GPCET
Pioneering Innovative Education

Department of Computer Science and Engineering

IV – B.Tech II SEMESTER

Project Title :

BMI Estimation using facial features

B. Somanaidu (19AT1A05E3)
K. Sreenu (19AT1A05F2)
G. Srivathsa (19AT1A05F8)
K. Umesh Chandra Reddy (19AT1A05G9)

Project Supervisor
Mr . D.JAYANARAYANA REDDY M.Tech.,(Ph.D)
Department Of CSE

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- LITERATURE SURVEY
- PROPOSED SYSTEM
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ABSTRACT

- Body Mass Index (BMI) is a measure of how healthy a person is with respect to their body weight. BMI has shown a correlation with various factors like physical health, mental health, popularity. BMI calculation often requires accurate height and weight, which would take manual work to measure.

- Largescale automation of BMI calculation can be utilized for analyzing various aspects of society and can be used by governments and companies to make effective decisions. Previous works have used only geometric facial features discarding other information, or a data-driven deep learning-based approach in which the amount of data becomes a bottleneck.

- In this project we are using python CNN (convolution neural networks) algorithm to predict BMI by analyzing facial features. CNN will take image as input and then extract facial features from image and based on facial features BMI will be predicted.

INTRODUCTION

The BMI(Body Mass Index) of any person is a crucial indicator of health. It checks if the person is underweight, normal, overweight, or obese. In the current scenario, health is one of the most neglected factor. Technology which has more benefits also has some drawbacks. It has made humans lazy and thus reduced their physical activity leading to a sedentary lifestyle and a rise in BMI which adversely affects their health and increases the risk of chronic diseases.

The more the BMI, the more is the chance of developing cardiovascular and other harmful diseases. On the other side of the coin, some people have problems like malnutrition and deficiencies. So, BMI can help a person to keep a track record of their health. According to [1], on average, one out of every three adults is obese, which is about 36% of the population, and by the year 2030, an estimated 20% of the global population would be obese.

LITERATURE SURVEY

Face-to-BMI: Using Computer Vision to Infer Body Mass Index on Social Media

https://www.researchgate.net/publication/314433619_Face-to-BMI_Using_Computer_Vision_to_Infer_Body_Mass_Index_on_Social_Media

A person's weight status can have profound implications on their life, ranging from mental health, to longevity, to financial income. At the societal level, "fat shaming" and other forms of "sizeism" are a growing concern, while increasing obesity rates are linked to ever raising healthcare costs.

For these reasons, researchers from a variety of backgrounds are interested in studying obesity from all angles.

LITERATURE SURVEY

Facial Image Analysis for Body Mass Index, Makeup and Identity
https://researchrepository.wvu.edu/cgi/viewcontent.cgi?article=7979&context=etd

ABSTRACT: The principal aim of facial image analysis in computer vision is to extract valuable information (e.g., age, gender, ethnicity, and identity) by interpreting perceived electronic signals from face images.

In this dissertation, we develop facial image analysis systems for body mass index (BMI) prediction, makeup detection, as well as facial identity with makeup changes and BMI variations. BMI is a commonly used measure of body fatness.

LITERATURE SURVEY

BMI Prediction From Face Images.
https://www.researchgate.net/publication/335364971_BMI_Prediction_From_Face_Images

ABSTRACT: Body-mass index (BMI) is the amount of mass per area of a person, and it is an important indicator of the weight status. From health industry till the social media applications, there are many areas where BMI data is used.

Various machine learning techniques are developed for BMI prediction only from a face image without any information about the weight and height of a person.Making this kind of predictions is a regression problem.

LITERATURE SURVEY

A Framework for Healthcare Everywhere: BMI Prediction Using Kinect and Data Mining Techniques on Mobiles

https://www.researchgate.net/publication/308817784_A_Framework_for_Healthcare_Everywhere_BMI_Prediction_Using_Kinect_and_Data_Mining_Techniques_on_Mobiles

ABSTRACT: Recently, health-care has become a popular issue. Having a good physique is also commonly regarded as important for being healthy. For evaluating our body status, the Body Mass Index (BMI) is a widely used indicator.

However, calculating BMI is inconvenient and requires the physical measuring of people's weights and heights. In this paper, we are interested in building a mobile-based BMI prediction system using Kinect and data mining techniques so that everybody can easily monitor their BMI everywhere by taking a snapshot of their face.

EXISTING SYSTEM

A person's body mass index (BMI) is a gauge of how healthy they are in relation to their weight. Numerous aspects, including physical health, mental health, and popularity, have been linked to BMI. BMI calculations frequently call for precise measurements of height and weight, which entail labor-intensive manual labor.

Governments and businesses can employ large-scale automation of BMI calculation to analyze different facets of society and to make smart decisions. Previous approaches have exclusively employed geometric facial traits, disregarding additional information, or have used a data-driven deep learning approach where the volume of data becomes a difficult.

