PROJECT REPORT

On

STRESS DETECTION

Submitted in partial fulfilment for the award of degree

of

Master of Computer Applications

By

GIBIN SKARIA PHILIP (MLM23MCA-2024)

Under the Guidance of

GREESHMAMOL P KURIAN
(Assistant Professor, Dept. of Computer Applications)

DEPARTMENT OF COMPUTER APPLICATIONS

MANGALAM COLLEGE OF ENGINEERING, ETTUMANOOR

(Affiliated to APJ Abdul Kalam Technological University)

APRIL 2025

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DEPARTMENT OF COMPUTER APPLICATIONS

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To become a centre of excellence in computer applications,competent in the global ecosystem with technical knowledge,innovation with a sense of social commitment.

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- To prepare learners with knowledge skills and critical thinking to excel in the technological landscape and contribute positively to society.

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Program Specific Outcomes

- **PSO I**: Apply advanced technologies through innovations to enhance the efficiency of design development.
- **PSO II**: Apply the principles of computing to analyze, design and implement sustainable solutions for real world challenges.

MANGALAM COLLEGE OF ENGINEERING, ETTUMANOOR
DEPARTMENT OF COMPUTER APPLICATIONS
APRIL 2025

CERTIFICATE

This is to certify that the Project Report titled ***"Stress Detection"*** *is the bonafide record of the work done by* ***GIBIN SKARIA PHILIP (MLM23MCA-2024)*** *of Masters of Computer Applications towards the partial fulfilment of the requirement for the award of the* ***DEGREE OF MASTER OF COMPUTER APPLICATIONS by APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY****, during the academic year 2024-2025.*

Project Guide
Ms. Greeshmamol P Kurian,
Assistant Professor
Dept of Computer Applications

Head of the Department
Ms. Divya S.B
Associate Professor
Dept of Computer Applications

Project Coordinator
Ms. Banu Sumayya S
Assistant Professor
Dept of Computer Applications

External Examiner

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GIBIN SKARIA PHILIP

(MLM23MCA-2024)

ABSTRACT

The purpose of the paper is the goal of stress detection in IT professionals using image processing and machine learning is to keep an eye on their emotional state while they spend a lot of time in front of a computer. can identify stress, lessen it, and make the workplace considerably more comfortable for IT workers. In order to maximize employee performance during working hours, this approach primarily focuses on stress management and creating a healthy, flexible work environment for the staff. Both the user and the administrator can log in with the username and password of their choice. The only restriction is that the same username cannot be accepted by more than one individual. Developing a dependable, practical, and precise detection system is the study's main goal. The research aims to achieve the following specific goals: To estimate a person's level of stress based on symptoms through observation. To evaluate the worker's stress thresholds. To offer treatments and answers to help the client get over their stress.

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LIST OF ABBREVIATIONS

ABBREVIATION		FULL FORM
WHO	–	World Health Organization
ML	–	Machine Learning
SVM	–	Support Vector Machine
AI	–	Artificial Intelligence
HRV	–	Heart Rate Variability
KNN	–	K-Nearest Neighbor
AU	–	Action Units

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The modern workplace environment, especially in the Information Technology (IT) industry, is often characterized by high demands, tight deadlines, and intense workloads. These factors can lead to stress, which, if left unmanaged, can adversely affect employees' well-being and job performance. Therefore, it is essential to develop effective methods for detecting and managing stress in IT professionals. This research focuses on leveraging image processing techniques and artificial intelligence (AI) to detect and assess stress levels in IT professionals. The proposed approach utilizes facial expression analysis through image processing algorithms to identify stress indicators, such as changes in facial features and expressions. The images can be captured through webcams commonly used in workplaces. These images are then processed to extract relevant facial features, such as eye movements, muscle tension, and variations in skin tone. Machine learning algorithms, such as convolutional neural networks, can be employed to train the model using a dataset of labeled stress levels. The model learns the patterns and correlations between the extracted features and stress levels, enabling it to predict stress levels for new input images. This research aims to contribute to the development of automated systems that can accurately and non-intrusively monitor and manage stress in the workplace, ultimately promoting a healthier and more productive work environment for IT professionals. Stress is a prevalent issue among IT professionals due to factors such as high workload, tight deadlines, and constant technological changes. Traditional methods for detecting stress often rely on self-reported surveys and questionnaires, which can be subjective and inconsistent.Image processing and machine learning offer a more objective and automated approach to detecting stress. This involves analyzing visual and physiological cues captured through images. he modern IT workplace is often marked by intense workloads, tight deadlines, and constant technological changes, leading to significant stress among professionals. If left unaddressed, such stress can negatively impact employees' well-being and job performance. Traditional stress detection methods, relying on self-reported surveys, often lack objectivity and consistency. This research proposes an innovative solution using image processing and AI to detect and assess stress levels non-intrusively. By capturing facial expressions through workplace webcams, features such as eye movements, muscle tension, and skin tone variations are extracted and analyzed.

1.2 INTRODUCTION

Stress detection and management have become crucial in the modern workplace, particularly for IT professionals who spend prolonged hours in front of screens. This paper presents a novel approach leveraging image processing and machine learning to monitor and evaluate the emotional states of IT employees, aiming to foster a healthier and more productive work environment. By identifying stress levels, providing effective solutions, and creating a flexible workplace, the system aspires to enhance employee well-being and performance. With a focus on developing a reliable and accurate detection mechanism, the research outlines specific objectives such as analyzing stress symptoms, assessing stress thresholds, and offering personalized interventions for stress relief. The system also incorporates a secure login for users and administrators, ensuring privacy while facilitating seamless use. This study underscores the potential of advanced technologies in promoting workplace wellness and setting new standards for stress management in the IT industry..

1.3 PROBLEM STATEMENT

The proposed system focuses on leveraging image processing and machine learning techniques to detect stress levels in IT professionals accurately and efficiently. By analyzing physiological signals such as heart rate and respiration, along with facial expressions captured through images, the system aims to identify signs of stress. Its primary objective is to provide real-time, non-invasive stress detection, allowing for timely intervention and support to enhance the mental well-being and productivity of IT professionals. This innovative solution will offer periodic stress analysis and personalized recommendations for stress management based on the detected levels. Designed to be user-friendly and unobtrusive, the system integrates seamlessly into the daily routines of IT professionals, offering a practical and effective approach to addressing workplace stress. The development of such a system presents a significant challenge in ensuring automatic, accurate, and reliable detection, but it holds immense potential for transforming stress management in the IT sector.

1.4 MOTIVATION

The demanding nature of IT work often subjects professionals to high levels of stress, driven by tight deadlines, long hours, and the continuous need to adapt to rapidly evolving technologies. Chronic stress among IT professionals can result in burnout, reduced productivity, and various health issues. Early detection of stress is crucial, as it enables timely intervention and support. Organizations can provide essential resources, such as counseling, stress management programs, and workload adjustments, to assist employees in managing stress effectively. Traditional methods of stress detection, like questionnaires and interviews, are often intrusive and time-consuming. In contrast, image processing and machine learning techniques offer a non-invasive approach, analyzing facial expressions and physiological signals to enable real-time stress monitoring without disrupting workflow. The implementation of such stress detection systems can significantly enhance workplace well-being by promoting employee health, fostering a supportive work environment, increasing job satisfaction, and reducing employee turnover. Furthermore, the development of these systems contributes to advancements in mental health technology, driving innovation and encouraging interdisciplinary collaborations. The economic benefits for organizations are also noteworthy, as lower stress levels lead to improved productivity, reduced absenteeism, and decreased healthcare expenses related to stress-induced illnesses.

1.5 SCOPE

The proposed system primarily targets IT professionals working in diverse environments, including traditional offices, remote setups, and hybrid workplaces, given the high levels of stress prevalent in this industry. To achieve accurate stress detection, the project will analyze a variety of physiological and behavioral indicators, such as facial expressions, eye movements, and skin tone changes, which can be effectively captured using image processing techniques. Advanced image processing methods, including facial recognition, feature extraction, and emotion detection algorithms, will be utilized to extract and interpret features from images and video frames. The machine learning models developed for this system will incorporate both supervised and unsupervised learning algorithms, leveraging techniques like convolutional neural networks (CNNs) and support vector machines (SVMs) for precise stress level prediction. A comprehensive dataset of images and videos will be collected from IT professionals in stress-inducing scenarios,

annotated with corresponding stress levels, to train and validate these models. Furthermore, the system is designed to operate in real-time, delivering immediate feedback on stress levels, which requires the integration of efficient processing algorithms and robust hardware capable of handling real-time data streams. By focusing on these aspects, the system aims to provide a non-invasive, reliable solution for stress monitoring and management.

CHAPTER 2

LITERATURE REVIEW

2.1 Stress and anxiety detection using facial cues from videos

Author(s): G. Giannakakis

This study develops a framework for the detection and analysis of stress/anxiety emotional states through video-recorded facial cues. A thorough experimental protocol was established to induce Volume 13, Issue 07, July 2023 ISSN 2457-0362 Page 1229 systematic variability in affective states (neutral, relaxed and stressed/anxious) through a variety of external and internal stressors. The analysis was focused mainly on non-voluntary and semi-voluntary facial cues in order to estimate the emotion representation more objectively. Features under investigation included eye-related events, mouth activity, head motion parameters and heart rate estimated through camera-based photoplethysmography. A feature selection procedure was employed to select the most robust features followed by classification schemes discriminating between stress/anxiety and neutral states with reference to a relaxed state in each experimental phase. In addition, a ranking transformation was proposed utilizing self reports in order to investigate the correlation of facial parameters with a participant perceived amount of stress/anxiety. The results indicated that, specific facial cues, derived from eye activity, mouth activity, head movements and camera based heart activity achieve good accuracy and are suitable as discriminative indicators of stress and anxiety

2.2 Detection of Stress Using Image Processing and Machine Learning Techniques

Author: Nisha Raichur

Stress is a part of life it is an unpleasant state of emotional arousal that people experience in situations like working for long hours in front of computer. Computers have become a way of life, much life is spent on the computers and hence we are therefore more affected by the ups and downs that they cause us. One cannot just completely avoid their work on computers but one can at least control his/her usage when being alarmed about him being stressed at certain point of time. Monitoring the emotional status of a person who is working in front of a computer for longer duration is crucial for the safety of a person. In this work a real time non-intrusive videos are captured, which detects the emotional status of a person by analyzing the facial expression. We detect an individual emotion in each video frame and the decision on the stress level is made in

sequential hours of the video captured. We employ a technique that allows us to train a model and analyze differences in predicting the features. Theano is a python framework which aims at improving both the execution time and development time of the linear regression model which is used here as a deep learning algorithm. The experimental results show that the developed system is well on data with the generic model of all ages.

