International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 07 | July 2022 www.irjet.net p-ISSN: 2395-0072

Integrated Health App

Namratha V Patil [1] , Ayaan Beig[2], Aman Doshi [3] ,Bhaskar K H[4] , Prof. Divakara N[5]

[1,2,3,4] *BTech. Student, JSS Science and Technology University, Mysore, Karnataka, India*
[5]*Assistant Professor, Sri Jayachamarajendra College of Engineering, Mysore , Karnataka, India*

Abstract - *Integrated health apps are accessible to users at all the time and at all the places. Health apps have become a part of the movement towards mobile health programs in health care. Our proposed work is to develop an Integrated Health Application to create a convenient and easy-to-use application for users. Our application can replace the current system in addition to a couple of extra features. The scope primarily consists of three health features. It includes functionalities like Heart Disease Prediction using ML, Skin Cancer Classification using Deep Learning and Tracking and notifying about real-time Covid-19 vaccine availability.*

Key Words*: *Heart Disease, Skin Cancer, Covid-19,* React Native, *SVM, CNN

1. INTRODUCTION

We are building an Integrated Health Application to create a convenient and easy-to-use application for users, our application can replace the current system in addition to a couple of extra features. In our integrated app we have aimed at Tracking and notifying about real-time Covid-19 vaccine availability along with Heart Disease Prediction System using ML and Skin Cancer Classification using Deep Learning.

This app provide users, information about availability of vaccine doses in the particular district/city or area with given pin code and the age group on a particular date. The results will show the vaccination centers related to the search with the number of doses left, whether it is paid or free if it is open to all age groups etc. The users can control the notification and alerts. Further, the user can view the location of vaccination centers on the map which are indicated by the pins, and also download certificates using mobile number and reference id.

This app is designed to detect whether the patient has heart disease or had suffered from a heart attack using the data from blood tests, ECG reports, and general information.

Further the app can detect if the person is suffering from skin cancer using the image clicked by the user and further classify the type of skin cancer. This app helps in life saving and fast diagnoses of skin cancer

2. LITERATURE SURVEY

In the work done by Thomas J. and Princy R.T in 2016 , "Human Heart Disease Prediction System using Data Mining Techniques"[4], two classifiers KNN and ID3 were used wherein KNN approach outperformed the ID3 approach in terms of accuracy by having accuracy of 80.6%. But this work has the limitation of selection of false attributes and there is no real-time prediction.

In the work of Ahmed F. Otoom in 2015 titled "Real-Time Monitoring of Patients with Coronary Artery Disease" [5], pulse sensor is used for monitoring the heart rate and sends it wirelessly to a mobile device via an arduino microcontroller, three classifiers as BayesNet, SVM, and FT are used where in SVM is the most accurate with 88.3% accuracy to build the model.

In the paper titled "Estimation of Prediction for Getting Heart Disease Using Logistic Regression Model of Machine Learning", Montu Saw, Tarun Saxena, Sanjana Kaithwas, Rahul Yadav, Nidhi Lal [6] have applied Naive Bayes and Logistic Regression and have compared the results. They have concluded that logistic regression gives the highest accuracy of 86.88% and has outperformed other model like Naive Bayes with accuracy 86.

In the paper titled "Design and Development of Real-Time Heart Disease Prediction System for Elderly People Using Machine Learning by Viswanath Reddy and Guttappa Sajjan" [1] have worked collectively to create a unique system and that can have the monitoring as well as predicting the disease at the early stage. They have implemented various machine learning algorithms such as Support Vector Machine, Decision Tree Model , Random Forest and compared the results which shows that SVM gives the highest accuracy of 85.71 has outperformed all other models like Decision Tree Model having an accuracy of 83.92 and Random Forest with accuracy 84.61.

In the paper titled 'Heart Disease Prediction System Using Random Forest', Yeshvendra Singh, Nikhil Sinha and Sanjay Kumar Singh [7] have exploited the non-linear tendency of heart disease dataset to apply Random Forest. They have concluded that Random Forest gives an accuracy of 85.81%. By the proposed algorithm for heart disease prediction, many lives could be saved in the future.

