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Psychometric Test for Medical Consultancy System

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Abstract: ***Preliminary investigations delve into the possibility of employing chatbots in psychiatric therapy to aid behavior modification through assessments and chatbot interventions. Nevertheless, these platforms overlook the mental conditions of users, neglecting interviews, continuous surveillance, or ethical factors. We propose that enhancing emotion detection could boost user contentment among individuals seeking mental health assistance. Our suggestion encompasses an interactive psychiatric counseling service employing sophisticated natural language comprehension and multimodal emotion detection. This method permits ongoing and delicate observation of emotional fluctuations. Moreover, an instance-oriented reaction model, integrating moral discernment, facilitates suitable clinical reactions in psychiatric consultations.***
Keyword: conversation service; Psychiatric counselling; mental health care; Emotion recognition.

I. INTRODUCTION

For a long time, researchers have been examining how machines can comprehend human emotions. Recently, advancements in artificial intelligence (AI) have bolstered studies in this realm. In our investigation, we've educated diverse models to categorize emotions utilizing a substantial volume of labeled data. With technological advancement, we presently train these models using assorted data formats such as images, videos, audio, and text. Certain studies even merge multiple categorization models for enhanced accuracy through hybrid techniques. They've demonstrated encouraging outcomes in precisely identifying human emotions. Despite these strides, there are still restricted applications employing emotion recognition technology. Although intelligent assistant services are gaining traction, they're not extensively incorporated into major applications yet. Hence, there's a burgeoning interest in devising healthcare applications utilizing intelligent aides. Some chatbots and virtual assistants are already leaving a favorable impression on commercial and customer services.

However, numerous studies underscore the necessity for improved design of human-computer interactions to seamlessly integrate these systems into healthcare routines. To address this challenge, several research endeavors are concentrated on enhancing the efficiency of these systems through theory-based design, data visualization, and dispersed interfaces.

In the domain of computer science, endeavors are directed towards enhancing health, well-being, and healthcare, often referred to as e-Health. This entails employing technology to communicate with patients, furnishing them with health-related information sans conventional phone calls. Given the widespread accessibility of the internet, numerous applications have surfaced for this purpose. The categorization of e-Health applications varies, with one proposed classification focusing on the system's purpose, the technology employed, and its impact on public health.

The Oxford Experimental Psychology Department is recognized as one of the leading psychology departments in the UK. It showcases strong research groups covering various areas such as human cognitive functions, neuroscience, linguistics, developmental psychology, social psychology, and mental health disorders.

Psychology Today stands as one of the oldest platforms committed to behavioral science. Its objective is to delve into every aspect of human behavior, furnishing insights to empower individuals to manage their health and well-being, adapt their mindset, and navigate myriad mental health and relationship challenges.

In this manuscript, we present an application of Counselling chatbot, furnishing conversational assistance for mental health care.

II. LITERATURE REVIEW

1) Researchers Ling lei, Jun Feng Li, and Wenrui Li carried out a study on "Evaluating the impact of artificial intelligence on mental health support for educators and students." The utilization of artificial intelligence in healthcare enhances illness diagnosis, categorization, and prognosis, providing advantages to both patients and healthcare practitioners.
2) Authors Sanjay Chakraborty, Hrithik Paul, and Sayani Ghatak conducted an experiment on "ALGORITHM-based medical chatbot model for predicting infectious diseases." Chatbots are very easy to use for everyone. This chatbot can be used in your language. The bot provides medical information such as doctor contact details, nearby hospital addresses, and contact details.

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3) Authors Gurpreet Singh, Bhavya Thotakura, Jeladurgam, Naveen Kumar Reddy conducted an experiment on "Online Health Consultation and Management System". After searching around the world to find such a formal public health system, they decided to make a similar request to my country.