DISADVANTAGES OF EXISTING SYSTEM:

the volume of data becomes a difficult

Recently there have been many advancements in deep learning where models can extract meaningful features from the images but can’t predict BMI

PROPOSED SYSTEM

In this project, we're analyzing facial features to estimate BMI using the Python CNN (convolution neural networks) algorithm.

CNN will use a picture as its input, extracting facial traits from it before predicting BMI based on those features.

Advantages of proposed system:
Far preprocessing for best prediction
High prediction rate

REQUIRMENTS

HARDWARE REQUIREMENTS

Minimum hardware requirements are very dependent on the particular software being developed by a given Enthought Python / Canopy / VS Code user.

Applications that need to store large arrays/objects in memory will require more RAM, whereas applications that need to perform numerous calculations or tasks more quickly will require a faster processor.

Operating system	**: windows, linux**
Processor	**: minimum intel i3**
Ram	**: minimum 4 gb**
Hard disk	**: minimum 250gb**

ALGORITHMS

CNN:

A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a ConvNet is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, ConvNets have the ability to learn these filters/characteristics. The architecture of a ConvNet is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex. Individual neurons respond to stimuli only in a restricted region of the visual field known as the Receptive Field. A collection of such fields overlap to cover the entire visual area.

MODULES

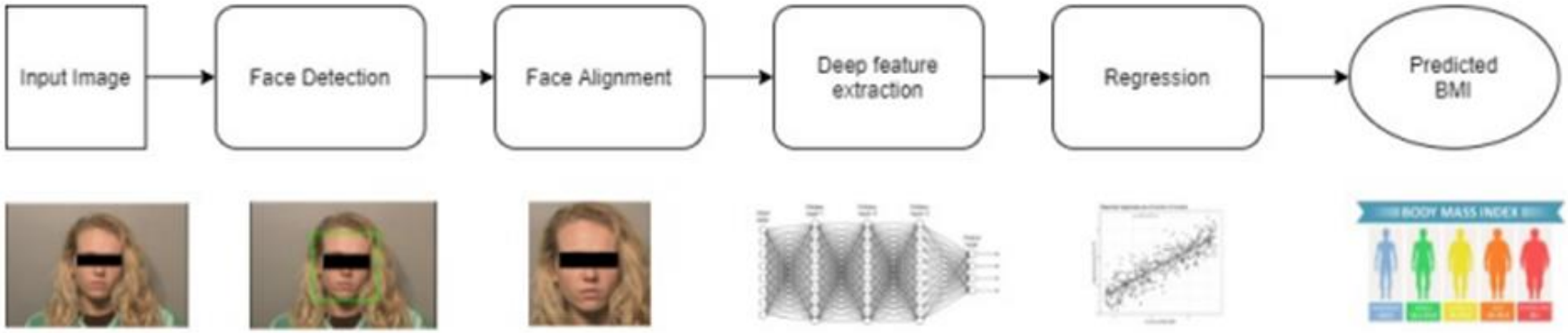
In this project we are using python CNN (convolution neural networks) algorithm to predict BMI by analysing facial features. CNN will take image as input and then extract facial features from image and based on facial features BMI will be predicted. To implement this project we have designed following modules.

Generate & Load BMI & Face Detection Models: Using this module we will load facial detection CV2library and BMI detection CNN model. Facial detection library help us to detect human face from uploaded image and then facial features will input to CNN model to predict BMI

