ABUAD Journal of Engineering Research and Development (AJERD)
ISSN (online): 2645-2685; ISSN (print): 2756-6811

Volume 8, Issue 3, 28-38

Application of Artificial Intelligence in Chatbot and Social Media Community for a Mental Health Monitoring Web-Application

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Received: 15/07/2025
Revised: 29/08/2025
Accepted: 19/09/2025
Available online: 03/10/2025

Abstract: *Mental health is a major challenge for modern society affecting people of working age and their families, jobs, and communities. To provide continuous emotional support, personalized assistance, and remote mental health tracking, chatbots and social media platforms are increasingly using Artificial Intelligence (AI). There is little or no previous literature that has documented a fully functional mental health monitoring web-app that uses AI to provide all these features: chatbot, e-community, video conferencing, and email automation. Chatbots are software systems that offer various interactive online services, including people with mental health needs and have been successfully integrated into the field of mental healthcare. Similarly, social media can help monitor the mental health situation by extracting information from posts for sentiment analysis as people often post their feelings on social media, so analysing these posts can reveal their mood, emotion, cognition, or mental state. This paper solves the problem sentiment by using the MERN stack to develop an interactive mental health monitoring application which features: social media community, chatbot named 'Dave the HappyBot', Email automation and video conferencing. The results showed that among the 13 users of the web-app from a performance indices class of A, B, C, D, and E, majority indicated that they felt 'happier' and 'somewhat mentally relieved' after interacting with the Chatbot. The A class recorded 18% responses, B class obtained 31%, the C class got 19%, the D class achieved 26%, and the E class gained 6%. The users were open to recommending the App to their peer and meeting their psychologist for constant mental health monitoring sessions. This paper can be further improved documenting the developments of web-app with more users who possess higher knowledge of software development and have a history of mental health struggle. Higher utility of the MERN stack would also be an improvement.*

Keywords: *Mental Health, Chatbot, Artificial Intelligence, MachineLearning, Social Media Community*

1. INTRODUCTION

Mental disorders varying across the most prevalent symptoms of anxiety and depression to psychosis and psychological issues, has affected about a billion individuals across the globe [1]. Within the Special Initiative for Mental Health (2019-2023), the World Health Organization (WHO) particularly reiterated the urgent need for psychological diagnosis and rehabilitation [2]. Eleven classifications of psychological disorders are listed in the International Classification of Diseases (ICD) [3] created by the WHO and twenty major classifications are listed

in the Diagnostic and Statistical Manual (DSM-5) of Mental Disorders (MD) [4] as formalized categorisations for universal understanding and regular standards. Symptoms include panic attacks, addiction, dementia, obsessive compulsive disorders, and depression [5]. To remedy these mental health issues, Natural Language Processing (NLP) methods and Artificial Intelligence (AI) algorithms have been developed and incorporated within interactive domain, live virtual assistants called Chatbots [6]. Chatbots are software programs that can simulate human conversation and interact with users using natural language interface. They can help users find information, perform tasks, or provide services through various channels suchas websites, apps, messaging platforms, or voice assistants, and can be usedin different aspects. According to Wang *et al.*, [7], NLP and AI have been applied broadly in a variety of healthcare use applications for chatbots. Unaffected by preconceptions, chatbots are a recent technological advancement that is always accessible, simple to use on a smartphone or other platforms,and could interact with any amount of people. Chatbots have been shown to offer efficient initial support for mental health issues faced by people, especially of teenage to middle age, because they are available on the internet and entirely automated [8].

As a result of the COVID-19 pandemic lockdown, psychological professionals and researchers from academia saw a rise in mental health issues and its association with social networking sites [9]. More recently, machine learning (ML) was used to assess depressive inclination using information from social media and it was discovered that users with mental illnesses use the cyberspace because of the ease in which feelings, ideas, and views may be expressed due to the world-wide web's rapid development [10]. Using social media networks to spread awareness about mental health issues may seem simple and cheap, but it requires a lotof time and effort to create effective messages and engage with the audience [11]. Therefore, mental health advocates suggest that the power of social media should be made use of, especially chatbots, to promote mental well-being through daily habits [11]. These days, people discuss their sentiments and moods on social media networks. Numerous well-known Apps, like Twitter,WhatsApp, Facebook, and others, are commonly utilised to communicate thoughts and sentiments in addition to forwarding simple texts or visuals. AI techniques may offer certain distinctive qualities that can assist in exploringdistinctive patterns concealed in internet interaction and processing them todisclose expressions like happiness, sadness, rage, surprise, or contempt [12].

