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Face to BMI: Estimating Body Mass Index [BMI] through Face Recognition Images

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Abstract: *Our paper aims to propose a system design which is based on the android app "Face to BMI", which identifies the BMI of the user through images. BMI can be easily predict from mobile application. In our system we added gym location, yoga/exercise videos, diet chart, insurance policy suggestion. An application should be easy to use and include options that will help user regarding health and fitness goals.*

Keywords: Android Application, Prediction, Machine Learning, Classification, Algorithms.

I. Introduction

In our daily life Physical health is need of life. Physical health is the state of being free from illness or injury. It can be cover a wide range of areas including healthy diet, healthy weight. Physical health can be affect our whole life. Because of unhealthy weight it leads different physical problems. Example of weight related issues like obesity, Mental health, Underweight, High blood pressure, abnormal cholesterol levels, Heart problems etc.

Because of our unhealthy lifestyle like eating junk, no physical activity we suffer physical health.Ranging from mental health to longevity, to financial income, At the social level "Fat shaming" and other forms of "Sizeism" are growing concern. Fat shaming leads to effect persons mental health. People also judge your financial status from your weight Physical also affects mental health.

We also did some research with help of previous year IEEE papers and some other international paper. We came to know that were some cons/disadvantage that were mentioned in papers that we came across. According to "Face To BMI" the following key points in application:

1. Self-Monitoring
2. Recommends Videos
3. Recommends Diet chart
4. Recommends insurance policy

II. Background and Motivation

In many previous papers, we observed different systems and methods. We found some analysis based on on that papers. We found some scope, advantages and disadvantages of the systems. We also known that issues occur in particular systems. There are different kind of systems that currently exist. Most of them use different methodologies to predict BMI. Some current system calculate BMI through height and weight. Some of them only predict BMI.

2.1 Literature Review

In [1] this model aims to identify, predict persons BMI. Dataset is the key for predicting BMI. More dataset means more accuracy in BMI. Dataset of 1026 subjects, Machine learning technology, regression method based on res-net architecture used for this model.

In [2] this model BMI identifies from photograph{facial image). Face recognition model detect face landmark, distance, and ratio of facial structure. Algorithm build to detect reliability of fBMI and mBMI.

In [3] this CNN algorithm used. Using CNN it compared large face dataset. Res-net and Dense-net used to scan face layers for proper output (BMI).

In [4] this CNN based recognition model have been proposed for high accuracy face recognition. VIP attribute and Bollywood dataset used which is free of cost. Used Re-gap for gender prediction.

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In [5] this system Facial ratios used with colour of a person bears a higher significance as compared to single correlation between BMI. This system unable to predict ethnic group.

In [6] this BMI System used to Prediction in two steps: deep feature extractionand training a regression model. Features extraction use deep models, one trained on general classification (VGG net). Deep convolutional models with parameters and trained on images. The models are trained on the 3368 training images and tested on 838 test images.

In [7] BMI with facial appearance was assessed by multivariate linear regression model.Collect larger data sample to improve results of BMI prediction. This system shows biological factors such as BMI, facial color , facial shape and WHR(waist-to-hip ratio) co-related to each other.BMI with facial appearance was assessed by multivariate linear regression model. All analysis and visualization were performed using Mathematica 10. The shape of face represent by 119 measurement points(landmarks)

In [8] this model Collected large database to demonstrate correlation between facial feature and BMI. The result occurs using image processing between higher pixel and lower pixel.

Explore more data facial feature for BMI prediction. Weight (area occupied by a silhouette in terms of pixel) and height (distance between the highest pixel and slowest pixel) The proposed test is the Pearson's correlation Coefficient.

In [9] this model seven face features used like (CJWR, FW ,LFH, PAR,ES, LF/FH, MEH).They develop a computational method to predict the BMI from face images automatically. Morph II dataset is imbalance of the age, gender, ethinicity. They formulate the BMI prediction from facial features as a machine vision problem, and evaluate large dataset with more than 14500 face images.