2.3 Machine Learning Techniques for Stress Prediction in Working Employees.

Author:U.S.Reddy

Stress disorders are a common issue among working IT professionals in the industry today. With changing lifestyle and work cultures, there is an increase in the risk of stress among the employees. Though many industries and corporates provide mental health related schemes and try to ease the workplace atmosphere, the issue is far from control. In this paper, we would like to apply machine learning techniques to analyze stress patterns in working adults and to narrow down the Volume 13, Issue 07, July 2023 ISSN 2457-0362 Page 1230 factors that strongly determine the stress levels. Towards this, data from the OSMI mental health survey 2017 responses of working professionals within the tech-industry was considered. Various Machine Learning techniques were applied to train our model after due data cleaning and preprocessing. The accuracy of the above models was obtained and studied comparatively. Boosting had the highest accuracy among the models implemented. By using Decision Trees, prominent features that influence stress were identified as gender, family history and availability of health benefits in the workplace. With these results, industries can now narrow down their approach to reduce stress and create a much comfortable workplace for their employees.

2.4 Classification of acute stress using linear and non-linear heart rate variability analysis

Author : Sorensen . H.B

Chronic stress detection is an important factor in predicting and reducing the risk of cardiovascular disease. This work is a pilot study with a focus on developing a method for detecting short-term psychophysiological changes through heart rate variability (HRV) features.The highest recognition rates were acquired for the neutral stage for each subject was found to be an important factor for

The purpose of this pilot study is to establish and to gain insight on a set of features that could be used to detect psychophysiological changes that occur during chronic stress. This study elicited four different types of arousal by images, sounds, mental tasks and rest, and classified them using linear and non-linear HRV features from electrocardiograms (ECG) acquired by the wireless wearable Patch recorder. The highest recognition rates were acquired for the neutral stage (90%), the acute stress stage (80%) and the baseline stage (80%) by sample entropy, detrended fluctuation analysis and normalized high frequency features. Standardizing non-linear HRV features for each subject was found to be an important factor for the improvement of the classification

2.5 Mood recognition at work using smartphones and wearable sensors

Author : Vatsikas.S

Stress, anxiety and depression in the workplace are detrimental to human health and productivity with significant financial implications. Recent research in this area has focused on the use of sensor technologies, including smartphones and wearables embedded with physiological and movement sensors. In this work, we explore the possibility of using such devices for mood recognition, focusing on work environments. We propose a novel mood recognition framework that is able to identify five intensity levels for eight different types of moods every two hours. We further present a smartphone app ('Healthy Office'), designed to facilitate self-reporting in a structured manner and provide our model with the ground truth. We evaluate our system in a small-scale user study where wearable sensing data is collected in an office environment. Our experiments exhibit promising results allowing us to reliably recognize various classes of perceived moods

CHAPTER 3

PROPOSED SYSTEM

The proposed system is designed to replace manual processes in the existing site with advanced computerized operations, utilizing technological advancements to improve overall organizational efficiency. By incorporating a fully centralized system, it streamlines operations and ensures cohesive management of data and processes. The system is tailored to provide an interactive and user-friendly interface, allowing users to access and retrieve information effortlessly, from any location and at any time. This accessibility not only enhances flexibility but also promotes seamless communication and coordination across various levels of the organization. Furthermore, the system focuses on delivering precise and timely information, which is essential for effective decision-making, administration, and strategic planning. By addressing key challenges associated with manual processes, the system significantly contributes to user satisfaction, as it simplifies workflows, reduces errors, and ensures a smoother experience. Overall, this innovation stands to transform the operational framework of the organization, fostering increased productivity, efficiency, and satisfaction among users The proposed system is to computerize all the manual activities in the existing site. As the rows we must adopt the advantages of the technologies to our organization. Advantages of Proposed System

3.1 Fully centralized systm

A fully centralized system offers a cohesive and streamlined approach to managing and accessing data across an organization. By consolidating all processes and information into a single, unified platform, it ensures seamless communication and coordination among various departments and stakeholders. This centralized framework not only enhances efficiency but also simplifies decision-making, as all necessary data and insights are readily available in one place. It eliminates redundancies and minimizes errors that often arise from decentralized operations, fostering a more reliable and accurate system. Additionally, a fully centralized system promotes transparency and accountability, as all activities and updates are systematically recorded and easily monitored. Its robust infrastructure supports scalability, making it adaptable to the growing needs of an organization. By providing a comprehensive solution, this system improves overall productivity, fosters collaboration, and empowers organizations to operate more effectively in a dynamic environment.

3.2 Interactive and user-friendly environment

An interactive and user-friendly environment plays a pivotal role in ensuring the efficient functionality and widespread adoption of any system. By designing an interface that is intuitive and engaging, users can easily navigate through the system without requiring extensive training or technical expertise. Such an environment enhances the overall user experience by providing seamless access to features and information, allowing users to complete tasks effortlessly. It fosters active participation and encourages interaction, ensuring that users feel confident and in control while using the system. Moreover, the user-friendly design reduces the likelihood of errors and misunderstandings, streamlining workflows and improving productivity. This type of environment promotes inclusivity, making it accessible to users with diverse backgrounds and varying levels of proficiency. By prioritizing simplicity, responsiveness, and interactivity, organizations can create a system that not only fulfills its intended purpose but also delivers an exceptional user experience, ultimately contributing to greater satisfaction and efficiency.

3.3 Information can be retrieved from anywhere and at anytime

The ability to retrieve information from anywhere and at any time has revolutionized modern systems, providing unparalleled convenience and efficiency for users. This feature ensures seamless access to critical data, enabling individuals to work and make informed decisions regardless of their physical location or time constraints. By breaking down traditional barriers to information retrieval, it fosters a dynamic and flexible environment where users can stay connected and productive in real-time. This accessibility is particularly valuable in today's fast-paced world, where quick responses and adaptability are key to success. The capability to access information remotely also enhances collaboration, allowing teams to share insights and updates effortlessly, regardless of geographical boundaries. Furthermore, it promotes transparency and accountability, as users can consistently stay updated with the latest data and developments. In essence, this feature empowers users to operate with greater autonomy and efficiency, redefining how information is utilized in organizational and personal contexts.

CHAPTER 4
METHODOLOGY

This research aims to design a dependable and precise stress detection system specifically tailored for IT professionals, utilizing advanced image processing and machine learning technologies. The primary objective of the system is to monitor the emotional states of individuals who spend extended hours in front of computer screens, a common scenario in IT workplaces. By detecting signs of stress at an early stage, the system seeks to provide timely interventions and solutions, thereby contributing to a more comfortable and accommodating workplace environment. The overarching goal of this approach is to create a healthier and more adaptable workspace that prioritizes the mental well-being of employees, enabling them to perform at their best during working hours. This initiative not only emphasizes stress identification and management but also highlights the importance of fostering productivity and enhancing the overall workplace experience for IT professionals through the integration of cutting-edge technological solutions.

Key features include:

1. **User and Admin Login System:** Both users and administrators can log in using unique credentials. Duplicate usernames are restricted to ensure secure access.

2. **Stress Evaluation:** The system observes physiological and behavioral symptoms to estimate stress levels.

3. **Stress Management Solutions**: The system offers tailored treatments and strategies to help users effectively manage their stress.

CHAPTER 5
SYSTEM ARCHITECTURE

The stress sensing system operates through three distinct modules, each contributing to the effective identification and management of stress levels. The first module focuses on employee registration, ensuring that users are securely enrolled into the system. This module also handles the delivery of notifications and presents questionnaires designed to gather initial insights into the employee's emotional state. The second module is centered on image processing, where captured images are translated into coordinates and subsequently mapped for detailed analysis. These mapped images are then evaluated to determine stress levels based on facial expressions and physiological indicators. Finally, the third module processes the collected data by converting it into binary values, which are crucial for precise stress level determination. Based on the analysis, this module offers suitable remedies to help alleviate stress. By integrating these three interconnected modules, the system delivers a comprehensive solution for real-time stress detection and management, promoting well-being and productivity in the workplace.

Illustrates the stress sensing system's operation. The system has three modules, and the first one registers the employee, sends notifications, and later offers questionnaires. A second module deals with images. Image capture is followed by image translation to coordinates, image mapping, and stress evaluation. The third module converts data to binary values, which Stress level is determined, and a remedy is determined made available for reducing stress

H/W SYSTEM REQUIREMENT

Microprocessor Types	: inteli3 and above
Processor speed	: 2.5 GHZ
Random Access Memory	: 4 GB
Hard Disk Memory	: 500 GB
Monitor	: SVGA Color
Keyboard	: Standard Keyboard
Mouse	: Standard Scroll Mouse

S/W SYSTEM REQUIREMENTS

Operating Environment	: Windows /Linux
Front End	: Python, HTML, PHP
Framework	: Django
Back End	: MySQL
Designing Tool	: Dreamweaver

CHAPTER 6
MODULES

The main modules present in the system:

1 Admin

2 Doctor

2 User

6.1 ADMIN

The first module of the stress sensing system is focused on the registration of administrators, granting them secure and centralized access to the data of IT employees. This module serves as the foundation of the system, enabling administrators to oversee and manage all activities within the application efficiently. Through the registration process, administrators are provided with unique credentials, ensuring secure access and preventing unauthorized entry. Once registered, administrators can utilize their access to monitor employee stress levels, evaluate data trends, and implement strategies for effective stress management. This module is designed to facilitate the management of every aspect of the application, including user registration, delivery of stress-related questionnaires, notifications, and monitoring stress evaluation results. It empowers administrators with tools to analyze stress metrics, generate comprehensive reports, and take timely actions to support the mental well-being of employees. By integrating robust management features, the first module plays a critical role in ensuring the seamless operation and success of the stress detection system.