4) Nivedita Bhirud and Subhash Tatale, the researchers, conducted a study on "Priority Index Based Organization of Residential Loads Using Intelligent Home Load Manager." It appears that there is a vast array of algorithms to execute all-Natural Language Understanding (NLU) and Machine Learning (ML) tasks. Selecting the appropriate algorithm relies on the capabilities offered by the chatbot and the area in which the service is offered.

5) Authors Kyo-Joong, Dong Kun Lee conducted an experiment on "Chatbot for Psychiatric Consultation in Mental Health care". Chatbots support psychiatric consultations in a conversational format. The service communicates with users through dialogue and provides psychiatric advice.

TABLE 1: Literature Review Overview: Provides an overview of the literature reviewed for the project

Sr. No.	Author	Publication and Year	Title	Observation
1	Ling lei Jun Feng Li Wenrui Li	Springer: 2023	Examining the impact of artificial intelligence in the Mental Health Support of Educators and Students.	Utilizing artificial intelligence in healthcare enhances illness diagnosis, categorization, and prognosis, offering advantages to both patients and healthcare practitioners.
2	Sanjay Chakraborty Hrithik Paul Sayani Ghatak	IEEE: 2022	An ALGORITHM-Based Medical Chatbot Model for Infectious Disease Prediction.	Chatbots are very easy to use for everyone. This chatbot can be used in your language. This chatbot furnishes healthcare-related details such as physician contact information algorithms, nearby hospital locations, and contact detail algorithms. .
3	Gurpreet Singh Bhavya Thotakura Jeladurgam, Naveen Kumar Reddy	IEEE: 2021	Online Health Consulting and Management System.	After searching around the world to find such a formal public health system, I decided to create a similar application in my country.
4	Nivedita Bhirud Subhash Tataale	IEEE: 2019	Priority Index based Scheduling of Residential Load using Smart Home Load Manager.	In carrying out all the functions of NLU and ML, it appears that there is a vast array of algorithms available. The selection of the appropriate algorithm relies on the capabilities offered by the chatbot and the specific domain in which the service operates.
5	Kyo-JoongOh, Dong Kun Lee	IEEE: 2017	A Chatbot for Psychiatric Counselling in Mental Healthcare Service Based on Emotional dialogue Analysis and Sentence Generation.	Chatbots aid in psychiatric consultations through interactive discussions. The platform engages with users via conversation and offers psychiatric guidance.

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III. WORKING OF PROPOSED SYSTEM

A. There are Multiple Approaches

1) *Face-to-Face Counselling:* This approach involves direct, in-person communication between the patient and the doctor. It allows for a personal connection
2) *Digital Intervention Counselling:* This approach utilizes digital platforms for Counselling when face-to-face interaction is not possible. Patients can interact with doctors through video calls, chat, or other digital means, which can be convenient and accessible.
3) *Algorithm Psychometric Testing:* In this method, algorithms are used to conduct psychometric tests on patients. These tests help in assessing the patient's mental health condition and categorizing it into basic or serious cases.
4) *Treatment Recommendation Process:* If the algorithm determines that the patient's case is basic, it provides solutions or Counselling strategies. However, if the case is deemed serious, the ALGORITHM recommends the patient to consult a psychiatrist for further evaluation and treatment

B. The Comprehensive Explanation for each Operational Phase is Outlined Below

1) *Data Collection and Planning:* This preliminary phase entails establishing objectives for the proposed application. We identified primary website participants/panels, including administrators.
2) *Development:* The nucleus of the project is the creation of a web application. We opted for HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets) for the design.
3) *Programming:* The dynamic web application algorithms are employed to store, modify, and retrieve information inputted through various user interfaces**.**
4) *Evaluation, Assessment, Launch:* Following the completion of the web application, it undergoes thorough testing to ensure its functionality. Subsequently, all system operation files, encompassing HTML, CSS, .NET, and other requisite files, will be uploaded to the cloud