In [10] this method they compared three PC models (2D shape-only PCs, color PCs and 2D shape and color PCs combined). The amount of variance explained by regression models. To explore the presence of a non-linear relationship between PCs and BMI a support vector machine with radial basis function kernel also implemented.

2.2 Commercial Survey

In Face to BMI mobile application

- BMI calculator app in this user whether you are anorexic, in good shape, overweight or obese. User need to enter height and weight and BMI will be displayed in numbers.
- Weight Track Assistant in this application it helps to track your daily weight. Provide weight chart to view your weight progress.
- Monitor your weight in this user can self-monitoring may promote weight loss by increasing awareness of your habits and progress.
- Ideal weight- BMI calculator & Tracker this application helps you to gain control, lose weight and track your BMI.
- Body Fat Calculator app is for calculates your BMI, waist-to-height ratio, approximate body fat percentage. Each calculation appears on a screen that offers a personalized ideal number for that measurement.
- Health Check- BMI, BMR helps you to calculate BMI and maintain our weight and height. It calculate ideal weight calculator based on the world health organization method.

III. PROPOSED SYSTEM

In this project, we are going to develop an android app that predict BMI of a person. This app will help to the user to get nearest gym location, diet chart, insurance policy ideas, yoga/exercise videos.

3.1 Workflow

In this app first we will give introduction guidelines that how to use this app after that login page will be there. If user don't have login then user can do signup. After that, user need to initialize camera then acquire new image from the camera then system will detect the face. Classifier will detect face features to predict the BMI. System will give user BMI as output. Also recommend diet chart to follow diet for healthy weight, Gym/yoga videos to help user to maintain healthy weight. Also provide nearest gym location to user. Also suggest insurance policy ideas according to user need.

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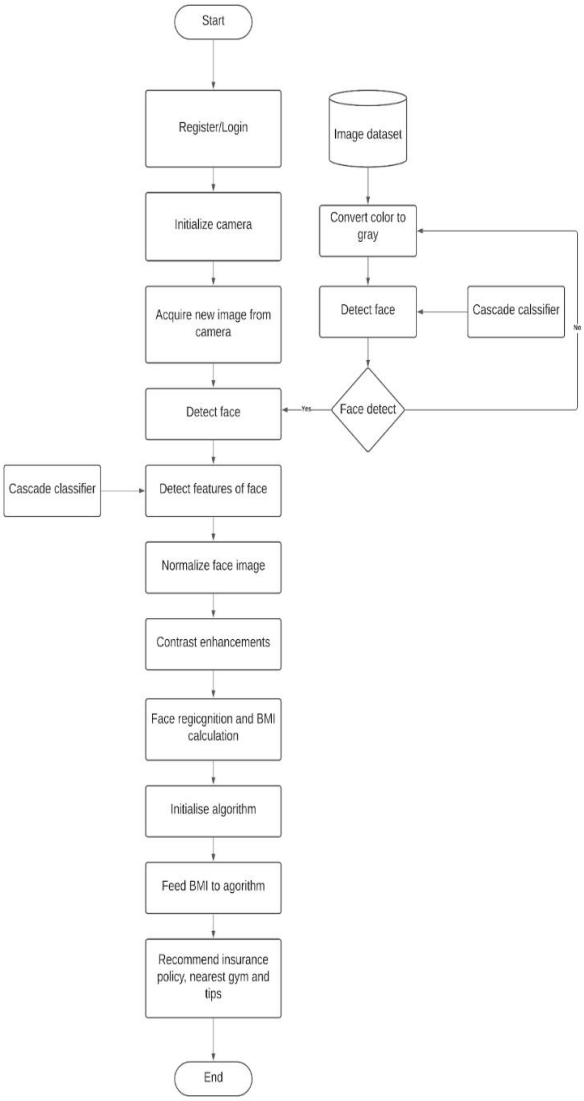

3.2 Software Requirement

A. Android Studio

Android studio provides a unified environment where you can build apps for android phones, tablets, android TV, etc. In android studio you can design your app front end and as well as their backend functionalities using java language.

