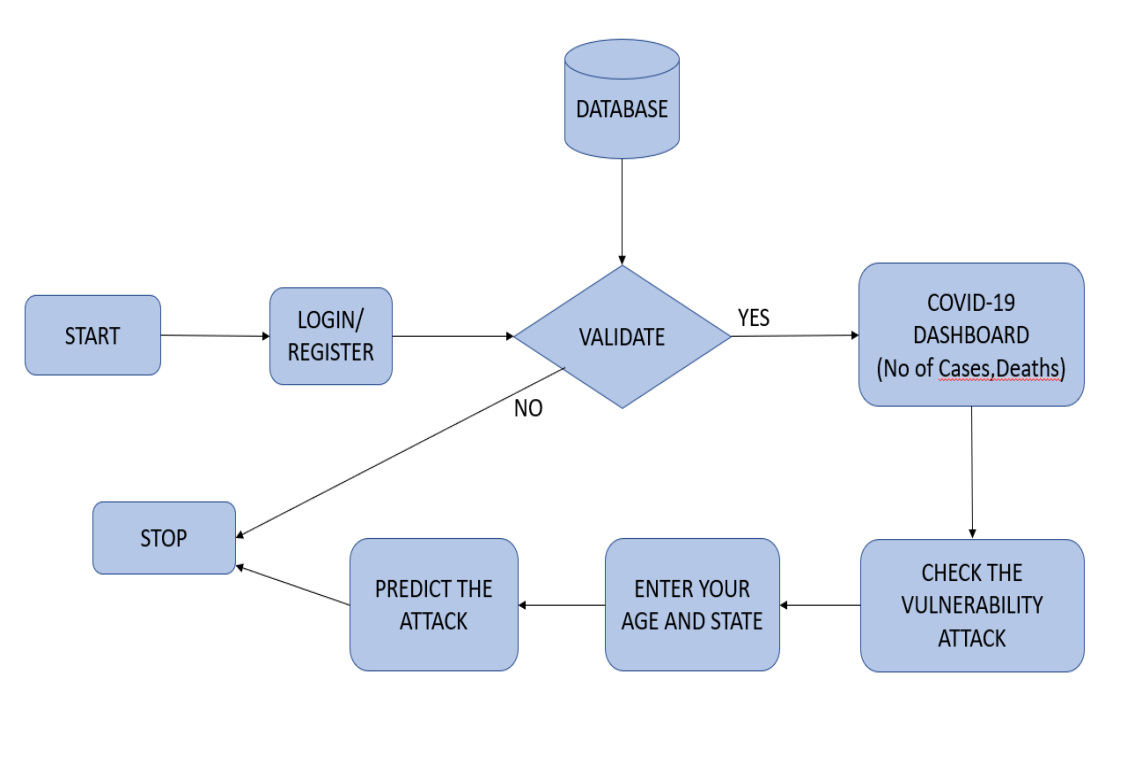
2.1 Proposed System

- In this system, we predict the vulnerability of people based on age and state. For that we had the data preprocessing. In data preprocessing, we clean the data, remove missing values from the dataset.