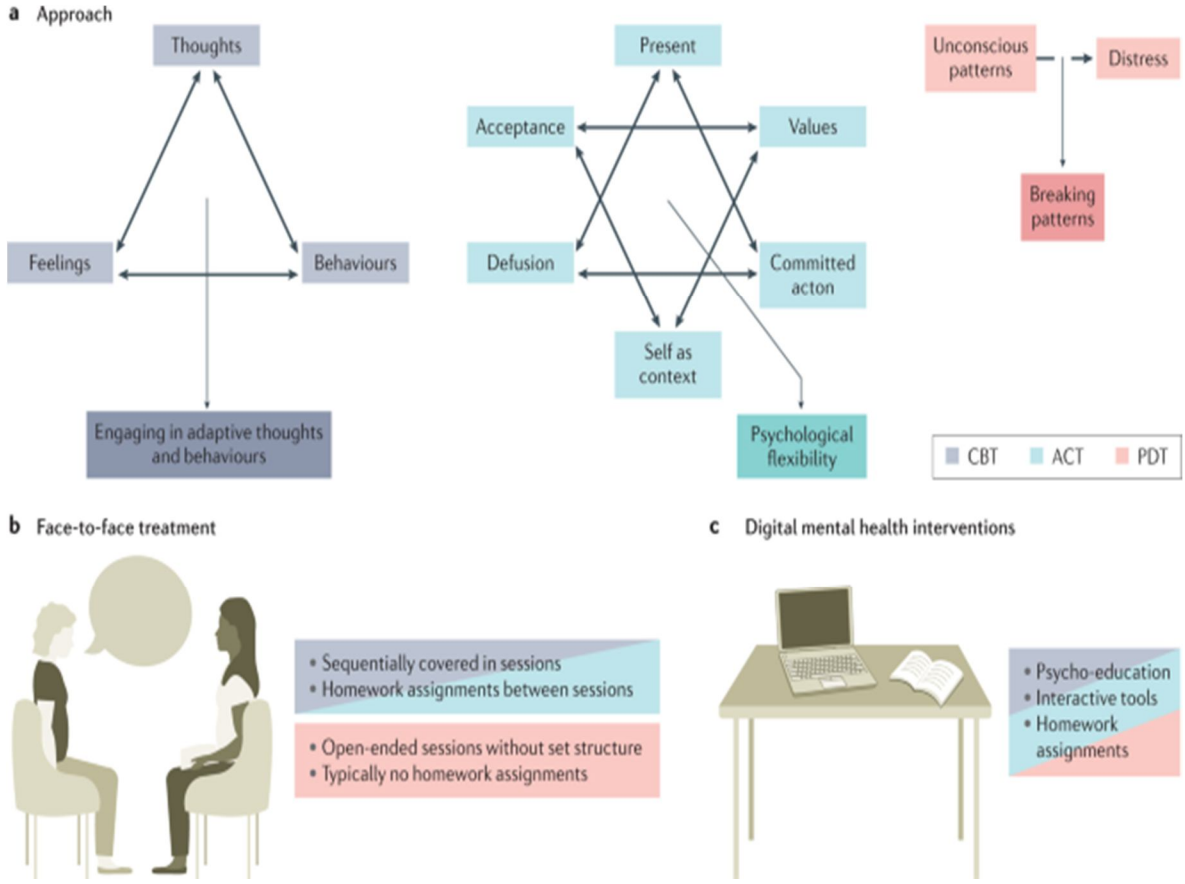


Figure 1: Multiple Approaches

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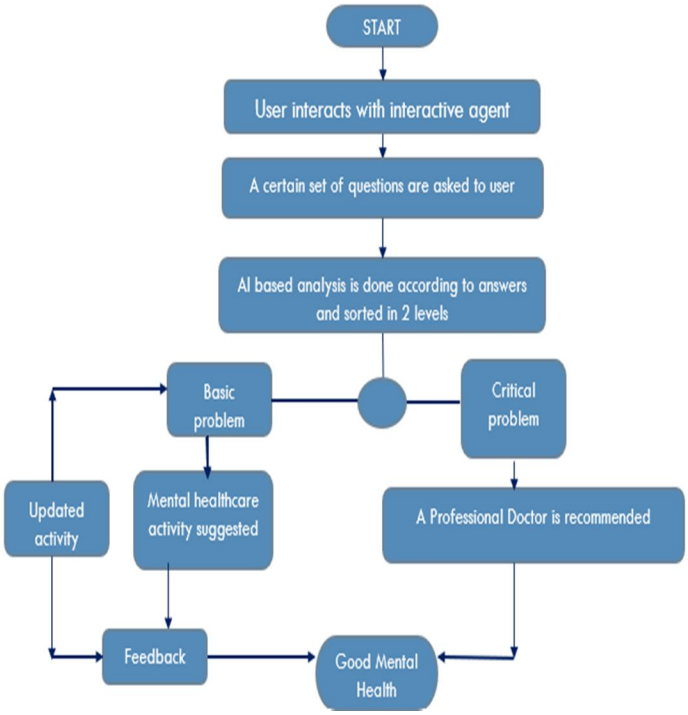


Figure 2: Proposed Methodology Overview: Provides an overview of the proposed methodology

Figure 2 describes Block Diagram of the system:
In the system first the user visits the website named "Trust-Trek" after coming over website. The user interacts with the interactive agent that is the user is asked to select with which problem the user is going through means different emotions are displayed in front of user like happiness, sadness, angriness, anxious and many more and according to that user selects the emotion.
Then certain set of questions are asked to user which are common questions related to the emotion selected by the user and such activity is known as Psychometric Test overall at first the user goes through a psychometric test in which certain common questions are asked to user related the emotion or the mental problem the user is going through.
After the psychometric test the site-based analysis is done according to answers answered by the user and those answers are sorted in 2 levels.

The site analysis is done and the answers are sorted in 2 levels:
a) Basic Problem
b) Critical Problem

If in the site analysis the answers answered by the user that is if through analysis the result/percentage of answers is below the result/percentage set by system then site sorts it as basic problem, if the user's problem is a basic problem, then the site itself provides the solution to user like some activities are suggested to the user for example; Yoga, Walking or Jogging, Dancing, Cycling and many more.
Also, the system keeps a follow-up of the user following the activities given by the system/site and if the user is not satisfied with the given activity or is unable to complete the given activities, then the system updates the activity to the user.
If in the site analysis the answers answered by the user that is if through analysis the result/percentage of answers is equal or above the result/percentage set by system then site sorts it as critical problem, if the user's problem is a critical problem, then the site suggest a near-by professional doctor or psychiatrics to the user so that the user meet the doctor for best therapy.
The block diagram represents the major components and their interconnections in the activity of mental health care system. It demonstrates how the user communicates with the site and site suggest some activities to user according to user's psychometric test.

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IV. USABILITY TESTING

We conducted usability testing to examine the user experience and quality of the website and identify opportunities for improvement. We also collected feedback from patients and professionals about the website and its features. The results are presented below:

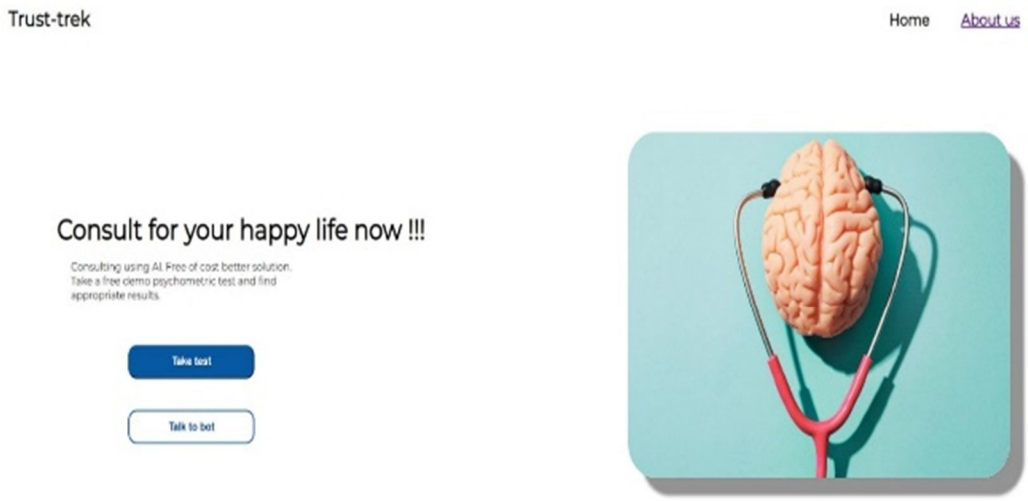


Figure 3: Screenshot of website page design: Describes the design of Trust-trek website page.

Above is the image of website page named “Trust-Trek” which is designed using web development concepts in which HTML and CSS is used, HTML (Hyper-text mark-up language) is used in website’s core development and CSS is used for designing of website.

In this first the user takes a test which is a psychometric test according to emotions displayed in front of the user below is the image (Figure 4) which displays the emotion for user to select.



Figure 4: Screenshot of website page: Emotions selection for Psychometric test

Even for this there is the used of web development concepts. And then after according to the emotion selected by the user certain algorithm set of questions are displayed in front of user. Below image (Figure 5) shows certain algorithm set of questions asked to user according to the emotion selected by the user.

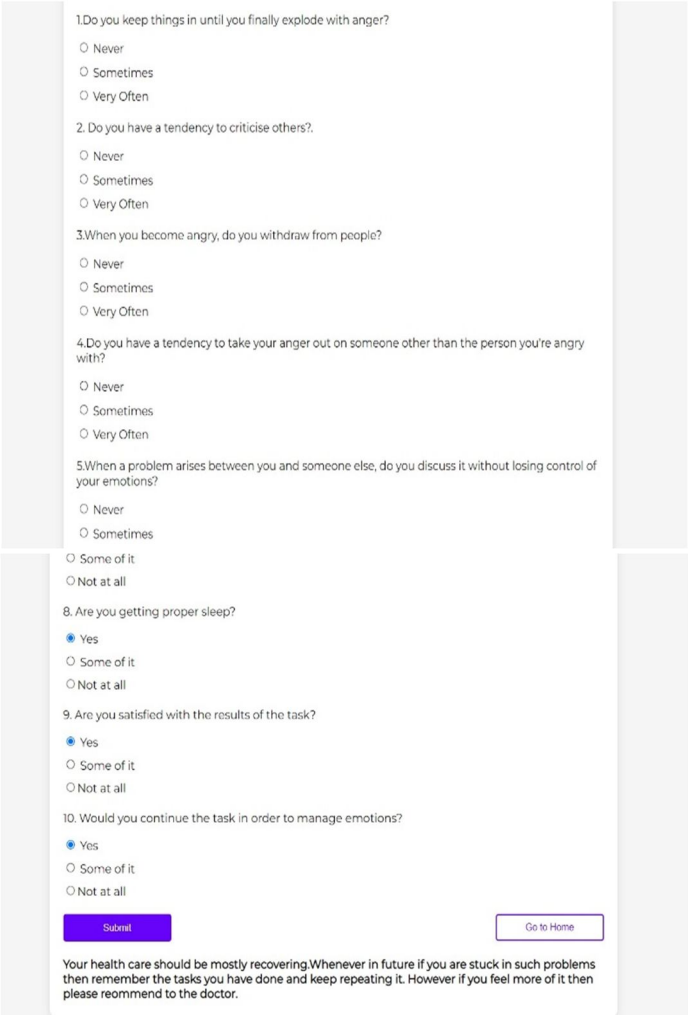


FIGURE 5: Screenshot of website page: Psychometric test

After answering the questions, the marks are displayed in front of user Figure 6 show the segregation of marks.