6.2. DOCTOR

The second module of the stress sensing system is dedicated to involving a doctor or medical professional to ensure precise evaluation and personalized intervention for stress management. This module enables the doctor to receive the user's stress level data, which is assessed through advanced image processing and machine learning techniques. Based on this analysis, the doctor provides tailored remedies and actionable recommendations to help users manage and reduce their stress effectively. In addition to offering real-time solutions, the module allows the doctor to access the user’s past health documents and stress-related history, ensuring a comprehensive understanding of the user's well-being. This holistic approach enables the doctor to consider previous health conditions, trends, and any recurring stress patterns while devising personalized

remedies. By integrating the expertise of medical professionals, the third module adds a critical layer of reliability, accuracy, and care to the system, ensuring users receive well-informed, timely, and effective support to enhance their mental health and overall productivity.

6.3. USER

The second module of the stress sensing system is designed specifically for IT employees, enabling them to log into the system securely using their credentials. This login feature ensures that each employee has individualized access to the platform and its functionalities. Once logged in, employees can utilize the integrated webcam feature to capture real-time images for stress analysis. The system processes these images using advanced image processing techniques to assess stress levels based on physiological indicators and facial expressions. Additionally, employees gain access to their health-related data, allowing them to track their stress metrics and observe patterns over time. This feature empowers employees to take proactive measures to manage their stress by providing clear insights into their emotional state and physical well-being. By combining secure login access with cutting-edge stress detection capabilities, the second module ensures user convenience, reliability, and a seamless experience that supports workplace wellness and productivity.

CHAPTER 7
DIAGRAM

DFD LEVEL 0

DATA FLOW DIAGRAM

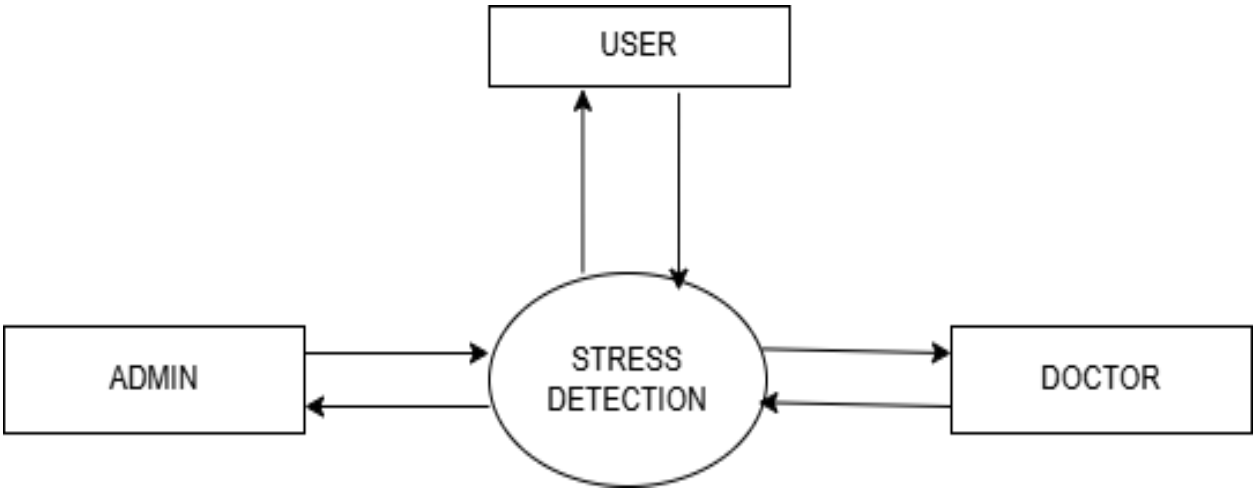


Fig 7.1

DFD LEVEL 1(ADMIN)

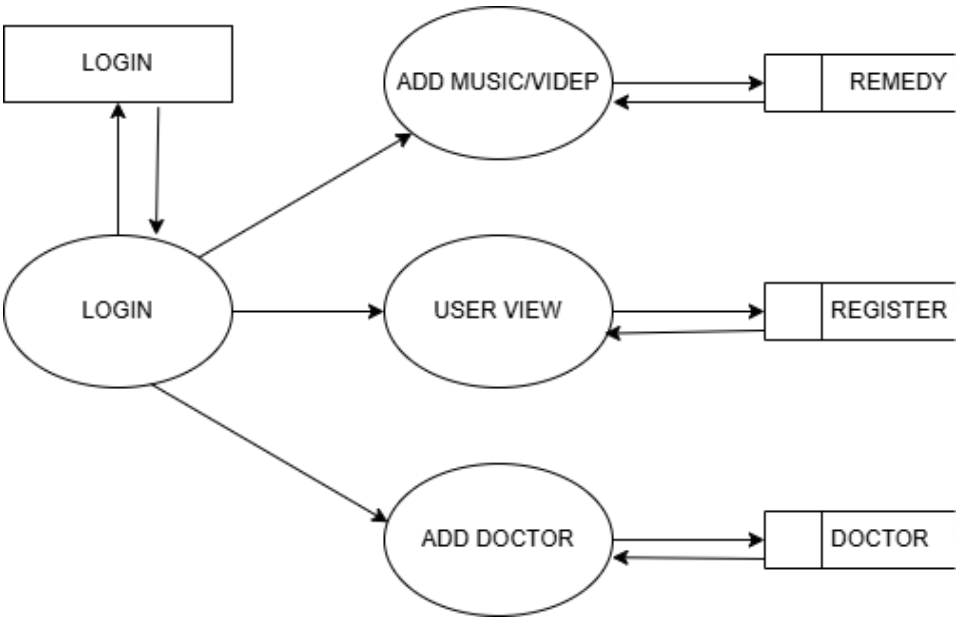


Fig 7.2

DFD LEVEL 1 (DOCTOR)

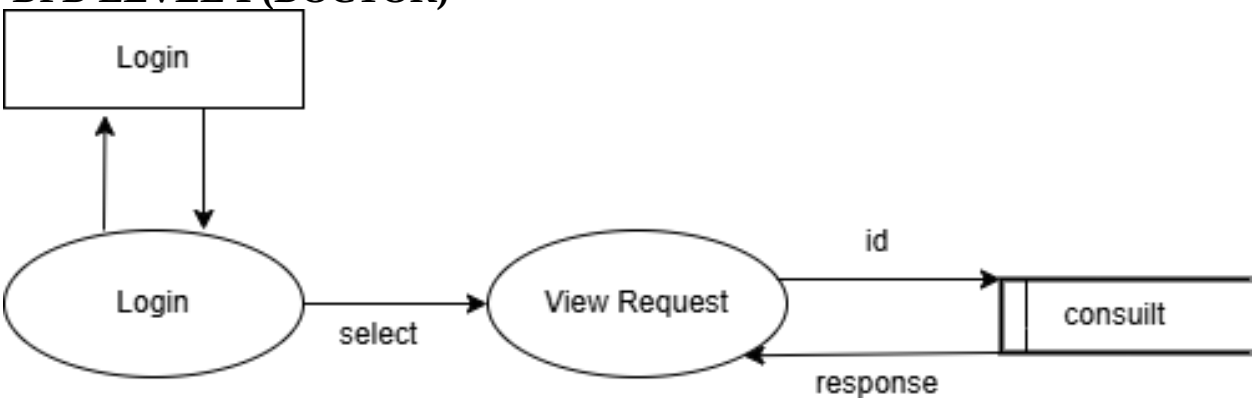


Fig 7.3

DFD LEVEL 1 (USER)