- **MySQL Database:** MySQL database is use storage purpose. In our case, it stores the user data like user information or his/her predicted BMI.
- **Python:** Python is an advanced programming language. Python makes the programming and development of the app easy. In our case, Python is use to make API for our app.
- **C. Anaconda:** Anaconda is an open-source distribution for python and R. It helps us to process large scale data and predictive analytics. It is used for machine learning. with the availability of more than 300 libraries.
- **D. Spyder:** Spyder is an open-source cross platform integrated development environment (IDE) for scientific programming in the python. It helps to do programming in python for machine learning.
- **E. Jupiter Notebook:** The Jupiter Notebook is an open source web application that allows us to create and share documents that integrate live code, output, visualization and other multimedia resources.

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- **F. Flask:** We use flask to create web pages for this project. For that initially we import all the dependent libraries. And initialize the app. Then we create some functions which are useful for our project and then write some functionality in that. After getting this we use one model to predict the high risk taxpayer. so when user entering into our webpage then he/she should have to fill all the details after filling all the details and submitting then that details are feed to the algorithm and predict that user is in risk or not whether user is in risk then algorithm also predict that he/she is in high risk taxpayers list and then we show our output.

3.3 Structure of Application

1. **Splash screen:** It shows the logo and loading screen of our app.
2. **Login and Register page:** You can login by providing login credentials. If you are a new user then you can sign up using the signup page.
3. **Home page:** It contains
4. **Prediction:** Clicking this page, there is upload photo option so that user can upload photo from gallery to predict his/her BMI.
5. **Location page:** This will provide user nearest gym location.
6. **Yoga/Exercise videos page:** After prediction app will suggest user videos of yoga/exercise. To improve their physical health.
7. **Diet chart page:** User can choose there diet plans according to BMI calculation. To gain or lose weight.
8. **Insurance policy suggestion page:** BMI plays important role in insurance policies that's why we added this feature to give information according to BMI range.

3.4 Random Forest Algorithm

Grouped random forest(grf) methodology is used to identify intrusions inside the network through dividing the complete network into character systems in order that eager remarks may be executed at the communication initiated within the network. This method selects and monitors each node in the community randomly from any or a couple of places. This is the purpose, this proposed technique is known as group random forest (grf). Whilst a community is hooked up and communication is initiated, then data is transferred from node to another node from sender to vacation spot. This procedure is sustained till transfer of statistics is completed. Whilst conversation is going on, log files are created and then those log files are given as input for the proposed technique.

3.5 Computer Vision

Images on computer systems are frequently saved as massive grids of pixels. Each pixel is described as a color, saved as an aggregate of three additive number one colors. To pick out those features in images, pc imaginative and prescient algorithms need to not forget small areas of pixels, referred to as patches. For example, an algorithm that finds vertical edges in a scene, to assist a drone navigate effectively via a subject of obstacles. For this operation, a mathematical notation is used, that is known as a kernel or filter. It consists of the values for a pixel-smart multiplication, the sum of that is stored into the middle pixel. Earlier, an algorithm known as Viola-Jones Face Detection became used, which blended a couple of kernels to detect features of the faces.

3.6 Libraries

In UI we import some dependent libraries which are needed. so first we import flask which is a basic library to config the all settings of flask app then we import render template and url_for which is use to redirect on that page but before that we define some path to that page for example if will define /index for home.html page and then on my server I will hit with /index then it will redirect to home page so redirection and routing part is done by render template and url_for. Then we import the request. It works like if we hit google.co.in on chrome then that request goes into the server database, server checks if the url is present in my database
or not and then acknowledges the user. Then we import MySql to connect with our database to store user registration and login info. then we import pickle file to use pickle file at the input side.

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Flask is a small and lime weight python web framework that provides useful tools and features that make creating web application in python easier. MySQL is used to store user details or prediction details.

IV. Result And Analysis

1. Installation of mobile application needs to be done by user.
2. During BMI prediction, app will scan users images and proceed to get BMI.
3. User can also click selfie to scan face to get BMI.
4. After that, data obtained by scanning the image will compare with dataset to get BMI as a output.
5. With BMI result it will also shows yoga/exercise videos, diet chart, insurance policy quotes to users.
6. User can logout from app after use.