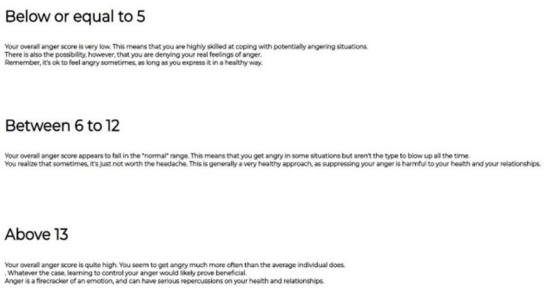


FIGURE 6: Screenshot of website page: Segregation of Marks

Talking about segregation of marks:
If marks are below or equal to 5 then the score is low and site provides a solution like “you are not that angry but keep a clam on yourself” or anything else.
If marks are between 6 to 12 then the score is low and site provides a solution in the same way, if marks are above 13 then same site provides a solution to it.

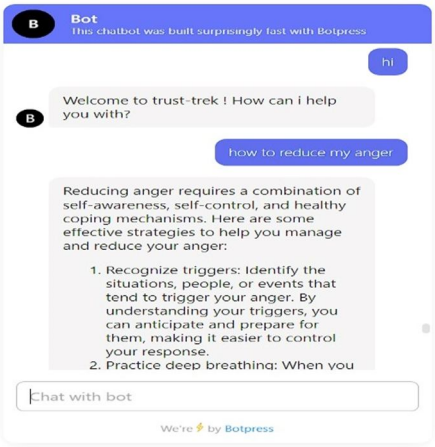


Figure 7: Screenshot of website page: Interaction of User with Chatbot

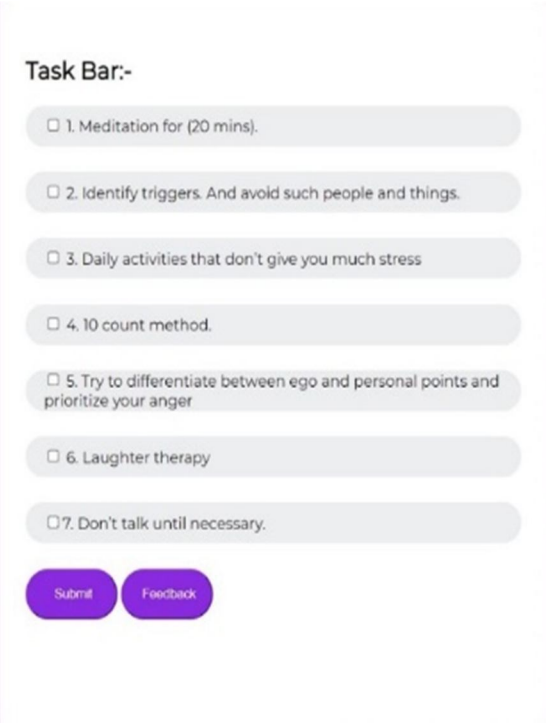


Figure 8: Screenshot of website page: Task allotted to user by Site

After the user engages with the site and asks for a solution to their problem, the site's chatbot provides the requested solution. Figure 7, illustrates the question posed by the user. Following the interaction with the chatbot, the website assigns tasks to the user.
Figure 8, displays the questions presented to the user as part of this task assignment process. This interactive feature enhances user engagement and facilitates the resolution of user queries or issues.