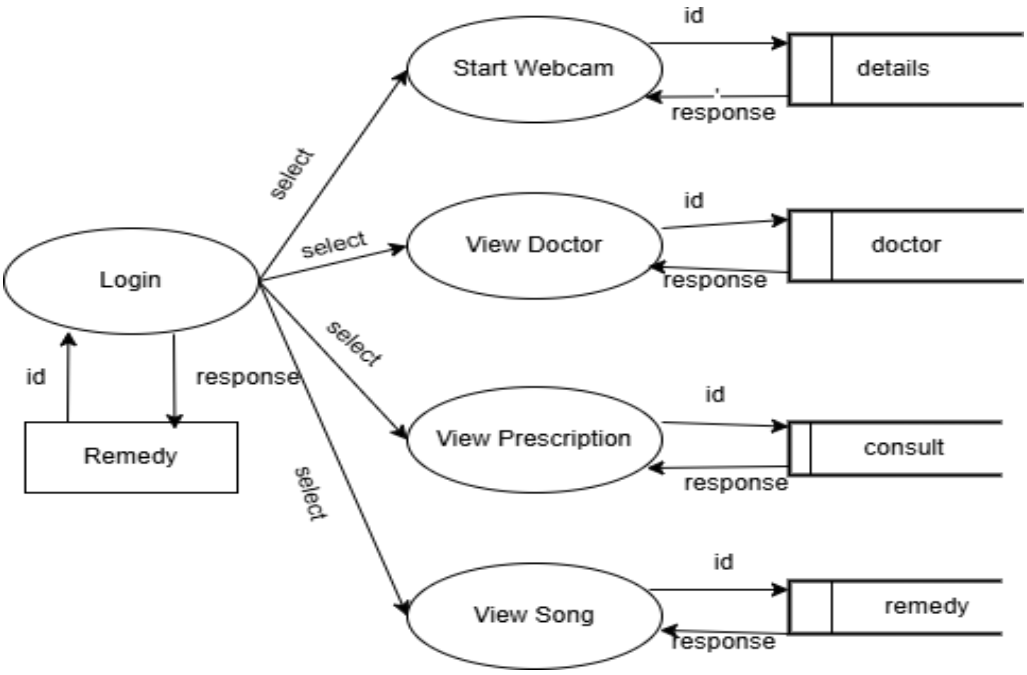


Fig 7.4

USECASE DAIGRAM

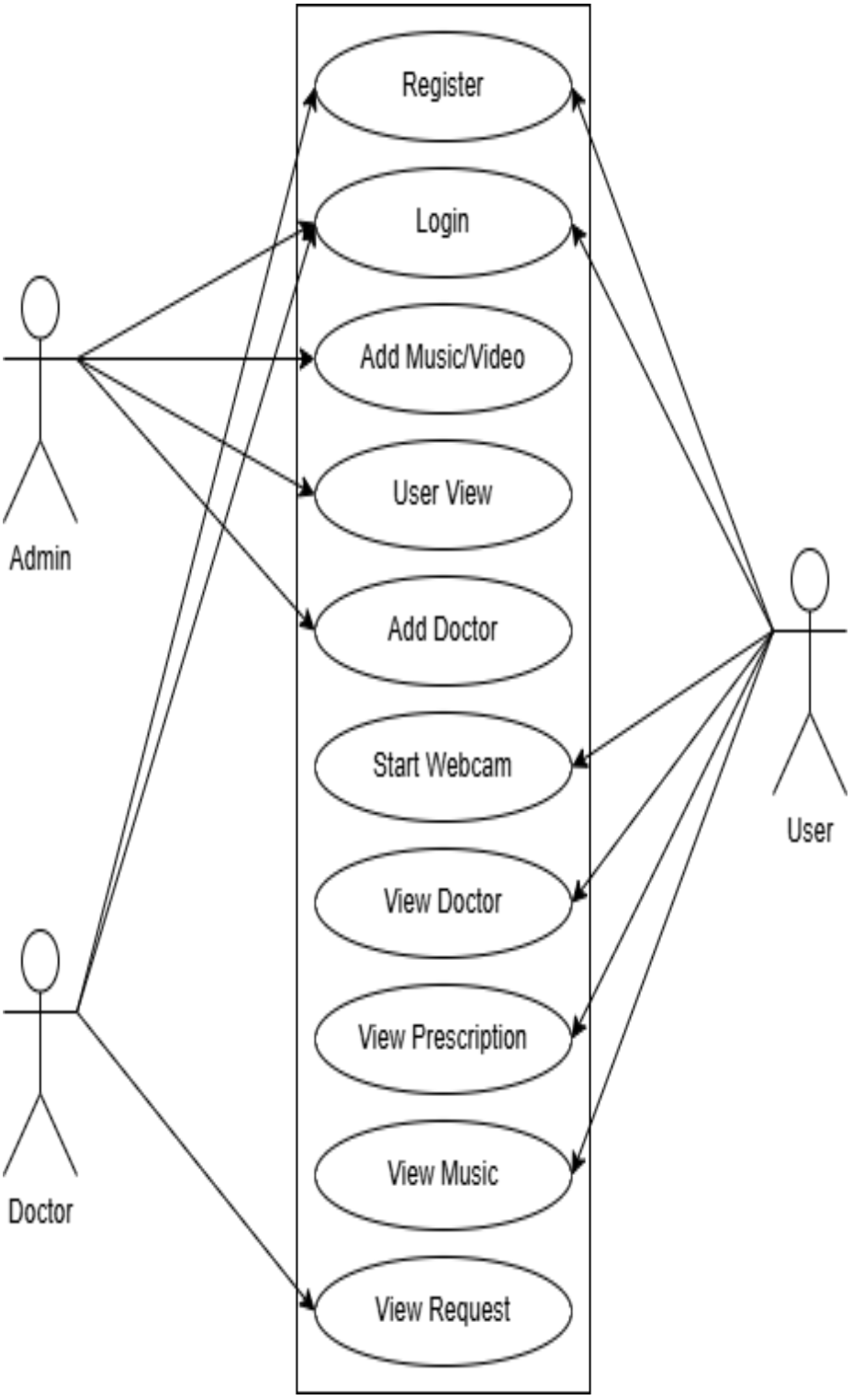


Fig 7.5

CHAPTER 8

ADVANTAGES & DISDVANTAGES

1 Non-Invasive Monitoring:

- Detects stress without physical contact, ensuring comfort for employees.

2 Real-Time Analysis:

- Provides instant feedback on stress levels, enabling timely interventions.

3 Cost-Effective:

- Reduces the need for expensive medical equipment or frequent health check-ups.

4 Scalability:

- Can be deployed across large organizations to monitor multiple employees simultaneously.

5 Objective Measurement:

- Eliminates subjectivity associated with self-reported stress assessments.

6 Early Detection:

- Identifies stress at an early stage, preventing long-term health issues.

7 Improved Productivity:

- Helps organizations address stress-related productivity losses proactively.

8 Personalized Insights:

- Tailors stress management strategies based on individual stress patterns.

9 Integration with Workplace Systems:

- Can be integrated with existing workplace tools (e.g., cameras, wearables).

10-Driven Decisions:

- Provides actionable insights for HR and management to improve workplace policies.

11 Enhanced Employee Well-Being:

- Promotes a healthier work environment by addressing stress proactively.

12 Reduced Absenteeism:

- Early stress detection can reduce stress-related absenteeism and burnout.

13Privacy Compliance:

- Can be designed to anonymize data, ensuring employee privacy.

14 Continuous Monitoring:

- Offers 24/7 stress monitoring without disrupting work routines.

15 Innovative Approach:

- Leverages cutting-edge technology (AI and image processing) for modern workplace

16 Enhanced Mental Health:

- By identifying stress early, the system can help employees address and reduce stress, promoting better overall mental well-being.

17 Improved Productivity:

- Detecting and managing stress leads to a healthier work environment, enabling IT professionals to perform more effectively during working hours.

DISADVANTAGES

1 Privacy Concerns:

- Employees might feel uncomfortable being monitored constantly.

2 Data Security:

- Risk of sensitive information being exposed or misused.

3 Cost of Implementation:

- High initial investment for setting up the system.

4 Data Accuracy:

- Image processing might not accurately capture subtle signs of stress**.**

5 False Positives/Negatives:

- Incorrectly identifying stress levels can lead to unnecessary interventions or missed signs.

6 Complexity:

- Requires sophisticated algorithms and expertise to implement effectively.

7 Bias in Algorithms:

- Potential for biased results if the training data is not representative.

8 Dependence on Technology:

- Over-reliance on technology can overlook other important factors.

9 Limited Interpretability:

- Machine learning models can be complex and difficult to interpret.

10 Challenges:

- Difficulty in integrating with existing systems and workflows.

11 User Acceptance:

- Employees may resist using the technology if they perceive it as intrusive.

12 Maintenance:

- Requires regular updates and maintenance to ensure accuracy and reliability.

13 Scalability:

- Challenges in scaling the system to accommodate large organizations.

14 Ethical Concerns:

- Ethical dilemmas related to surveillance and employee autonomy.

15 Limited Scope:

- May not address all dimensions of stress, as stress is multifaceted and influenced by various factors.

16 Privacy Concerns:

- Monitoring emotional states and stress levels may feel intrusive to some employees, raising issues around data privacy and consent.

17 Data Security Risks:

- Storing and analyzing sensitive personal data, such as facial expressions or physiological signals, poses risks of data breaches or misuse

CHAPTER 9
TESTING

It seems like you are working on a fascinating project that uses image processing and machine learning to detect and manage stress among IT professionals. If you're referring to testing the system, here are some potential steps or methods you could consider:

Dataset Collection:

- Ensure you have a comprehensive dataset of images and emotional indicators, annotated with stress levels to train and test your model.

Model Testing:

- Test the accuracy of your machine learning model with the validation dataset. Common metrics include precision, recall, F1 score, and overall accuracy.

User Testing:

- Allow IT professionals to use the system and provide feedback about its practicality and accuracy in detecting their stress levels.

Stress Threshold Validation:

- Compare the detected stress levels with manual observations or expert evaluations to verify accuracy.

CHAPTER 10
CONCLUSION

Conclusion

Stress Detection System is designed to predict stress in the employees by monitoring captured images of authenticated users which makes the system secure. The image capturing is done automatically when the authenticate user is logged in based on some time interval. The captured images are used to detect the stress of the user based on some standard conversion and image processing mechanisms. Then the system will analyze the stress levels by using Machine Learning algorithms which generates the results that are more efficient. The study "Stress Detection in IT Professiona by Image Processing and Machine Learning" has demonstrated the potential of using image processing and machine learning techniques for stress detection in IT professionals. The results showed that these techniques could accurately detect stress levels with a high level of accuracy, highlighting the potential for non-invasive methods to identify and manage stress levels in the workplace more effectively. The use of image processing algorithms to extract relevant features related to stress from facial images is an innovative approach that can provide insight into an individual's stress levels. The use of machine learning models, such as support vector machines and random forests, to predict stress levels based on these features is a powerful tool that can improve stress management in the workplace.

One of the key advantages of using these techniques for stress detection is the non-invasive nature of the approach. Traditional methods of measuring stress levels, such as self-reporting or physiological measurements, can be invasive and time-consuming. By contrast, facial image processing and machine learning techniques can provide a quick and easy way to detect stress levels without requiring any physical contact with the individual. The findings of this study have implications for the management of stress in the workplace, particularly in high-stress industries such as IT. The ability to quickly and accurately detect stress levels in employees can enable employers to implement interventions to reduce stress levels, such as providing additional support or adjusting workload. This, in turn, can lead to improved employee well-being, reduced absenteeism, and increased productivity.

In conclusion, the study "Stress Detection in IT Professionals by Image Processing and Machine Learning" has demonstrated the potential of using non-invasive techniques for stress detection in the workplace.