In the work "An intelligent for monitoring skin disease" done by Pollap D[8], has proposed a method of clustering image using navi for classification. They have used the SIFT method for detection of key points in the image. After that they have used CNN and SVM for classification and segmentation. They have an accuracy of 84% and a precision of 82%.

In the work "Segmentation and classification of skin lesions for disease diagnosis" [9] done by Sumitra, has proposed a method for detection of disease by using the combination of SVM and KNN algorithms. They used segmentation and classification methodology to get the accuracy of 61%.

In the work done by Menzis, frequency and morphologic characteristics of invasive melanomas lacking specific surface microscopic features has proposed SVM classifier-based model for identification of melanomas. They used color feature and texture feature extraction to get accuracy of 75%[4].

We limited our review to skin lesion classification methods. In particular, methods that apply a CNN only for lesion segmentation or for the classification of dermatoscopic patterns as in Demyanov et al [10][3] are not considered in this paper.

Furthermore, only papers that show a sufficient scientific proceeding are included in this review. This latter criterion includes presenting the approaches in an understandable manner and discussing the results sufficiently.

3. PROPOSED WORK

An integrated android health application is built with the following functionalities.

- Heart Disease Prediction System using ML
- Skin Cancer Classification using Deep Learning
- Tracking and notifying about real-time Covid-19 vaccine availability.

The technology that is being used to build the mobile application is React Native. React Native is a JavaScript framework for writing real, natively rendering mobile applications for iOS and Android. It's based on React, Facebook's JavaScript library for building user interfaces, but instead of targeting the browser, it targets mobile platforms. In other words: web developers can now write mobile applications that look and feel truly "native," all from the comfort of a JavaScript library that we already know and love.

To implement the ML feature for heart disease detection and skin cancer detection, we have used information such as blood tests report, ECG reports, and general information

To consider the skin cancer detection feature the images that were used in the dataset are taken from Kaggle which is an online community of data scientists and machine learning practitioners.

Table -1: Modules in the app

Module Name	Statement of the Objective	Resource Utilized
Vaccination availability	To provide users, information about availability of vaccine doses in the particular district/city or area with given pin code and the age group on a particular date.	React Native
Heart disease prediction	To detect whether the patient has heart disease or had suffered from a heart attack using the data from blood tests, ECG reports, and general information.	Various machine learning algorithms like SVM, Naïve Bayes, Random forest, Simple Logistic, ANN.
Skin cancer prediction	To detect if the person is suffering from skin cancer using the image clicked by the user and further classify the type of skin cancer.	Google Colab, Convolution Neural Network with keras tensorflow

3.1.1 Vaccine Availability

The application would use the data from the government-run API provider and the filtering is done based on the pin code and selecting a combination of state and district. The date can be selected from the date picker and the age category using the radio buttons. As the vaccines are recognized only for 18+ age groups, we will have the categories of

1) 18 - 44
2) 45+
3) All

On successful search, the centers' list is displayed with each card having a toggle button at the corner which will add the center into the wishlist. Clicking the card will take us to the page where it shows the complete address of the

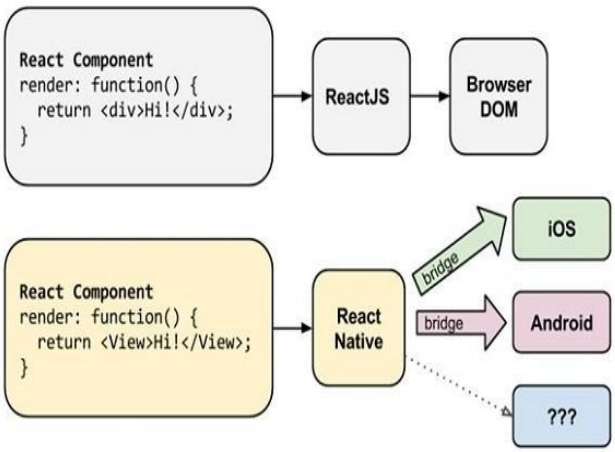

Fig -1: Working model of React Native

Vaccination center, the number of doses available, age group allowed, approx. distance from the location of the user to the center. The direction button will lead us to google maps navigation to the vaccination center. The users have the access to the notification control center where the alerts/ notifications can be switched to on/off. The user has the privilege to select whether the app should fetch details of all the centers in the pin code/district to give alerts or the centers in the wish list which can be customized by using the toggle button. The frequency of alerts (fetching details) and the sleep time can be customized using this action center using the slider component. Once the alerts are toggled on, the device will automatically fetch the details according to the preferences and frequency set.