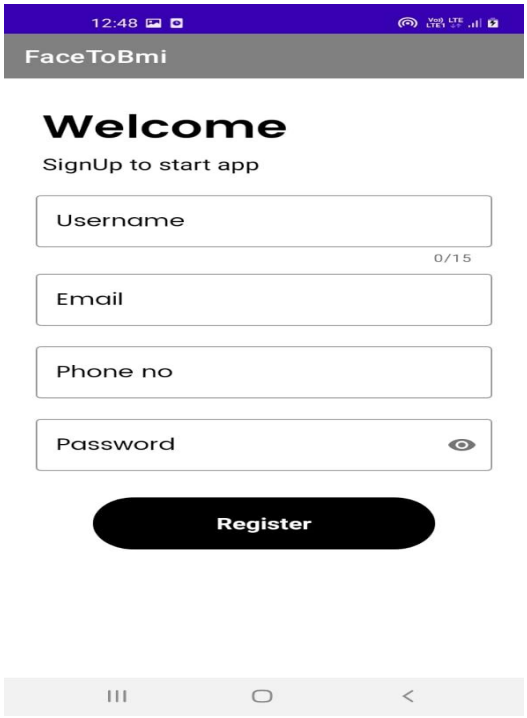

Figure 1

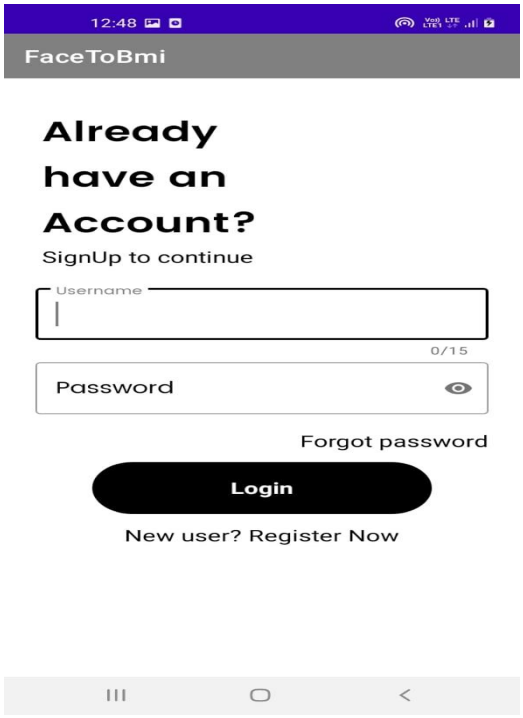

Figure 2

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Figure 3

Figure 4

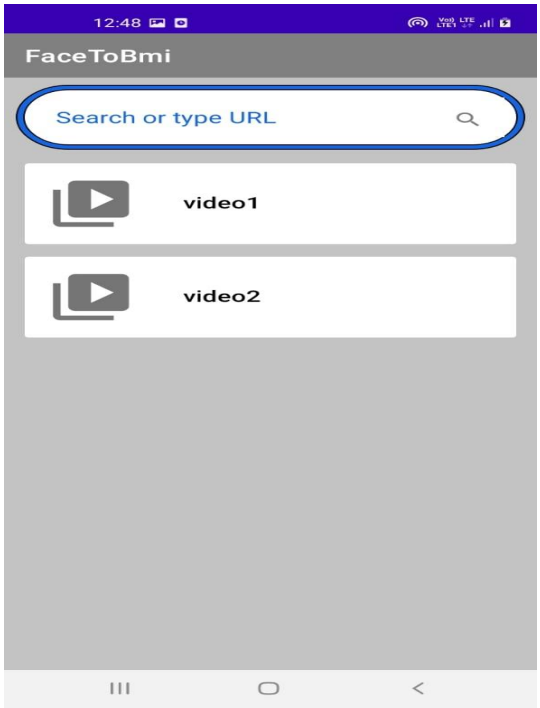

Figure 5

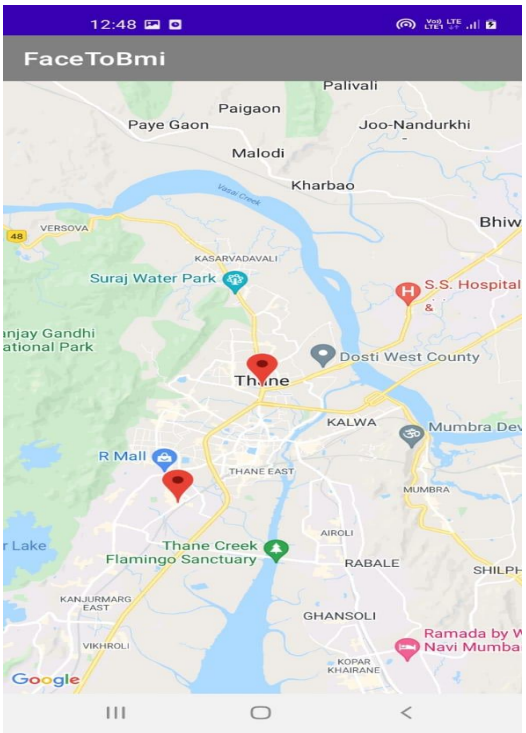

Figure 6

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Figure 7

Figure 6

V. CONCLUSION

In this work, we made android app as platform for our project which works according to our need. We discuss about machine learning algorithms how they going to work on our dataset. When inferring information from a person's profile image. We also search for different dataset available on net which mentioned in different research papers to get suitable dataset for our project. In future work, we will apply our method to dataset. We will apply our method to social media profile pictures to model population level obesity rates.

REFERENCES

[1]. Antitza Dantcheva ,Francois Bramond ,Piotr Bilinski France antitza.dantcheva@inria.fr, France francois.Bremond@inria@.fr ,United kingdom August 24th 2018

[2]. MakenzieL.Barr, Sarah. E-Colby,Meliss D. Alfert, Guodong Guo, Davis college of Agriculture, USA, mbarr@mix.wvu.edu, Benjamin M.stalter college of engineering. Guodong.guo@mail.wvu.edu, Department of nutrition. The university of Tenesses, Melissa.alfert@gmail.wvu.edu, August 31st 2018

[3]. Hera, Ajita Rattani, Dakshani Ranjan,Tanner Dean, Wichita state university, USA, National institute of technology, India, University of kanvas medical centre,USA, October 17th 2020