CHAPTER 11
APPENDICES

Index.html

```
{% load static %}
{% block content %}
{% include "header.html" %}


  <!-- header section end -->
  <!-- banner section start -->
  <div class="banner_section layout_padding">
     <div id="my_Controls" class="carousel slide" data-ride="carousel">
 <div class="carousel-inner">
  <div class="carousel-item active">
   <div class="container">
       <div class="banner_taital">
          <h1 class="find_text">CALMNESS IS THE CRADLE OF POWER</h1>
          <h2 class="crush_text">Get active</h2>
          <p class="long_text">Virtually any form of physical activity can act as a stress reliever.
Even if you're not an athlete or you're out of shape,
          exercise can still be a good stress reliever</p>
       </div>
       <div class="contact">
       </div>
     </div>
  </div>
  <div class="carousel-item">
   <div class="container">
       <div class="banner_taital">
          <h1 class="find_text">CALMNESS IS THE CRADLE OF POWER</h1>
          <h2 class="crush_text">Eat a healthy diet</h2>
         <p class="long_text">Eating a healthy diet is an important part of taking care of yourself.
Aim to eat a variety of fruits and vegetables, and whole grains.</p>
       </div>
```

```
  <div class="contact">
          </div>
       </div>
    </div>
    <div class="carousel-item">
      <div class="container">
          <div class="banner_taital">
             <h1 class="find_text">CALMNESS IS THE CRADLE OF POWER</h1>
             <h2 class="crush_text">Meditate</h2>
             <p class="long_text">During meditation, you focus your attention and quiet the stream of jumbled thoughts that may be crowding your mind and causing stress. Meditation can instill a sense of calm,
                peace and balance that can benefit both your emotional well-being and your overall health</p>
          </div>
          <div class="contact">
          </div>
       </div>
    </div>
  </div>
  <a class="carousel-control-prev" href="#my_Controls" role="button" data-slide="prev">
    <span class="carousel-control-prev-icon" aria-hidden="true"></span>
    <span class="sr-only">Previous</span>
  </a>
  <a class="carousel-control-next" href="#my_Controls" role="button" data-slide="next">
    <span class="carousel-control-next-icon" aria-hidden="true"></span>
    <span class="sr-only">Next</span>
  </a>
</div>


    </div>
    <!-- banner section end -->
    <!-- about section start -->
```

```
 <div class="about_section_2 layout_padding">
      <div class="container">
         <h1 class="about_text_2"><strong>ABOUT US</strong></h1>
          <p class="client_long_text">The general objective of the study is to propose a reliable,
convenient and accurate detection system.
</p>
      </div>
   </div>
   <div class="about_section">
      <div class="row">
         <div class="col-md-6">
            <div class="about_taital">
               <h1 class="about_text">Stress</h1>
                <p class="long_text_2">Stress is high in software profession because of their nature
of work, target, achievements, night shift, over work load. 1. To study the demographic profile of
the employees. 2. To access the level of job stress and quality of life of the respondents. 3. To study
in detail the health problems of the employees. All employees working in IT and BPO industry for
more than two years were included into the study. A detailed questionnaire of around 1000 IT and
BPO employees including their personal details, stress score by Holmes and Rahe to assess the
level of stress and master health checkup profile were taken and the results were analysed. Around
56% had musculoskeletal symptoms. 22% had newly diagnosed hypertension,10% had diabetes,
36% had dyslipidemia, 54% had depression, anxiety and insomnia, 40% had obesity. The stress
score was higher in employees who developed diabetes, hypertension and depression. Early
diagnosis of stress induced health problems can be made out by stress scores, intense lifestyle
modification, diet advice along with psychological counselling would reduce the incidence of
health problems in IT sector and improve the quality of work force.</p>
               <div class="about_bt"><a href="#">ABOUT MORE</a></div>
            </div>
         </div>
         <div class="col-md-6">
            <div class="about_img"><img src="{% static 'images/stress.jpg'%}"></div>
         </div>
      </div>
```

```
</div>
  <!-- about section end -->
  <!-- our service section start -->
  <div class="our_section layout_padding">
    <div class="container">
      <h1 class="our_text"><strong>REMEDIES</strong></h1>
      <p class="client_long_text">It is a long established fact that a reader will be distracted by the readable</p>
      <div class="row padding_top_0">
        <div class="col-lg-4">
          <div class="image_7"><a href="#"><img src="{% static 'images/meditation.png' %}"></a></div>
          <h2 class="design_text">MEDITATION</h2>
          <p class="fact_text">A Set of Guided Practices to Detoxify Anger, Fear, Stress and Passion. Learn to Manage Your Life and Your Emotions the Heartfulness Way</p>
        </div>
        <div class="col-lg-4">
          <div class="image_7"><a href="#"><img src="{% static 'images/spend.png'%}"></a></div>
          <h2 class="design_text">Spend time with friends and family</h2>
          <p class="fact_text">Social support from friends and family may help you get through stressful times and cope with stress </p>
        </div>
        <div class="col-lg-4">
          <div class="image_7"><a href="#"><img src="{% static 'images/diet.png'%}"></a></div>
          <h2 class="design_text">Follow a healthy diet </h2>
          <p class="fact_text">Studies show that people who follow a diet high in ultra-processed foods and added sugar are more likely to experience higher perceived stress levels</p>
        </div>

      </div>
```

```
  </div>
    </div>
    <!-- our service section end -->
    <!-- project section start -->

    <!-- project section end -->
    <!-- our price section start -->

    <!-- our price section end -->

    <!-- contact section start -->

    <!-- contact section end -->
     <!-- footer section start -->
{% include "footer.html" %}
{% endblock %
```

Login.html

```
{% load static %}
{% block content %}
{% include "header.html" %}

    <!-- header section end -->
    <!-- contact section start -->
    <div class="about_section_2 layout_padding">
        <div class="container">
            <h1 class="contact_text_2"><strong>LOGIN</strong></h1>

        </div>
    </div>
    {% if status %}
    <script>
      alert('{{status}}')
```

```
 </script>
  {% endif %}
  {% if msg %}
  <script>
   alert('{{msg}}')
  </script>
  {% endif %}
  <div class="contact_section ">
    <div class="row">
      <div class="col-md-12 background_bg">
        <div class="contact_bg">
          <div class="input_main">
            <div class="container">
            <h2 class="request_text">LOGIN HERE</h2>
              <form action="logint" method="POST">
              {% csrf_token %}

               <div class="form-group">
              <input type="text" required class="email-bt"placeholder="email" name="email">
               </div>

               <div class="form-group">
                  <input type="password" required class="email-bt"  placeholder="********"
name="password">
               </div>
               <center>
        <div class="col-6">
                    <button class="btn btn-danger w-100 py-3" type="submit" name="submit"
> Login</button>
                  </div></center>
              </form>
            <a style="color: white; font-size: 20px;" href="http://127.0.0.1:8000/forget">Forget
Password ?</a>
```

```
  </div>

  </div>
            </div>
          </div>

      </div>
   </div>
   <!-- contact section end -->
   <!-- footer section start -->
  {% include 'footer.html' %}

  {% endblock %}
```

Register.html

```
{% load static %}
{% block content %}
{% include "header.html" %}

   <!-- header section end -->
   <!-- contact section start -->
   <div class="about_section_2 layout_padding">
      <div class="container">
         <h1 class="contact_text_2"><strong>REGISTER</strong></h1>
      </div>
   </div>
  {% if status %}
  <script>
   alert('{{status}}')
  </script>
  {% endif %}
   <div class="contact_section ">
      <div class="row">
```

```
<div class="col-md-12 background_bg">
        <div class="contact_bg">
          <div class="input_main">
            <div class="container">
             <h2 class="request_text">REGISTER HERE</h2>
              <form action="addreg" method="POST">
        {% csrf_token %}
                <div class="form-group">
                      <input type="text" class="email-bt" required placeholder="Your Name" name="name">
                </div>
                <div class="form-group">
                <input type="email" class="email-bt" required pattern="[a-z0-9._-]+@[a-z]+\.[a-z]{2,4}$" placeholder="email" name="email">
                </div>
                <div class="form-group">
                        <input type="text" class="email-bt" required placeholder="Phone" pattern="[6789][0-9]{9}"  title="Enter 10 digit start with 6/7/8/9" name="phone">
                </div>

        <div class="form-group">
                    <input type="password" class="email-bt" required placeholder="password" title="It must contain at least one digit,one lowercase letter,one uppercase letter and at least 8 characters long." pattern="(?=.*\d)(?=.*[a-z])(?=.*[A-Z]).{8,}" name="password">
                </div>
                <center>
      <div class="col-6">
                    <button class="btn btn-danger w-100 py-3" type="submit" name="submit" value="submit"> Register</button>
                  </div></center>
              </form>
            </div>
          </div>
```

```
</div>
        </div>

      </div>
   </div>
   <!-- contact section end -->
   <!-- footer section start -->
  {% include 'footer.html' %}

  {% endblock %}
```

View.html

```
{% load static %}
{% block content %}
{% include "header.html" %}

   <!-- header section end -->
   <!-- contact section start -->
   <div class="about_section_2 layout_padding">
      <div class="container">
         <h1 class="contact_text_2"><strong></strong></h1>

           <div class="col-md-12">

                 <table class="table" width="100%">
               <tr>
               <th>User Name</th>
               <th>Date</th>
               <th>Description</th>
               <th>Currently Using Medicines</th>
               <th>View File</th>
               <th>Prescription</th>
```

```
</tr>
                {% for i in result %}

                <tr>
                <td>{{i.uid}}</td>
                <td>{{i.date}}</td>
                <td>{{i.des}}</td>
                <td>{{i.medicine}}</td>
                <td>Download: <a  href="../media/{{ i.file }}" download>{{ i.file }}</a></td>
               <td><a href="{% url 'dtt' id=i.id %}" class='btn btn-primary'>Prescription</a></td>

                </tr>
                {% endfor %}
                </table>

                                        </div></center>
    </div>
</div>

<!-- contact section end -->
<!-- footer section start -->
{% include 'footer.html' %}

{% endblock %}
```

User.html

```
{% load static %}
{% block content %}
{% include 'admin/menu.html' %}

<br><br>
        <div id="layoutSidenav_content">
            <main>
```

```
    <div class="container-fluid px-4">

<br><br>

<style>
table,th,tr,td{border:1px solid}

</style>
                    <div class="card mb-4">
                       <div class="card-header">
                          <i class="fas fa-table me-1"></i>
                          View User
                       </div>
                       <div class="card-body">
                          <table id="datatablesSimple" border="2px">
                             <thead>
                                <tr>
                                <td>NAME</td>
                                 <td>EMAIL</td>
                                 <td>PHONE</td>
                                                                  </tr>
                             </thead>

                             {% for i in res %}

                       <tr>
                                <td>{{i.name}}</td>
                                <td>{{i.email}}</td>
                                <td>{{i.phone}}</td>



                                </tr>
```

```
  {% endfor %}

                        </table>
                    </div>
                </div>
            </div>
        </main>

        <footer class="py-4 bg-light mt-auto">
            <div class="container-fluid px-4">
                <div class="d-flex align-items-center justify-content-between small">
                    <div class="text-muted"></div>
                    <div>
                    </div>
                </div>
            </div>
        </footer>

    </div>
</div>

{% include 'admin/footer.html' %}
    {% endblock%}
```