3.1.2 Heart Disease Prediction

Machine learning is all about developing mathematical,computational, and statistical methodologies for finding patterns in and extracting insight from data. The aim of machine learning research in healthcare is not, of course, to replace human doctors or nurses, but rather to supplement and provide support where humans struggle. By doing precisely what humans can't, namely processing huge amounts of data quickly, machine learning methods can both improve the quality and consistency of care on a large scale.

Support Vector Machine (SVM): An SVM performs classification by finding the hyperplane that maximizes the margin between two classes. The vectors that define the hyperplane are the support vectors. Usage of the SVM for data set classification has its own advantages and disadvantages. Medical data sets can be non-linear of high dimensionality by observing properties. It is clear that SVM would be one of the favorite choices for classification.

It is clear that SVM would be one of the favorite choices for classification. Some of the advantages to select the SVM for classification choice.. Firstly, regularization parameters which avoid problem of over fitting which one of the major challenges is in decision tree and Kernel tree is used to avoid the expert knowledge through the knowledge of kernel

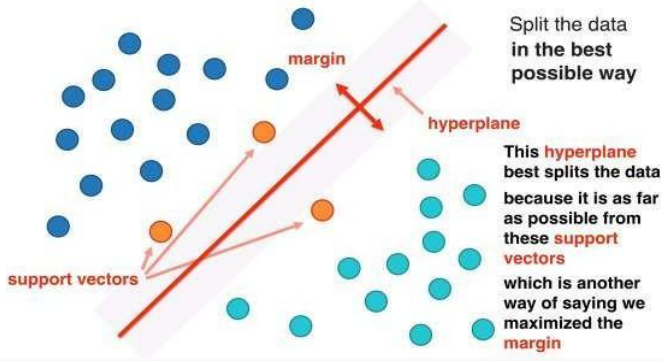

Fig -2: classification for heart disease prediction

3.1.3 Skin Cancer Prediction

Skin cancer is the most common human malignancy, is primarily diagnosed visually, beginning with an initial clinical screening and followed potentially by dermoscopic analysis, a biopsy and histopathological examination. Automated classification of skin lesions using images is a challenging task owing to the fine-grained variability in the appearance of skin lesions.

The dataset is taken from the ISIC (International Skin Image Collaboration) Archive. It consists of 1800 pictures of benign moles and 1497 pictures of malignant classified moles. The pictures have all been resized to low resolution (224x224x3) RGB. The task of this kernel is to create a model, which can classify a mole visually into benign and malignant which corresponds to the type of cancer. It detects two different classes of skin cancer i.e Benign and Malignant

In this kernel we will try to detect two different classes of moles using Convolution Neural Network with keras tensorflow in backend and then analyze the result to see how the model can be useful in a practical scenario.

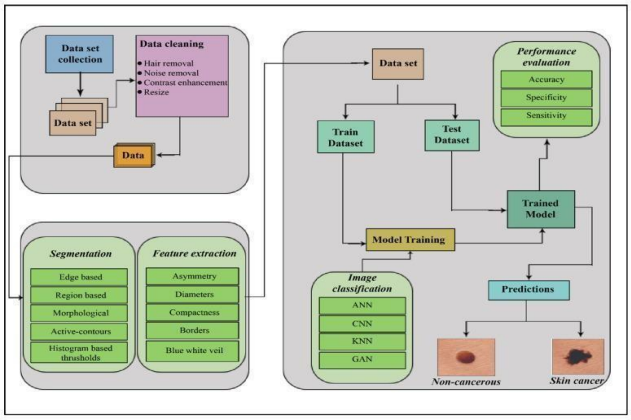

Fig -3: Skin cancer prediction.