[4]. Nadeem Yousaf, Sarfraz Hussain, Waqas Sultani, 1/2 Intelligent machine lab, informarion technology university,USA, Machine learning and data science ,USA

[5]. Shiv Bidani, R.Padma Priya, computing science and engineering, VIT university, Vellere, India. shivbidani@gmail.com,Padmapriya.r@vit.ac.in

[6]. FerdaOfli, Yusuf Aytar, Javier Marin,Antonio Torralba, Ingmar Weber, Qatar Computing Research Institute University of Oxford, Massachusetts institute of technology, Singapore-MIT Allianca, Qatar research institute.

[7]. Christine Mayer,SonjaWindhgar,Katrin Schaefer, Phillip Mitteroecker, Department of theoretical biology, University of Vienna, Austria, Department of Biosciencess, University of Oslo, Norway, Department of Anthropology, Venna,Austria

[8]. Habib Bipembi, James Hayfron-Acquah, Joseph Penford, Obed Appiah, Kwame Nkrumah University of science and technology, University of Energy and Natural Resources.

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[9]. Lingyun Wen, Guodong Guo, Lane Department of computer science and Electrical Engineering, West Virginia University Morgantown,WV,26506,United States.

[10]. Karin Wolffhechel, Amanda Hahn, Hanne jammer, Claire Fisher, Benedict Jones, Lisa De Bruine, 1/3 Centre for Biological Sequences Analysis,DTU systems, University of Denmark,2/4/5/6 Institute of Neuroscience &Psychology, Glascow