View.py

```
from django.http import HttpResponse
from django.shortcuts import render ,get_object_or_404
from django.shortcuts import redirect
from  django.core.files.storage import FileSystemStorage
from django.conf import settings
from .models import *
import pycurl
from urllib.parse import urlencode
```

```
from ML import emotions_detection
#from ML.emotion_text import emotion_text

from keras import backend as K

def sends_mail(mail,msg):

    crl = pycurl.Curl()
    crl.setopt(crl.URL, 'https://alc-training.in/gateway.php')
    data = {'email': mail,'msg':msg}
    pf = urlencode(data)

    # Sets request method to POST,
    # Content-Type header to application/x-www-form-urlencoded
    # and data to send in request body.
    crl.setopt(crl.POSTFIELDS, pf)
    crl.perform()
    crl.close()

def first(request):
    return render(request,'index.html')



def index(request):
    return render(request,'index.html')



def reg(request):
    return render(request,'register.html')



def addreg(request):
    if request.method == 'POST':
        name = request.POST.get('name')
```

```
        email = request.POST.get('email')
        phone = request.POST.get('phone')
        password = request.POST.get('password')

        if register.objects.filter(email=email).exists():
            return render(request, 'register.html', {'status': 'Email already exists. Registration failed.'})
        else:
                                    user = register(name=name, email=email, phone=phone,
password=password,status='pending')
            user.save()
            return render(request, 'register.html', {'status': 'Registration successful.'})

    return render(request, 'register.html')

def aproveuser(request,id):
    user = get_object_or_404(register, id=id)
    user.status='approved'
    user.save()
    sel=register.objects.all()
    return render(request,'admin/user.html',{'res':sel})

def rejectuserrr(request,id):
    user = get_object_or_404(register, id=id)
    user.status='rejected'
    user.save()
    sel=register.objects.all()
    return render(request,'admin/user.html',{'res':sel})

def logint(request):
    email = request. POST.get('email')
    password=request. POST.get('password')
    if email == 'admin@gmail.com' and password == 'admin':
        request.session['logintdetail'] = email
        request.session['logint'] = 'admin'
```

```
        return render(request, 'admin/index.html',{'status': 'LOGIN SUCCESSFULLY'})

    elif register.objects.filter(email=email,password=password,status='approved').exists():
        userdetails=register.objects.get(email=request.POST['email'],  password=password)
        if userdetails.password == request.POST['password']:
            request.session['uid']      =      userdetails.id
            request.session['sname'] = userdetails.name

            request.session['semail'] = email

            request.session['user'] = 'user'
            password = request.POST.get('password')



            return render(request,'index.html',{'status': 'LOGIN SUCCESSFULLY'})

    elif doctor.objects.filter(email=email,password=password).exists():
        userdetails=doctor.objects.get(email=request.POST['email'], password=password)
        if userdetails.password == request.POST['password']:
            request.session['did'] = userdetails.id
            request.session['tname'] = userdetails.name

            request.session['temail'] = email

            request.session['doctor'] = 'doctor'

            return render(request,'index.html',{'status': 'LOGIN SUCCESSFULLY'})




    else:
        return render(request, 'login.html', {'status': 'INVALID USERID OR PASSWORD'})

def login(request):
```

```
    return render(request,'login.html')

def logout(request):
    session_keys = list(request.session.keys())
    for key in session_keys:
        del request.session[key]
    return redirect(first)

def forget(request):
    return render(request,'forgetpass.html')

def forgetpassword(request):
    if request.method == "POST":
        entered_email = request.POST.get('email')

        # Check if the entered email exists in the regtable (User model)
        try:
            user = register.objects.get(email=entered_email)
            password = user.password  # Retrieve the password from the User model

            # Send the password to the user's email using the sends_mail function
            message = f'Your password For login is: {password}'

            sends_mail(entered_email, message)

             return render(request, 'login.html', {'msg': 'Your password has been sent to the registered email.'})

        except register.DoesNotExist:
            return render(request, 'login.html', {'msg': 'Entered email does not exist .'})

    return render(request, 'login.html', {'msg': 'Enter your registered email to recover your password.'})
```

```
def addremedys(request):
    if request.method == 'POST':
        emotion=request.POST.get('emotion')
        disease=request.POST.get('disease')
        user=remedy(emotion=emotion,disease=disease)
        user.save()
    return render(request,'admin/addremedy.html')



def rem(request):
    return render(request,'admin/addremedy.html')

def addmusic(request):
    if request.method == 'POST':
        name=request.POST.get('name')
        emotion=request.POST.get('emotion')
        if emotion in ['happy','surprise']:
            stress="low"
        elif emotion in ['sad','fear','neutral']:
            stress="medium"
        else:
            stress="high"
        myfile=request.FILES['music']
        fs = FileSystemStorage()
        filename = fs.save(myfile.name,myfile)
        myfile1=request.FILES['video']
        fs1 = FileSystemStorage()
        filename1 = fs1.save(myfile1.name,myfile1)
        user=remedy(name=name,emotion=emotion,music=filename,video=filename1,stress_level=
stress)
        user.save()
    return render(request,'admin/addmusic.html')
```

```
def addvideo(request):
    if request.method == 'POST':
        name=request.POST.get('name')
        emotion=request.POST.get('emotion')
        if emotion in ['happy','surprise']:
            stress="low"
        elif emotion in ['sad','fear','neutral']:
            stress="medium"
        else:
            stress="high"
        myfile=request.FILES['video']
        fs = FileSystemStorage()
        filename = fs.save(myfile.name,myfile)
        user=remedy(name=name,emotion=emotion,music=filename,stress_level=stress)
        user.save()
    return render(request,'admin/addvideo.html')

def viewstress(request):
    sel=remedy.objects.all()
    return render(request,'admin/viewremdey.html',{'res':sel})

def userview(request):
     sel=register.objects.all()
     return render(request,'admin/user.html',{'res':sel})

def dash(request):
    return render(request,'admin/index.html')

""def addup(request,id):

    sel=remedy.objects.get(pk=id)

    sel.save()
        return redirect(viewstress)
```

```
    return render(request,'admin/update.html',{'res':sel})'"

def update(request,id):
        request.session['emotion_id']=id
        return render(request,'admin/update.html')



def addup(request):
    if request.method == "POST":
            #print("hi")
            disease=request.POST.get('disease')
            sel=remedy.objects.get(id=request.session['emotion_id'])
            sel.disease=disease
            sel.save()
            return redirect(viewstress)
    return render(request,'admin/update.html')

def startwebcam(request):
    K.clear_session()
    emotion,stress_level=emotions_detection.predict()
    K.clear_session()
    Print ("the prefdicted emotion is:",emotion)
    Print ("the predicted stress level is:",stress_level)
    #user1=remedy(stress_level=stress_level)
    #user1.save()
    user=remedy.objects.filter(emotion=emotion)
    return render(request,'viewremedies.html',{'res':user})

#def text_emotion(request):
    '"if request.method=="POST":
        text_data=request.POST.get('text_data')
        K.clear_session()
        emotion,stress_level=emotion_text.predict(text_data)
        K.clear_session()
```

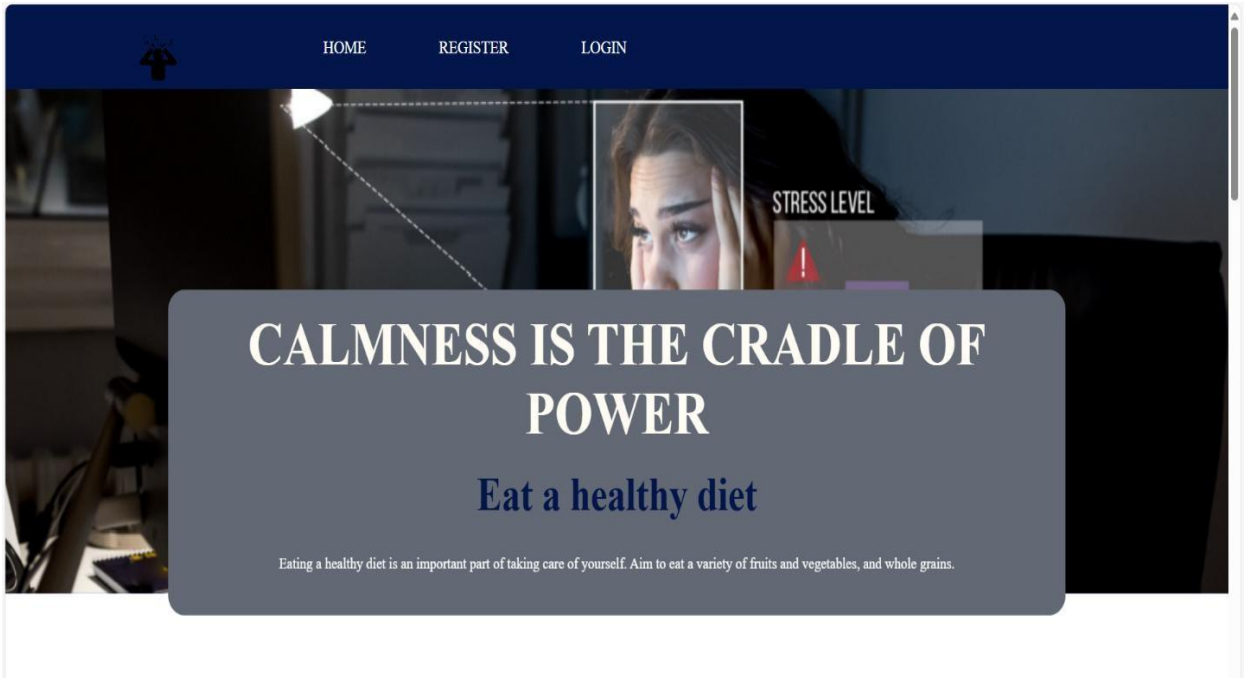
```
        print("the prefdicted emotion is:",emotion)
        print("the predicted stress level is:",stress_level)
        user=remedy.objects.filter(emotion=emotion)
        return render(request,'viewremedies.html',{'res':user})
    return render(request,'text_emotion.html')
    if request.method=="POST":
        text_data=request.POST.get('text_data')
        K.clear_session()
        emotion=emotion_text.predict(text_data)
        K.clear_session()
        print("the prefdicted emotion is:",emotion)
        user=remedy.objects.filter(emotion=emotion)
        return render(request,'viewremedies.html',{'res':user})
    return render(request,'text_emotion.html')"'



def viewuser(request):
    upd=remedy.objects.all()
    return render(request,'viewremedies.html',{'res':upd})
def adddoctor(request):
    return render(request,'admin/adddoctor.html',{'status': 'SUCCESSFULLY ADDED'})
def viewuserdoctor(request):
    sel=doctor.objects.all()
    return render(request,'viewuserdoctor.html',{'result':sel})
def consult1(request,id):
    sel=doctor.objects.get(id=id)
    return render(request,'consult.html',{'result':sel})
def addconsult(request):
    if request.method=="POST":
        des=request.POST.get('des')
        date=request.POST.get('date')
        did=request.POST.get('did')
        medicine=request.POST.get('medicine')
        uid=request.session['uid']
```

```
        file = request.FILES['file']
        fs = FileSystemStorage()
        file = fs.save(file.name,file)



        donor=consult(did=did,uid=uid,date=date,des=des,file=file,medicine=medicine,status='pend
ing')
        donor.save()
        return redirect(viewuserdoctor)
def userprescribe(request):
    sel=consult.objects.filter(uid=request.session['uid'],status='consult')
    sel1=doctor.objects.all()
    for i in sel:
        for j in sel1:
            if str(i.did)==str(j.id):
                i.did=j.name
    return render(request,'userprescribe.html',{'result':sel})
def viewuserconsult(request):
    sel=consult.objects.filter(did=request.session['did'],status='pending')
    sel1=register.objects.all()
    for i in sel:
        for j in sel1:
            if str(i.uid)==str(j.id):
                i.uid=j.name
    return render(request,'vieww.html',{'result':sel})
def dtt(request,id):
    sel=consult.objects.get(id=id)
    return render(request,'dc.html',{'result':sel})
def dconsult(request):
    if request.method == "POST":
        cid = request.POST.get('cid')
        prescription = request.POST.get('prescription')
        a = consult.objects.get(id=cid)
        did = a.did
```