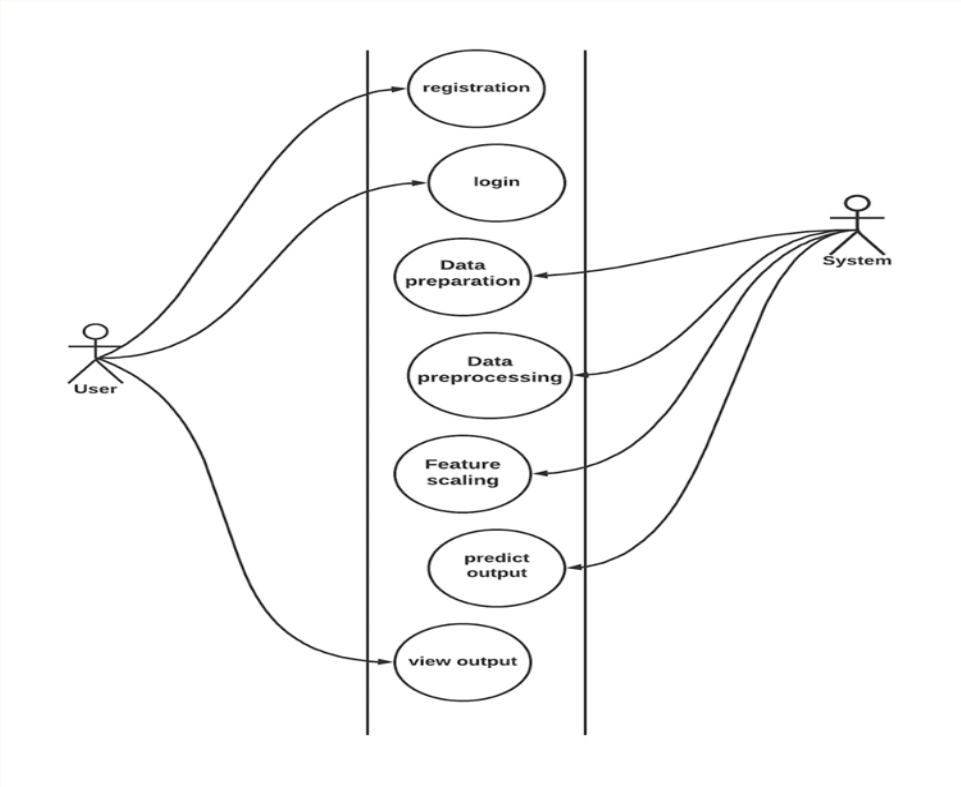
- Machine learning algorithms will then be determined during the advanced route but those labels should be used. It is a very important step for pre-processing in a systematic database in supervised reading.This data is further divided into 2 parts. First part is the training dataset and secode is for testing. A machine learning model is a file that has been trained to recognize certain types of patterns.

- We mainly used four different classifiers like Logistic regression, Naive byers, Random forest, SVM. But the random forest model has more accuracy than other models So we selected this model in our project.

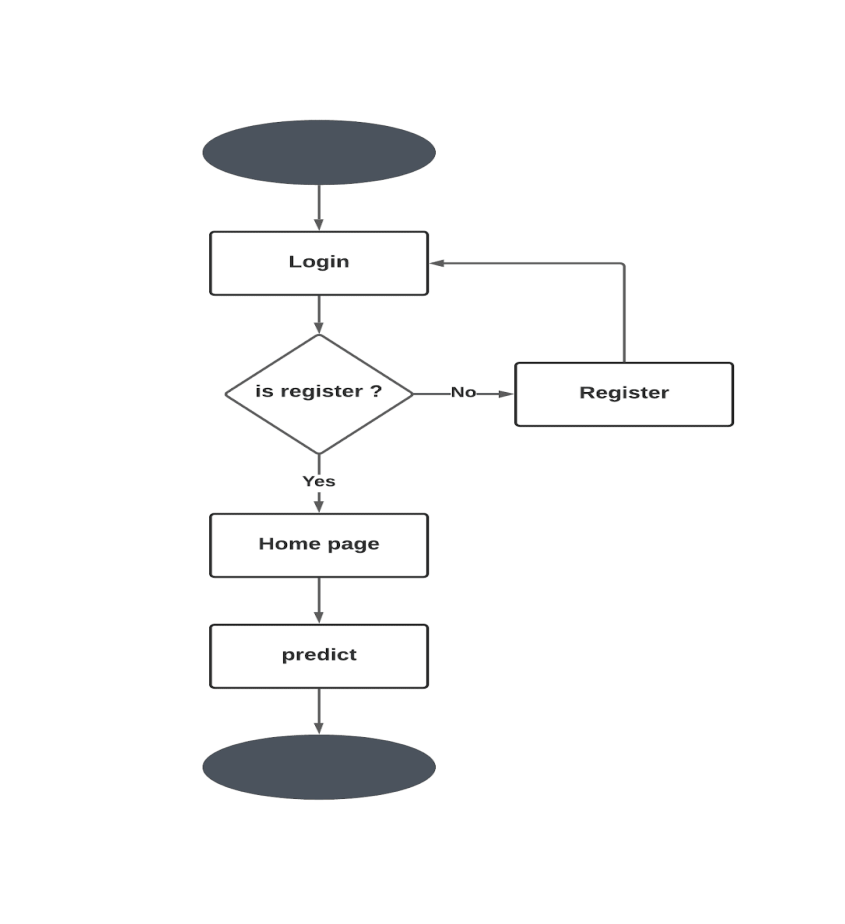
2.2 Design(Flow Of Modules)