Upload Image: using this module we will upload image to application

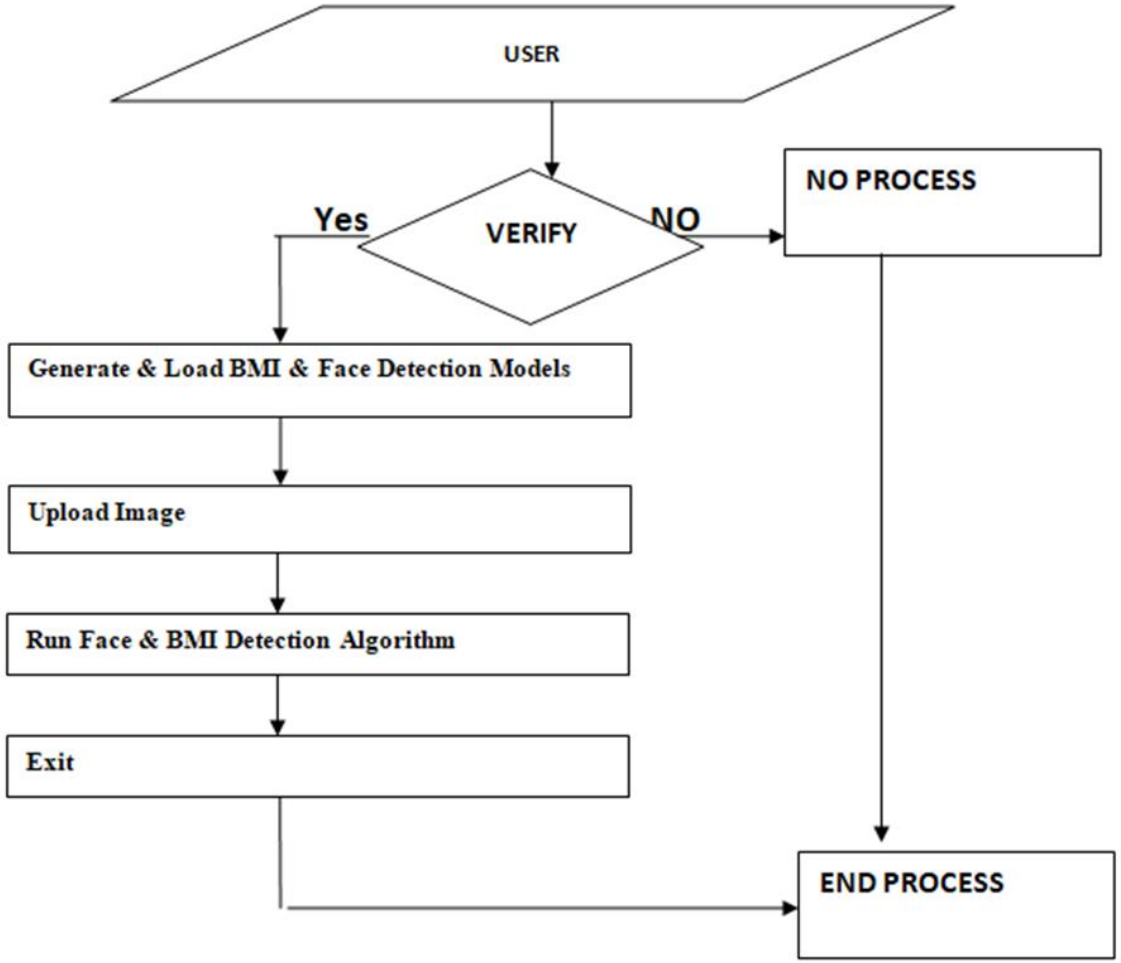
Run Face & BMI Detection Algorithm: This model extract face from given input image and then facial features will be analyse to predict BMI. Based on predicted BMI insurance policy will be quoted to users.