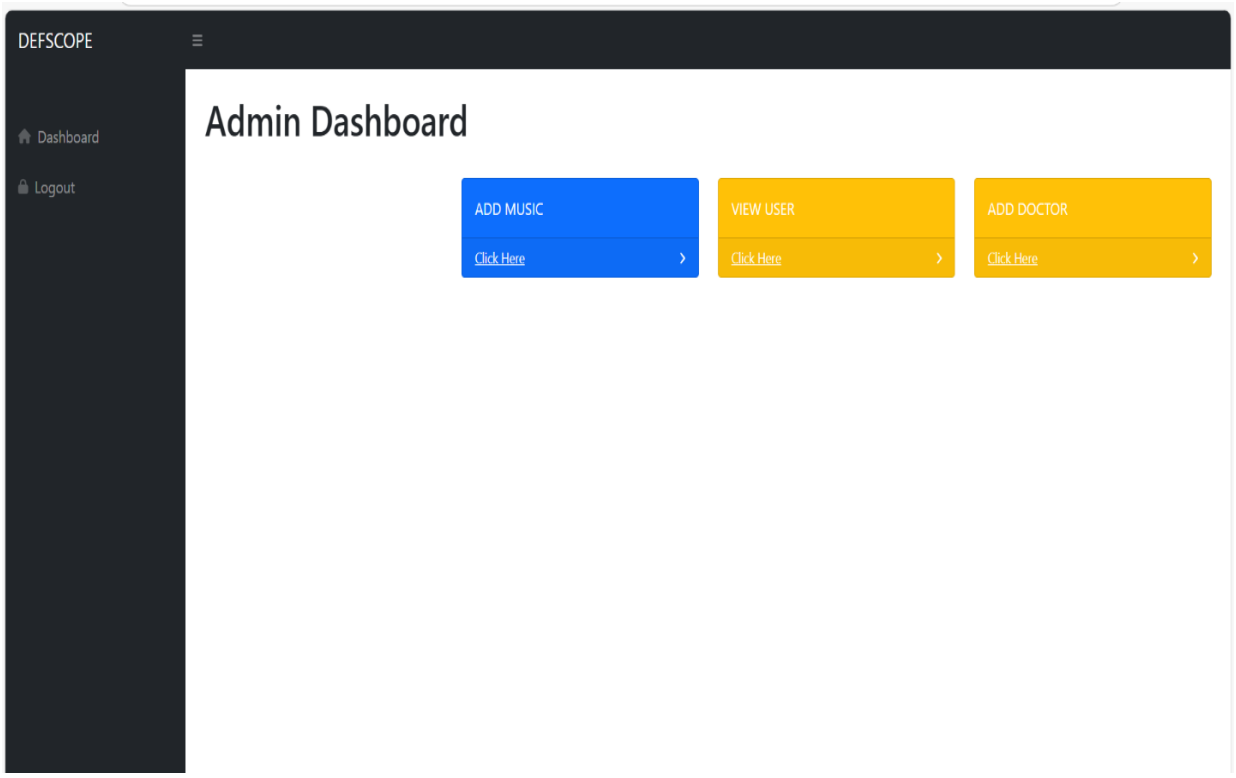
```
        uid = a.uid
        des = a.des
        date = a.date
        file = a.file
        medicine = a.medicine




        idd = a.id


            donor1 = consult(did=did, file=file, uid=uid, des=des, date=date, medicine=medicine,
prescription=prescription, status='consult', id=idd)
        donor1.save()
    return redirect(viewuserconsult)
def addd(request):
    if request.method=="POST":
        name=request.POST.get('name')
        email=request.POST.get('email')
        phone=request.POST.get('phone')
        address=request.POST.get('address')
        password=request.POST.get('password')
        age=request.POST.get('age')
        specialization=request.POST.get('specialization')
        experience=request.POST.get('experience')

         donor=doctor(specialization=specialization,experience=experience,name=name,email=emai
l,phone=phone,address=address,password=password,age=age)
        donor.save()
        return render(request,'adddoctor.html',{'status':' Successfully Added'})
```

Screenshots

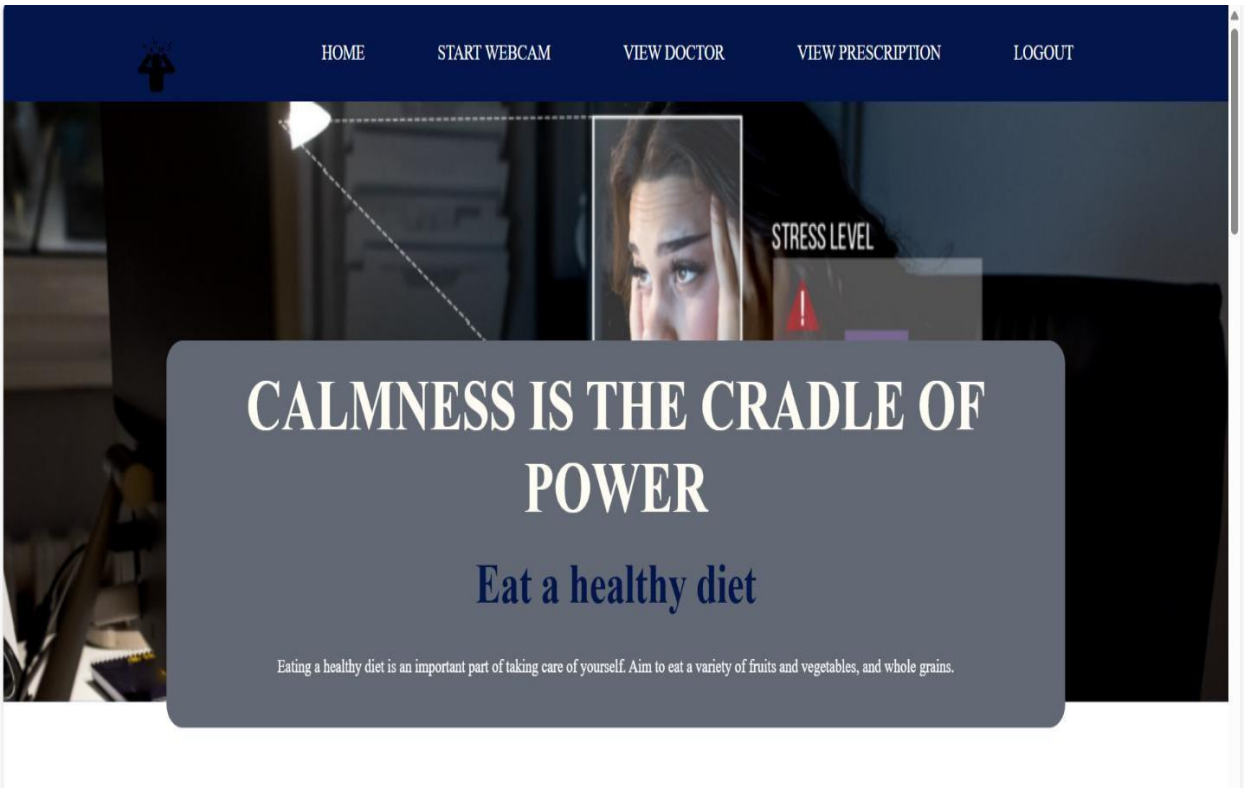
Admin (home page)