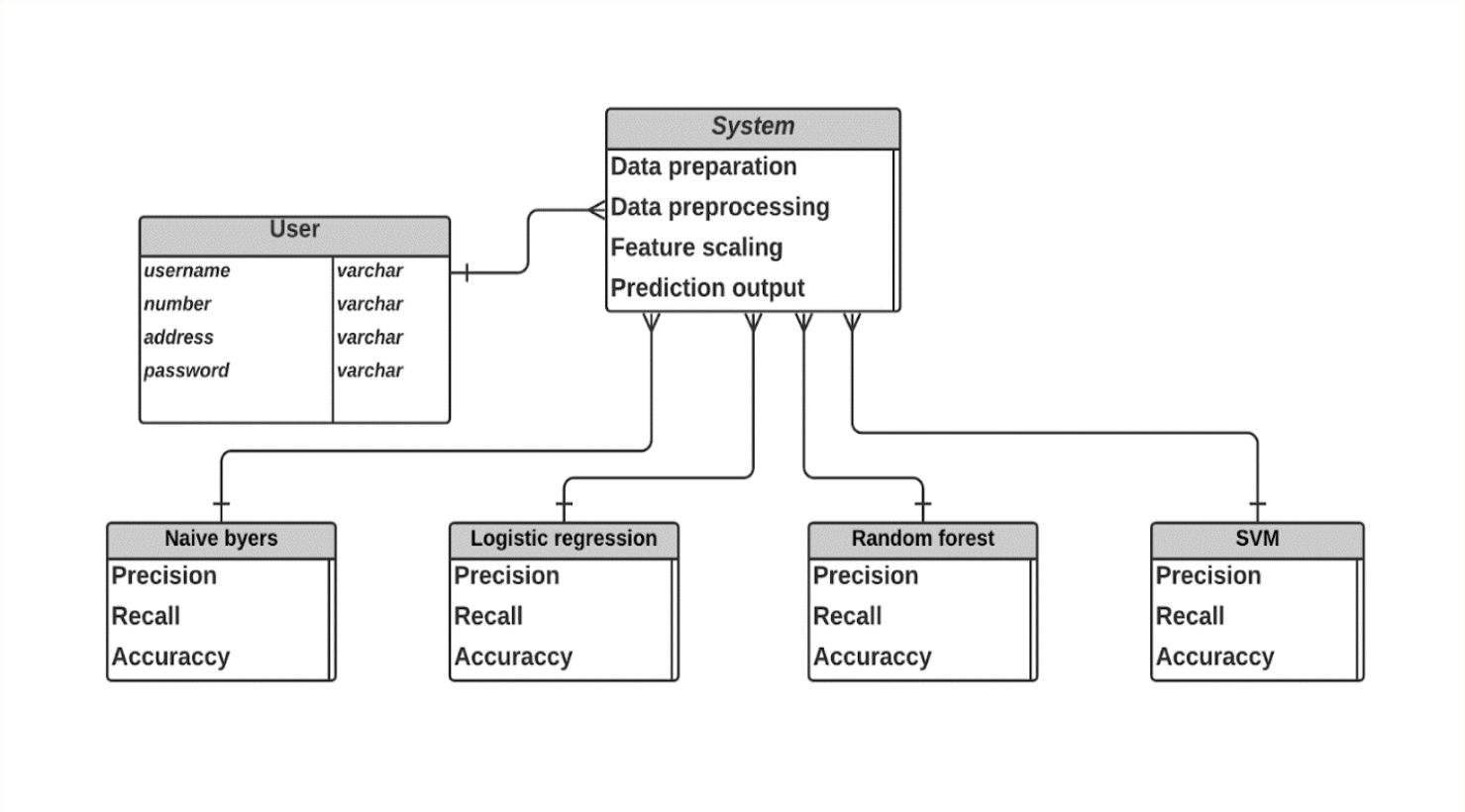
2.3 Use Case Diagram



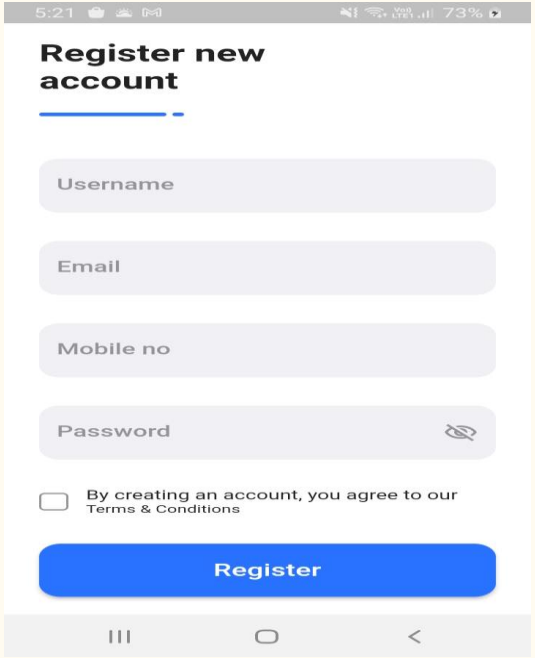
2.4 Activity diagram



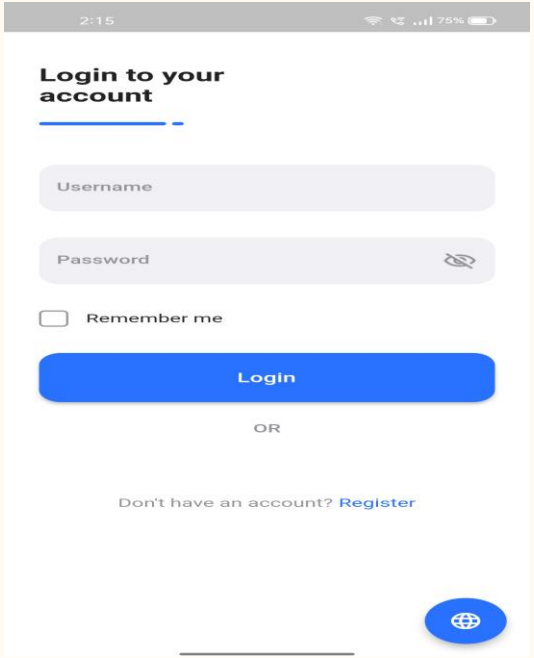
2.5 Class Diagram



3. Implementation

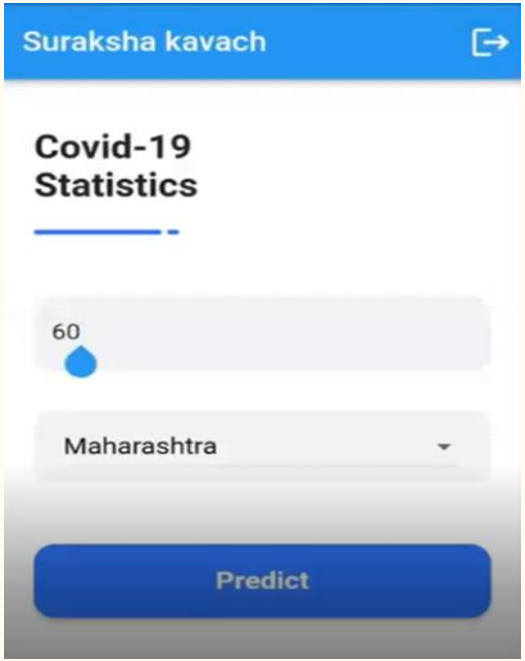


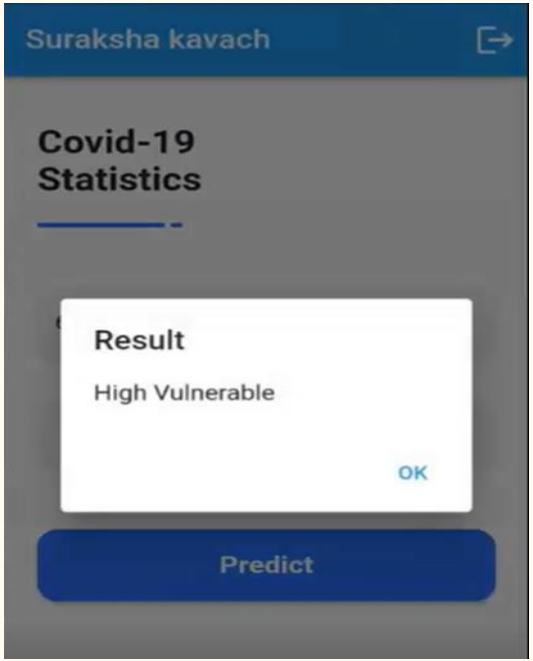
This is the Registration Page, where once the user clicks on application on mobile the screen occurs including username,email,mobile no and password.Then click on Register.



This is the Login page where user need to enter username and password.But if the user has new account he/she can click on Register.

After clicking on Login button there is a screen which shows Statistics based on daily new cases.This is a static page. The pages here includes language Localization i.e Hindi and Marathi.





So the next main part of our project is to predict the vulnerability of covid according to age and state.So consider an example if a user enter his age as 60 and state as Maharashtra so the vulnerability attack of that person will be more because the cases in Maharashtra are more as compare to other states and also user age belongs to senior citizens.So once the user click on predict button he will get the output as “High Vulnerable” as shown above.

4. Testing

Functional Testing

Unit Testing:
The initial level of testing is unit testing, which is frequently carried out by the developers themselves. It is the process of ensuring that specific components of a piece of software are functional and work as intended at the code level. In a test-driven environment, developers will often write and execute the tests before passing the software or feature to the testing team. Manual unit testing is an option. Debugging will be easier as a result of unit testing since flaws will be detected earlier in the testing process and will take less time to fix than if they were discovered later.Our application development process is ideally suited for unit testing. During that time, we began to code in units to develop various modules. Also, test each module separately, such as the login,register page,Home Page,Prediction Page. All these pages are tested and debuggedbefore going further integrating and check whether we are getting the desired output from each module as for the objectives.

5. Result

So The idea of ML based app is to make people aware regarding their vulnerablities of covid attack which will help people to take precautions at an early stage to avoid further serious consequences and protect themselves and their family. Overall this app will be easily available on any platform which will help people to easily access and take the benefit of it. We have arrived at a conclusion that ML based Suraksha Kavach App is a much viable solution for the people to take precautionary measures at an early stage.

Age and State	Result
60, Maharashtra	High Vulnerable
15, Haryana	Less Vulnerable
20, Ladakh	Less Vulnerable
35, Odisha	Medium Vulnerable
60, Uttarkhand	Medium Vulnerable

Fig: The above table consists of age and state and its predicted result.

6. Conclusion and Future Scope

6.2 Conclusion

In our project,the prediction of percentage attack is done using MachineLearning Algorithms. Random forest is suitable algo as its accuracy is more.We came up with this solution as people are getting infected by this covid at a very large number.So its neccessary to spread awareness and take precautions as soon as possible.This app will save the life of many people and help them to live happy and healthy life.

6.1 Future Scope

The idea about lockdown reminder is one of the feature we can add so that people can know by the notifications on screen.The idea of booking vaccination slots can also be implemented.

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Paper Publication

Paper entitled **“Surakhsha Kavach : ML based Cross Platform Application for Covid-19 Vulnerability Detection”** is selected at **“ICTIS 2022 6th International Conference on ICT for Intelligent Systems”** by **“Jasmine Kaur Wadhwa”, “Ruchi Raicha”, “Srushti Patil”.**

Thank You