SYSTEM ARCHITECTURE

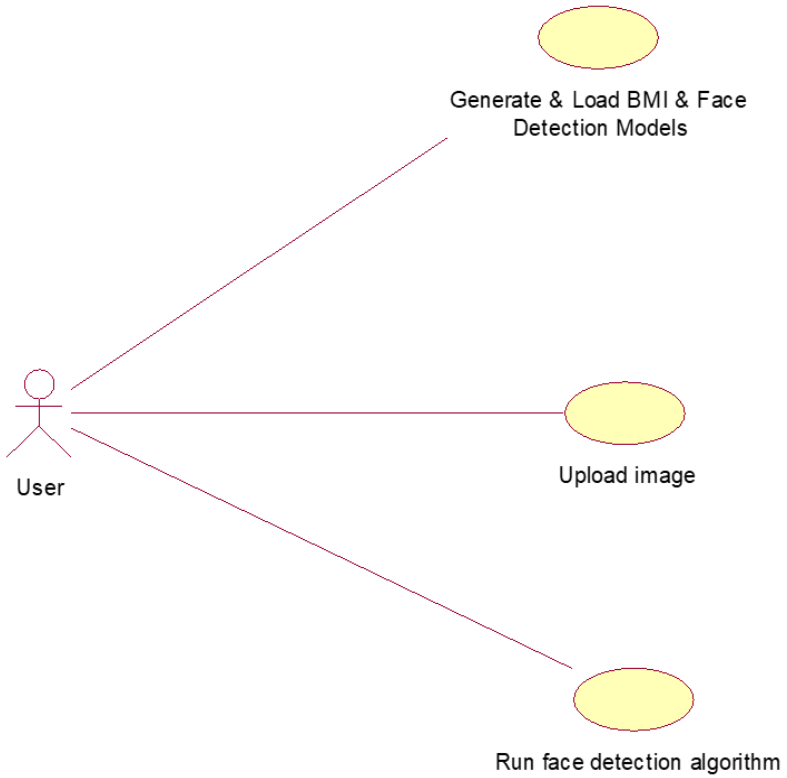


UML DIAGRAMS

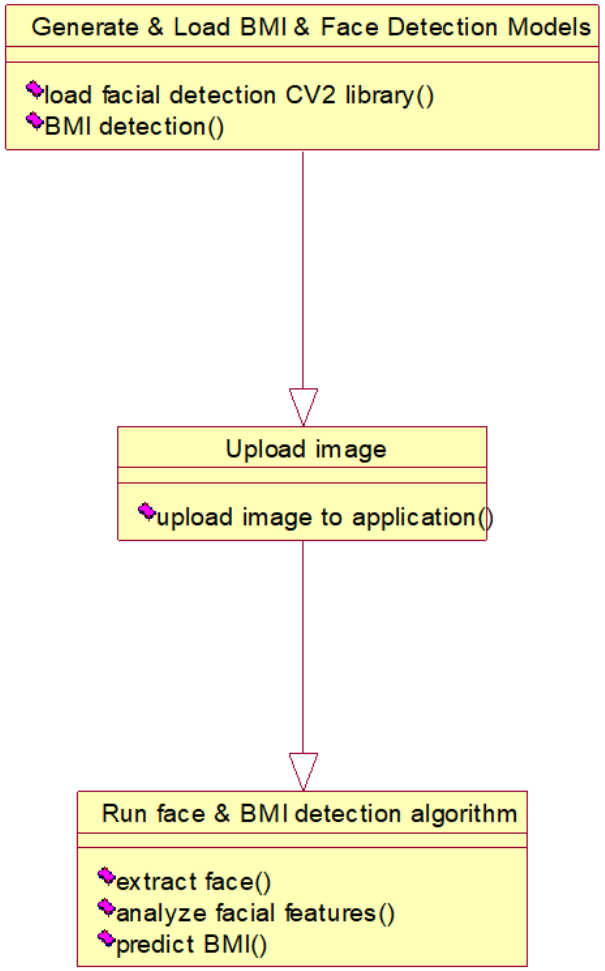
DATA FLOW DIAGRAM



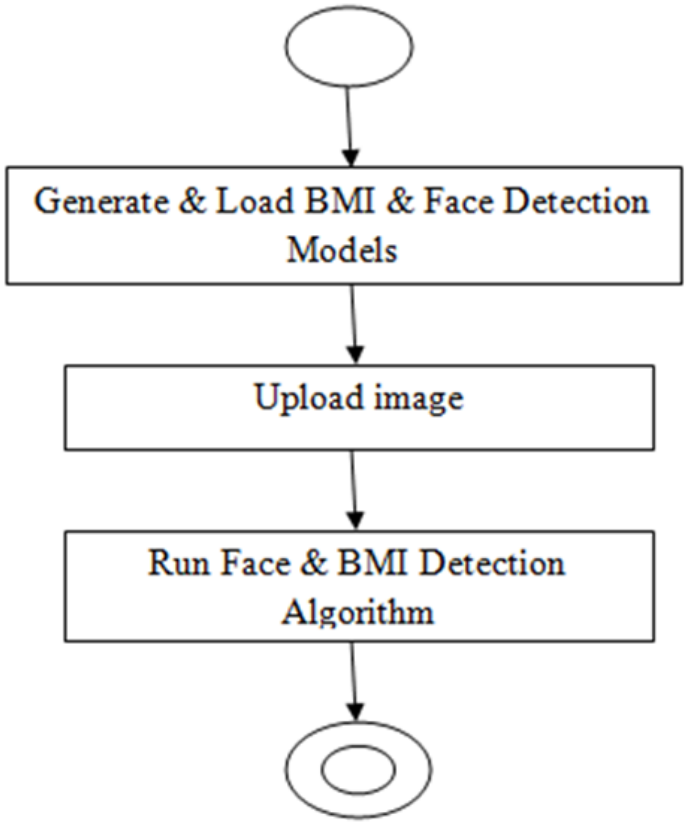
USE CASE DIAGRAM



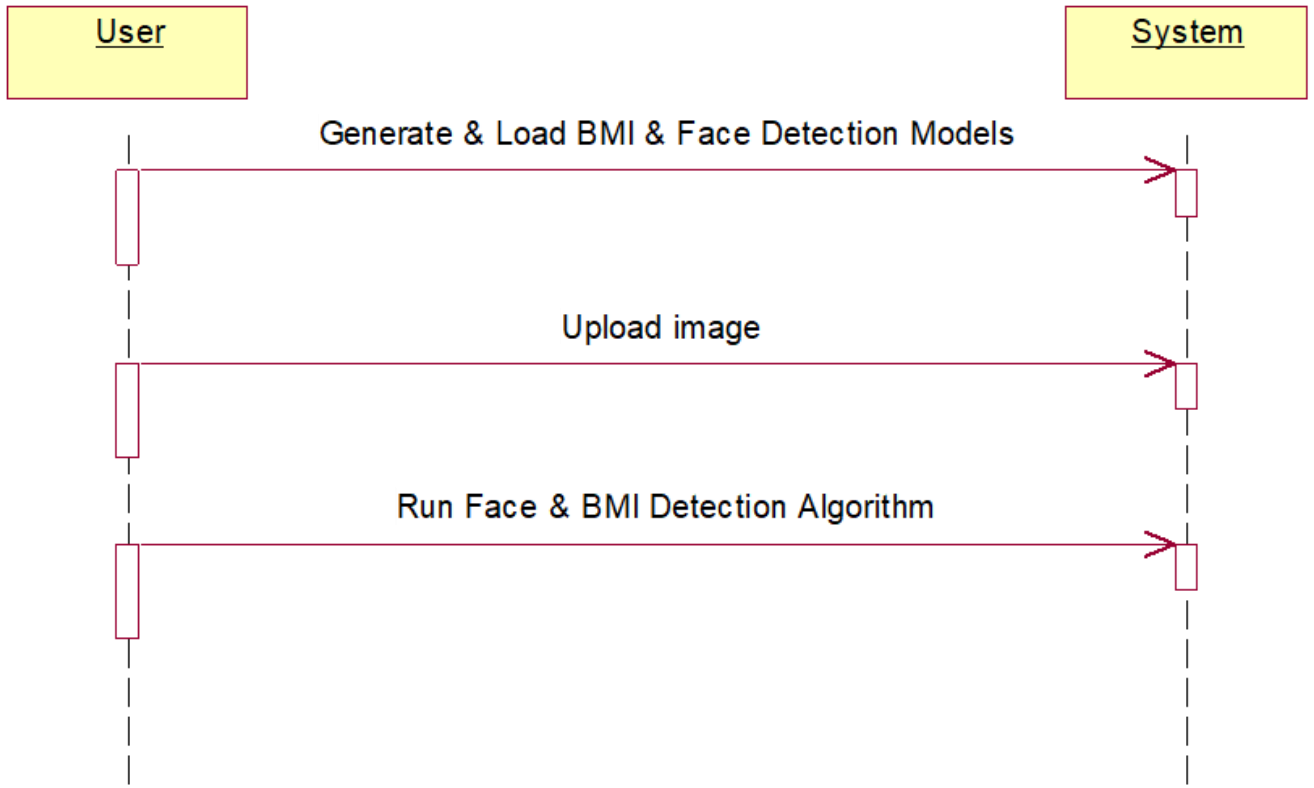
CLASS DIAGRAM



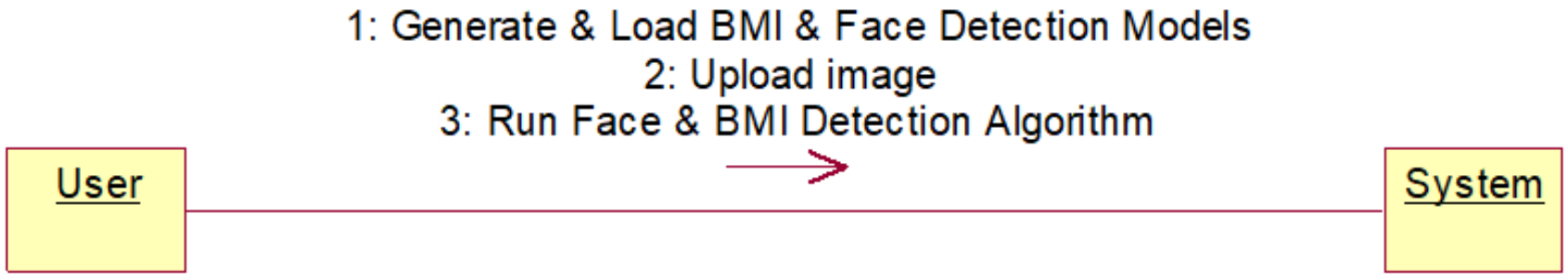
ACTIVITY DIAGRAM



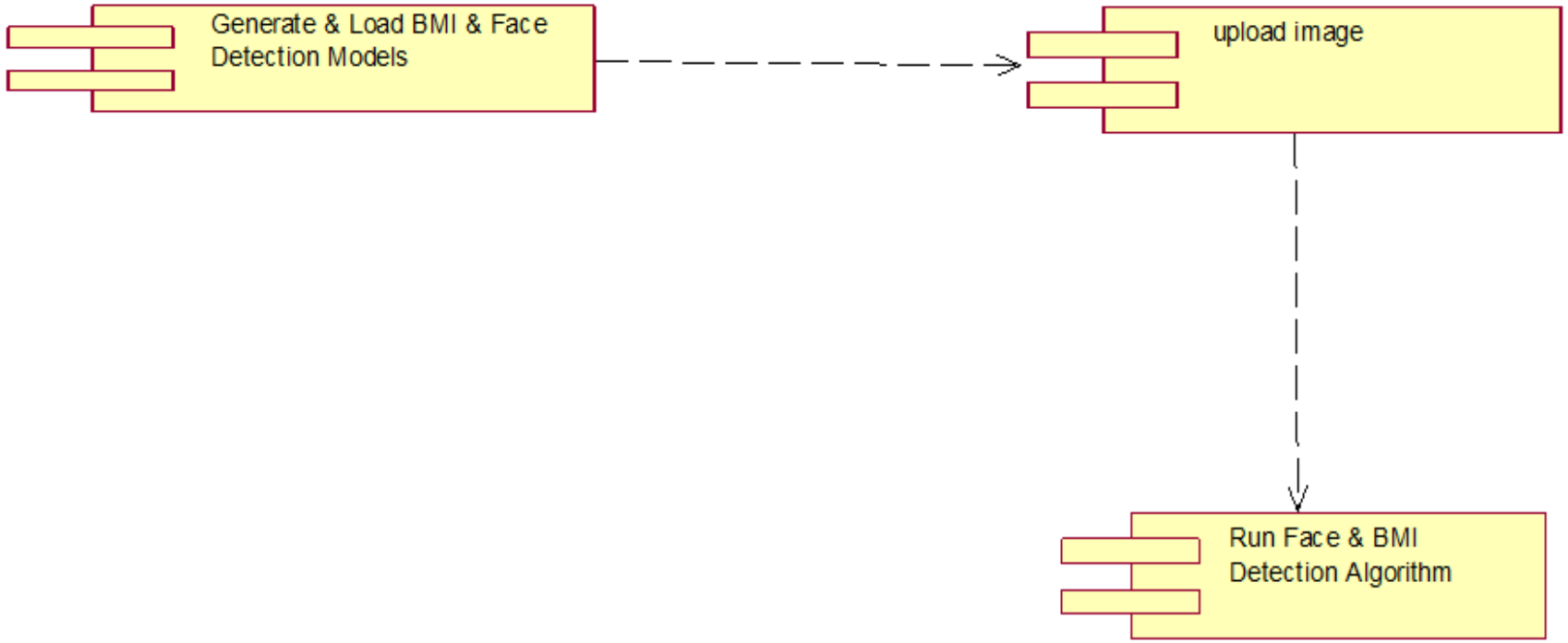
SEQUENCE DIAGRAM



COLLABORATION DIAGRAM



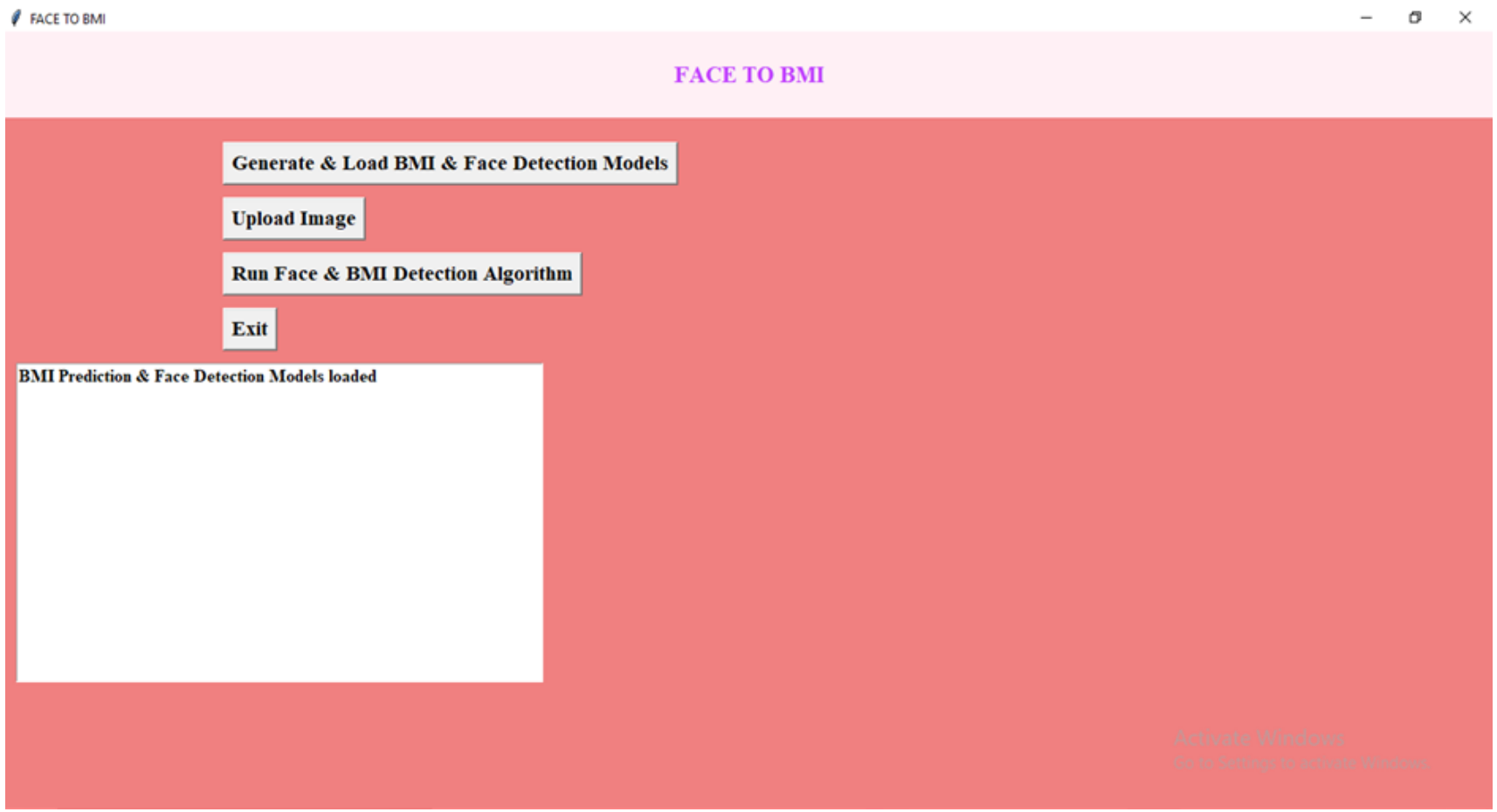
COMPONENT DIAGRAM

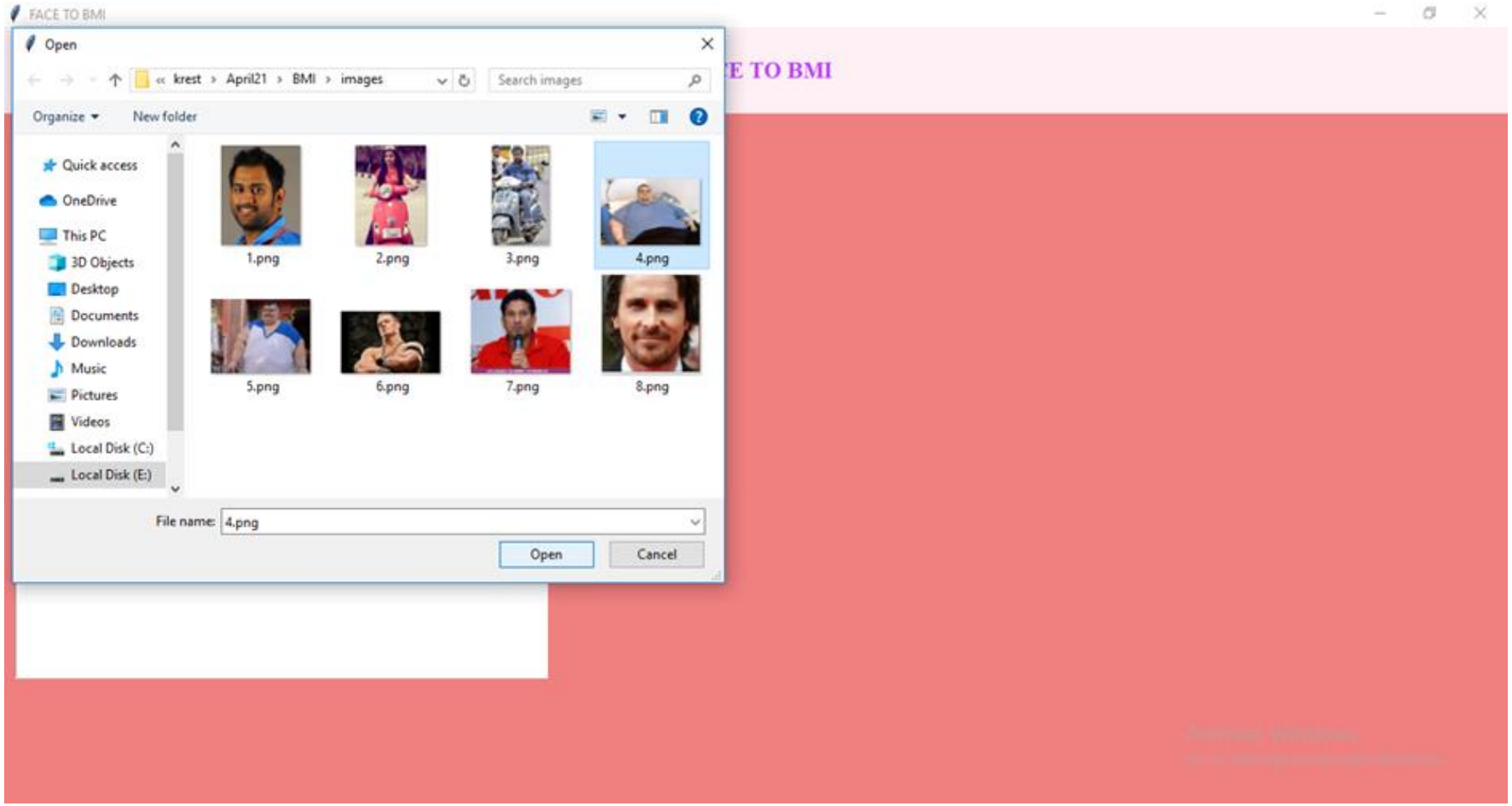


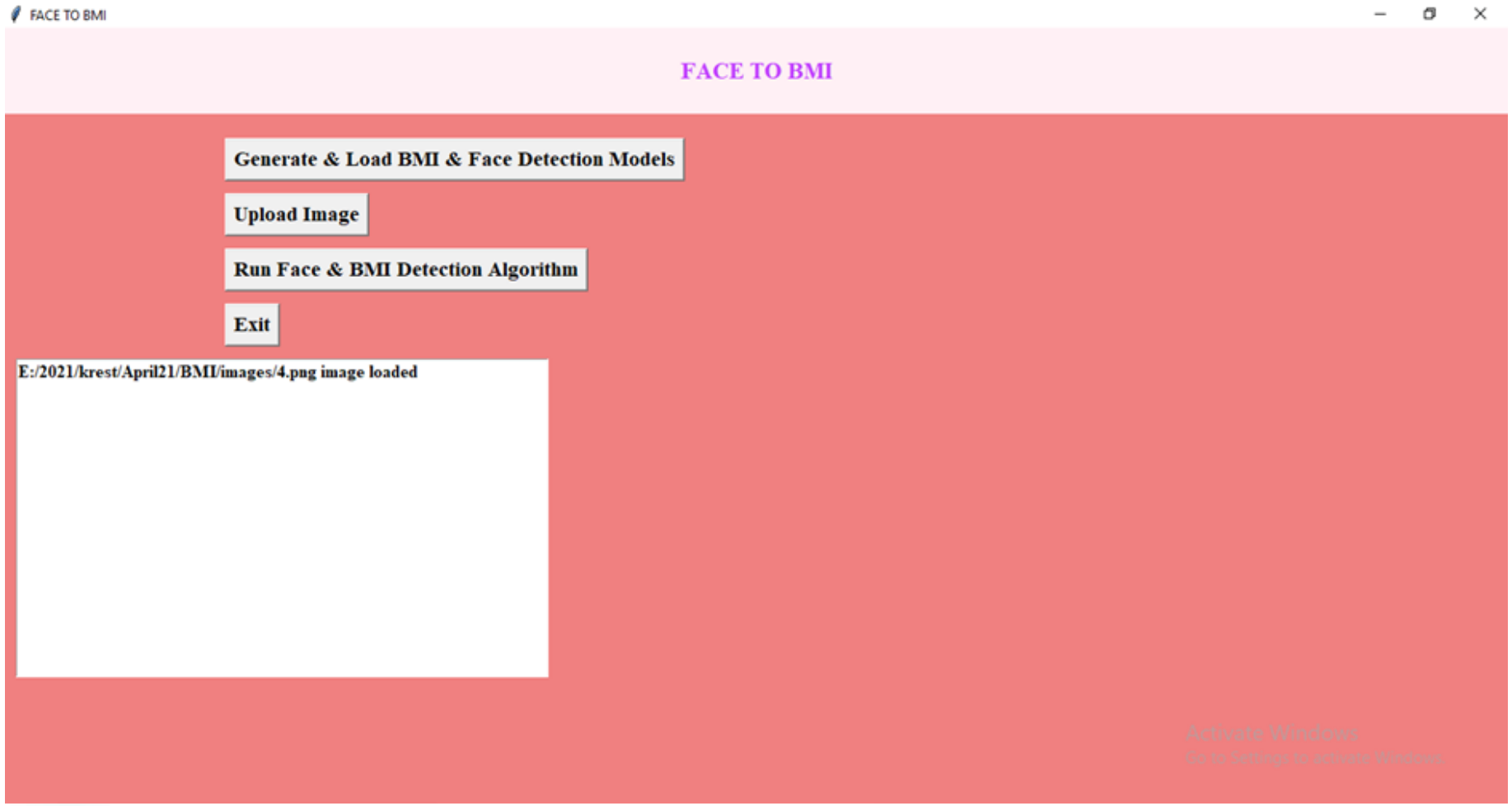