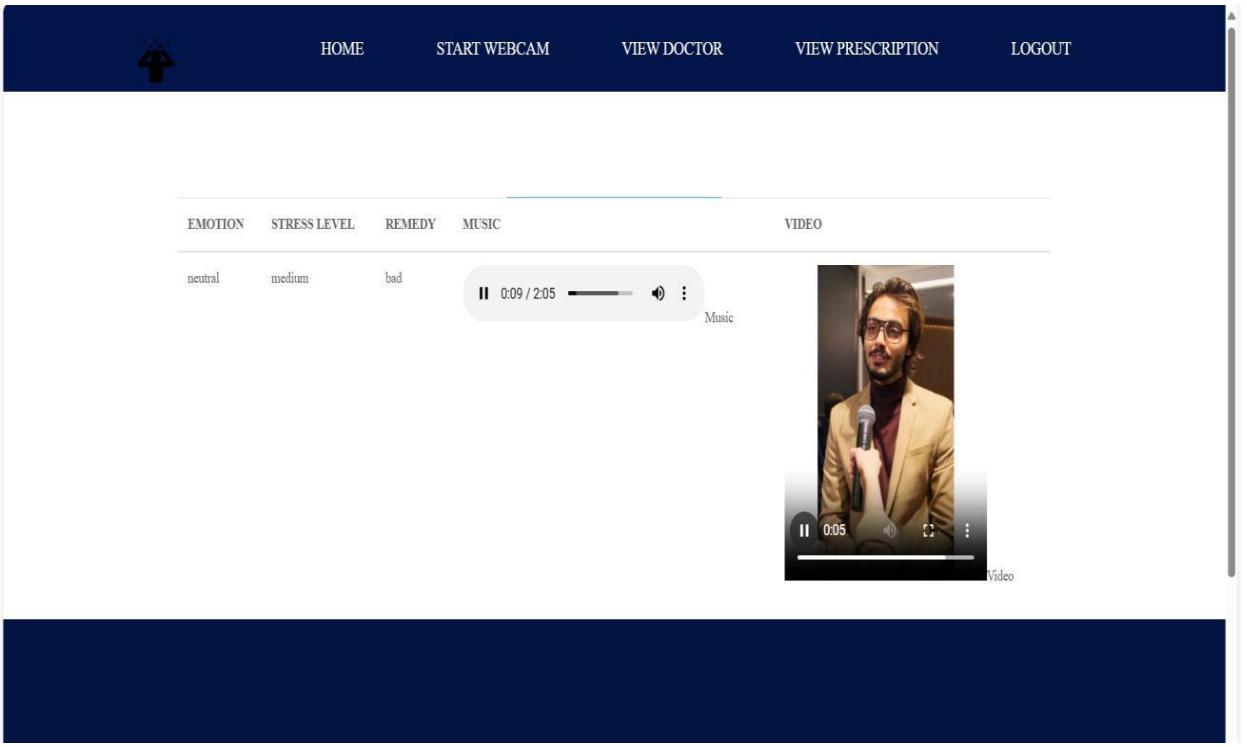
Admin View



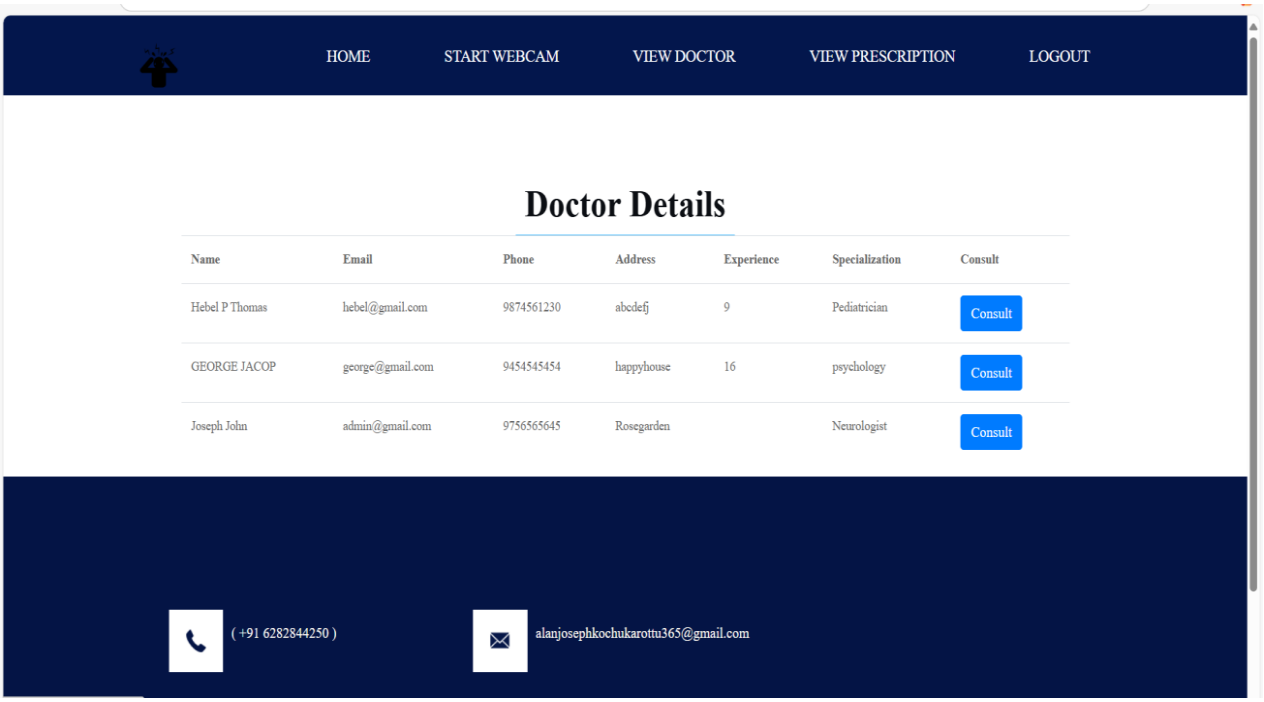
User (Home page)



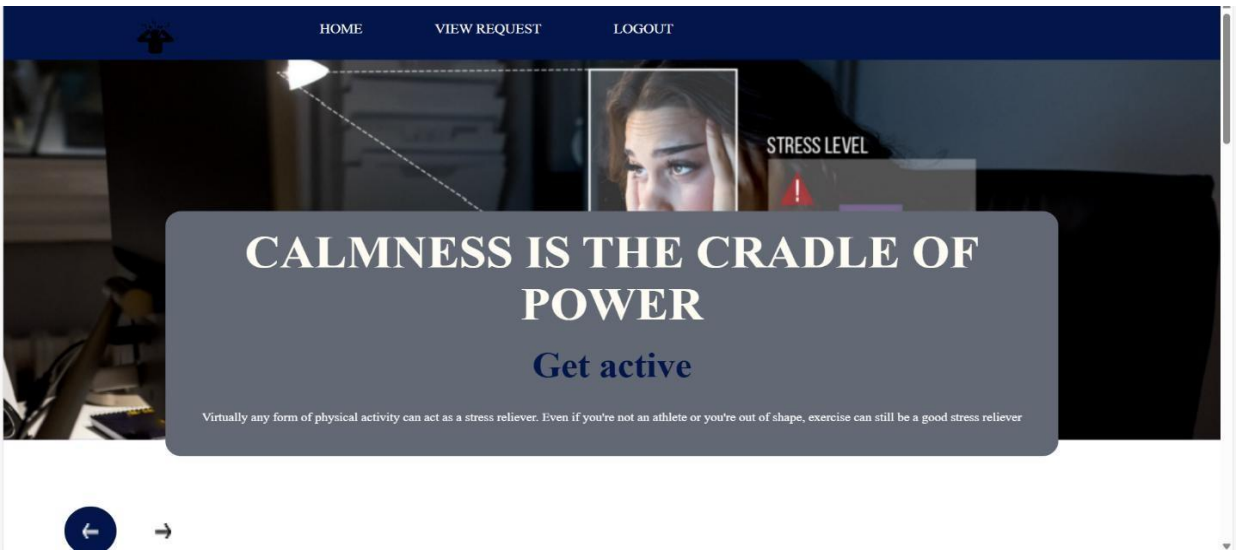
User (Webcam)



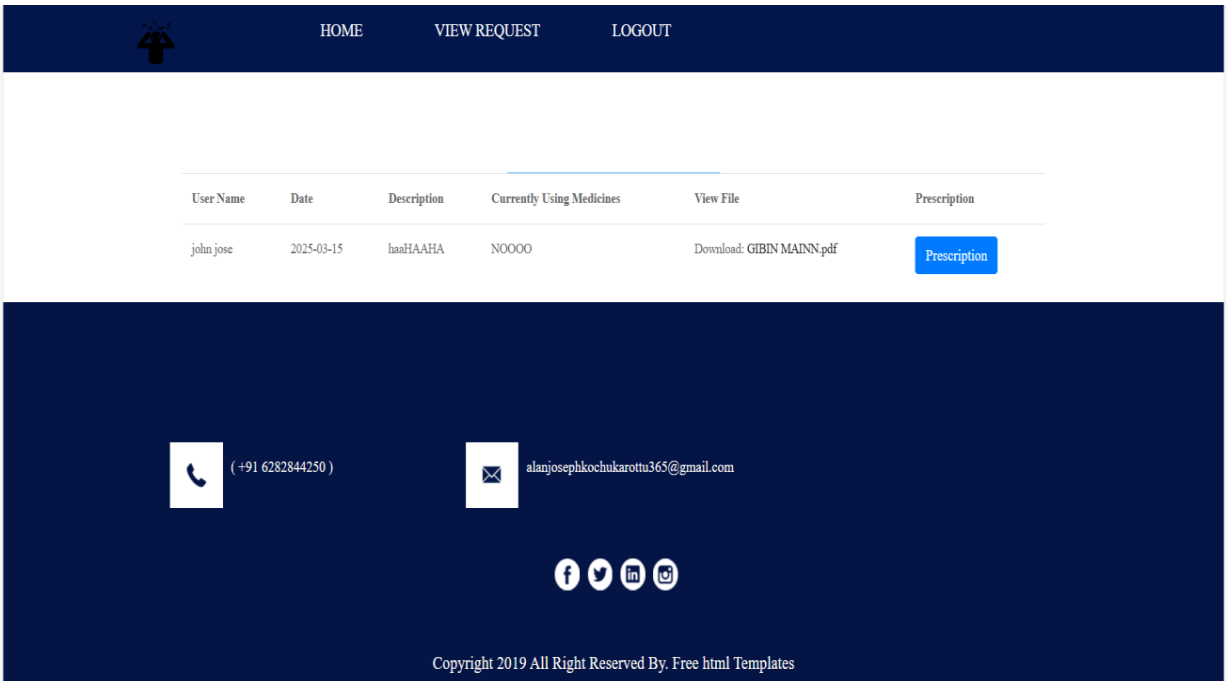
User (View doctor)



Doctor (Home Page)



Doctor (View Request)



CHAPTER 12
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PROJECT REPORT

On

STRESS DETECTION

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of

Master of Computer Applications

By

GIBIN SKARIA PHILIP (MLM23MCA-2024)

Under the Guidance of

GREESHMAMOL P KURIAN

(Assistant Professor, Dept. of Computer Applications)

DEPARTMENT OF COMPUTER APPLICATIONS

MANGALAM COLLEGE OF ENGINEERING, ETTUMANOOR

(Affiliated to APJ Abdul Kalam Technological University)

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