4. SNAPSHOTS OF RESULTS

Below screenshots show the API testing on web application:

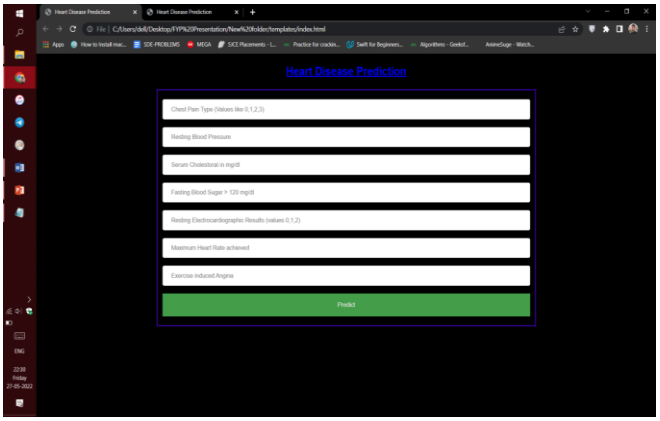

Fig -4: Image showing form to fill details from heart reports.

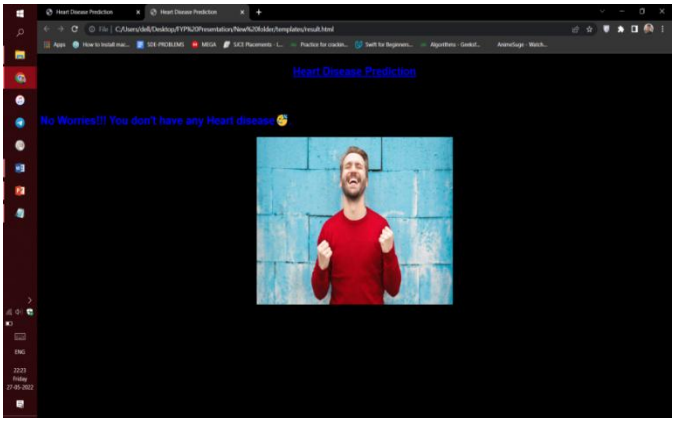

Fig -5: Positive result shown for safe heart patients.