DATA FLOW DIAGRAM

RESULTS


FACE TO BMI
FACE TO BMI
Generate & Load BMI & Face Detection Models
Upload Image
Run Face & BMI Detection Algorithm
Exit
Activate Windows
Go to Settings to activate Windows.


FACE TO BMI
FACE TO BMI
Generate & Load BMI & Face Detection Models
Upload Image
Run Face & BMI Detection Algorithm
Exit
BMI Prediction & Face Detection Models loaded
Activate Windows
Go to Settings to activate Windows.


FACE TO BMI
Open
krest › April21 › BMI › images
Search images
Organize
New folder
Quick access
OneDrive
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Local Disk (C:)
Local Disk (E:)
1.png
2.png
3.png
4.png
5.png
6.png
7.png
8.png
File name: 4.png
Open
Cancel
E TO BMI


FACE TO BMI
FACE TO BMI
Generate & Load BMI & Face Detection Models
Upload Image
Run Face & BMI Detection Algorithm
Exit
E:/2021/krest/April21/BMI/images/4.png image loaded
Activate Windows
Go to Settings to activate Windows.

FACE TO BMI

Generate & Load BMI & Face Detection Models

Upload Image

Run Face & BMI Detection Algorit

Exit

E:/2021/krest/April21/BMI/images/4.png image loaded

Predicted BMI based on facial features is : 32.81663818359375


FACE TO BMI
FACE TO BMI
Generate & Load BMI & Face Detection Models
Predicted BMI based on facial features is : 26.873333740234376
Predicted BMI based on facial features is : 26.873333740234376
Suitable Quoted Policy Based on Predicted BMI is 20 Lakhs
E:/2021/krest/April21/1

CONCLUSION

We observed that people with more BMI have a higher risk of developing health issues. We found that there exists a strong association between BMI and the face of a human. So, we proposed an approach to predict BMI from facial images using deep learning. We preprocessed the facial data by aligning the faces to the center using the BMI detection algorithm.

In future work, we will apply our method to social media profile pictures to model population-level obesity rates. Preliminary results show that both regional and demo graphic differences in BMI are reflected in large amounts of Instagram profile pictures.

REFERENCES

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