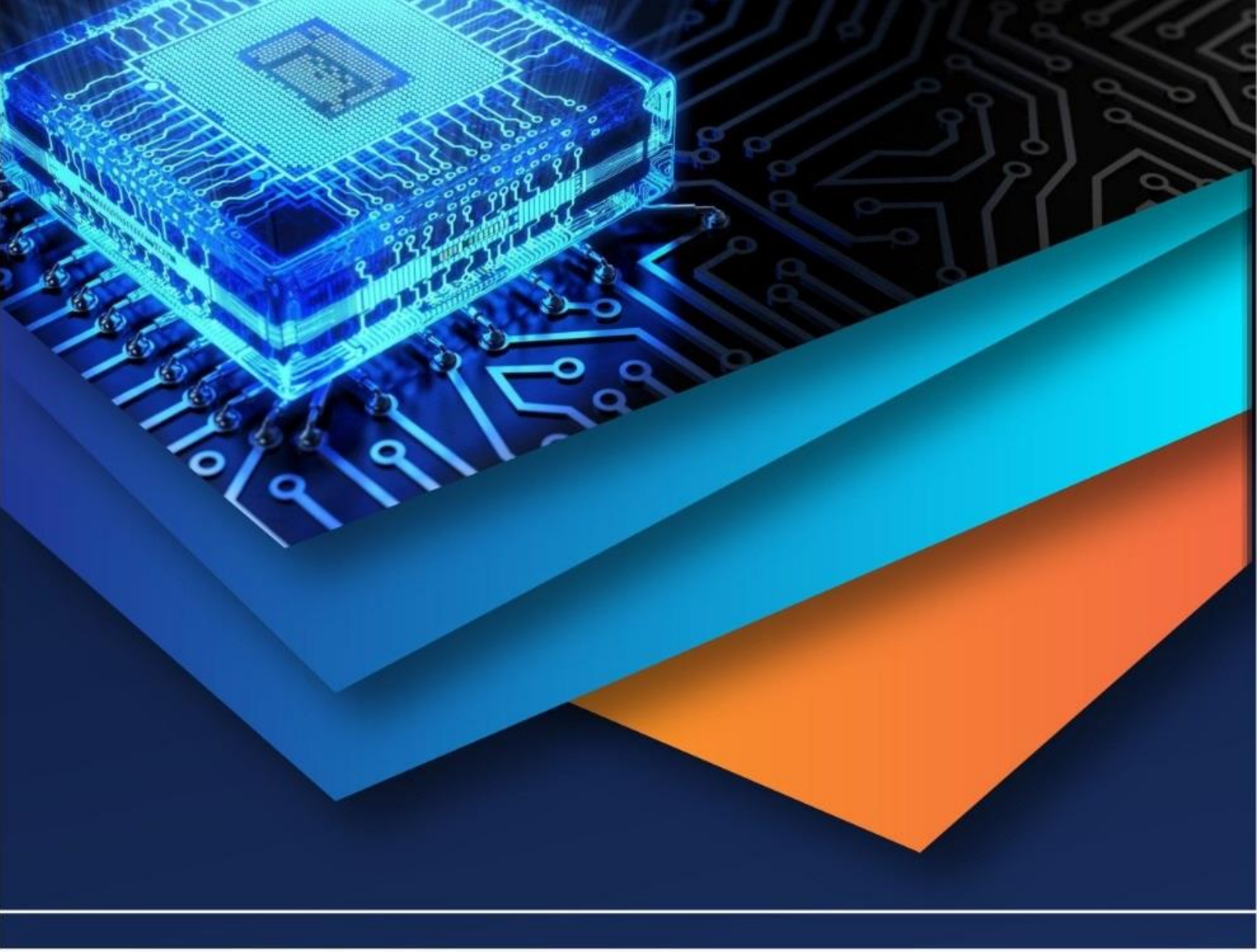
V. CONCLUSION

From this endeavor, create distinctive, dynamic, and adaptable software frameworks that integrate all medical system variables comprehensively. These platforms efficiently arrange all health metric discoveries. They can be employed by medical practitioners for assessment and generating valuable insights to improve decision-making.

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