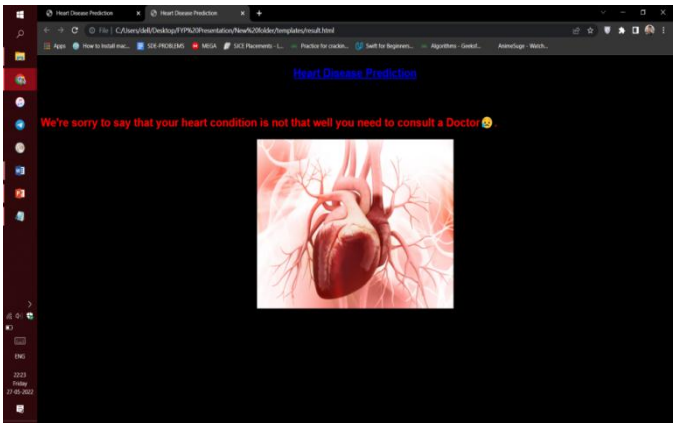

Fig -6: Negative result shown for patients with heart problems

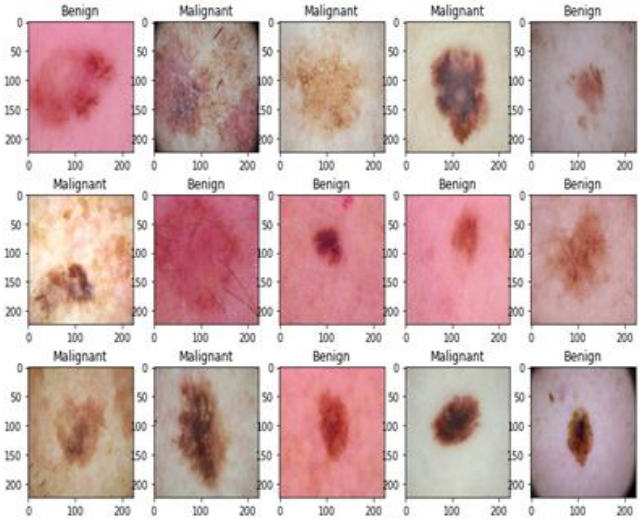

Fig -7: Resultant images of skin cancer prediction system

5. CONCLUSIONS

Many medical applications for smartphones have been developed and widely used by health professionals and patients. The use of smartphones is getting more attention in healthcare day by day. We have developed an Integrated Health Application to create a convenient and easy-to-use application for users. In our integrated app we have aimed at Tracking and notifying about real-time Covid-19 vaccine availability along with Heart Disease Prediction System using Machine Learning algorithms and Skin Cancer Classification using Deep Learning algorithm. The results obtained are proved to be of more than 90% accuracy.

ACKNOWLEDGEMENT

It gives us immense pleasure to write an acknowledgement to this project, a contribution of all the people who helped to realize it. We extend our deep

regards to Dr. S.B. Kivade, Honourable Principal of JSS Science and Technology University, for providing an excellent environment for our education and his encouragement throughout our stay in college.

We would like to convey our heartfelt thanks to our HOD, Dr. M.P. Pushpalatha, for giving us the opportunity to embark on this topic. We would like to thank our project guide, Prof.Divakara N for their invaluable guidance and enthusiastic assistance and for providing us support and constructive suggestions for the betterment of the project, without which this project would not have been possible.

We appreciate the timely help and kind cooperation of our lecturers, other staff members of the department and our seniors, with whom we have come up all the way during our project work without whose support this project would not have been a success. Finally, we would like to thank our friends for providing numerous insightful suggestions. We also convey our sincere thanks to all those who have contributed to this learning opportunity at every step of this project.

REFERENCES

[1] Viswanath Reddy and Guttappa Sajjan, "Design and Development of Real-Time Heart Disease Prediction System for Elderly People Using Machine Learning", August 2019.

[2] Davide Chicco and Giuseppe Jurman, "Machine learning can predict survival of patients with heart failure from serum creatinine and ejection fraction alone", in the journal of Chicco and Jurman BMC Medical Informatics and Decision Making, 03 February 2020.

[3] Titus Josef Brinke et al, "Skin Cancer Classification using Convolutional Neural Networks: Systematic Review" (Preprint), Journal of Medical Internet Research (http://www.jmir.org), 17.10.2018. August 2018.

[4] Diwakar Gautam and Mushtaq Ahmed "Melanoma Detection and Classification Using SVM Based Decision Support System", Conference Paper. December 2015 DOI: 10.1109/INDICON.2015.7443447

[5] Ahmed F. Otoom, Ahmed Kefaye, Mohammad Ashour, Yousef Shanti, and Mohammad Al-Majali , "Real-Time Monitoring of Patients with Coronary Artery Disease", International Journal of Future Computer and Communication, Vol. 4, No. 3, June 2015

[6] Montu Saw, Tarun Saxena, Sanjana Kaithwas, Rahul Yadav, Nidhi Lal. "Estimation of Prediction for Getting Heart Disease Using Logistic Regression Model of Machine Learning", International Conference on Computer Communication and Informatics (ICCCI)

[7] Yeshvendra Singh, Nikhil Sinha and Sanjay Kumar Singh, 'Heart Disease Prediction System Using Random Forest', International Conference on Advances in Computing and Data Sciences, July 2017,DOI:10.1007/978-981-10-5427-3_63

[8] Dawid Połap , Alicja Winnicka, Kalina Serwata, Karolina K¸esik and Marcin Wo´zniak, "An intelligent for monitoring skin disease", Sensors 2018,18, 2552

[9] R.Sumithra,Mahamad,Suhil and D.S.Guru, "Segmentation and classification of skin lesions for disease diagnosis", International Conference on Advanced Computing Technologies and Applications (ICACTA2015)

[10] Demyanov et al, "Classification of dermoscopy patterns using deep convolutional neural networks", IEEE 13th International Symposium on Biomedical Imaging, 2016