After careful research, it has been discovered that there is little or no previous literature that has documented a fully functional mental health monitoring web-app which incorporates the use of Artificial Intelligence (AI) to provide features that include chatbot, e-community, video conferencing, Email automation, all in one. Therefore, this paper solves the problem by documenting a developed web-based mental health monitoring App that possesses these features: social media community, chatbot named ‘Dave the HappyBot’, Email automation after a mental health quiz and video conferencing to communicate with psychologists, and other users on the e-community. The web-app was created within the University of Johannesburg - Accenture work training programme for 2022, using the Fourth Industrial Revolution (4IR) technology of (AI). This paper aims to shows how effective this web-based mental health monitoring App is, using AI for its functionalities in its delivery to users. This paper’s section 1 introduces the research topic, states the problem statement and the aim/objective of the paper, as to how the problem was solved, the section 2 reviews similar work, stating how previous literature have attempted to solve the research problem. The section 3 outlines the conceptual framework which pieces the stages of the web-app for its users for their utility. The section 4 details the methodology, showing the computational network of the web-app, which shows the process to the functionality of the system as a whole, with detail in the technical features. Section 5 features the algorithm and technology, which displays and explains the backend coding system done by the developer. The next and final sections are the section 6, displaying the results, and the section 7, showing the conclusion.

2. REVIEW OF SIMILAR WORKS

It is believed that the first known chatbot, created to enhance mental health was ELIZA, and it was created to resemble text-based conversation with a therapist [13]. The employment of chatbots in conjunction with Cognitive Behaviour Therapy (CBT) for mental illness care has been influential. Additionally, Fitzpatrick *et al.*, [14] created “Woebot,” a completely autonomous communicative AI to provide cognitive behavioural counselling to people exhibiting signs of anxiety and sadness. According to results of the Patient Health Questionnaire 9 (PHQ-9) research, clients of Woebot dramatically lessened reported depressive symptoms during the duration of the research. Inkster *et al.*, [15] created another unique software called “Wysa” to test the viability of teaching psychological principles and mental health skills through message interaction. According to the paper, those that utilized the software regularly showed considerable mental development in comparison to people who utilized it less consistently.

The idea behind Mobile Coach, a mobile chat program for human-bot communication via texting is that, the user sends texts to the bot and is charged fees for doing so. The client would be supplied with a collectionof expected responses among which he is expected to select a single replyand the program was restricted to text engagement with a prepared answer choice to the bot [16]. Many have pushed so far as to say that social media does in fact createa beneficial medium for raising consciousness about mental illness and enhancing a social sense of connection [17], despite the reality that a majority of research have associated social networks to depression and insomnia [18]. Psomakelis *et al.*, [19] carried out a thorough analysis of sentiment polarity categorization techniques for Twitter content. Additionally, they went on to aggregate and use a number of labelled tweets for the assessment of the approaches in addition to including a mixture of predictors within an examined set. Aman & Szpakowicz [20] proposed a unique

classifier algorithm based on the understanding of emotional intensity is noteworthy. The writer's reliabilityfor the job of classifying emotions from blog corpus was about 66%.

In summary, the review shows different algorithms developed by different researchers for mental health data extraction. The limitations encountered by these approaches clearly shows the need for the development of more robust, flexible, and social interfaces for mental health monitoring using integrated AI algorithms. With these assertions, the research is motivated to make its contribution on these previous gaps by developing:

i. An obtainable fully functional mental health monitoring web-app that uses AI to provide all these features: chatbot, e-community, video conferencing, and email automation.
ii. An algorithm that solves the problem of sentiment using the MERN stack for interactive mental health monitoring application.

3. CONCEPTUAL FRAMEWORK

This section provides a walk-through of the mental health monitoring application that was created. Figure 1 further illustrates with graphical representation, the developed process through which a new and mentally distressed user would have to go through. A first-time user on this application might be drawn to the chatbot, called "Dave the HappyBot", as it is represented by a happy and welcoming icon pictorially.

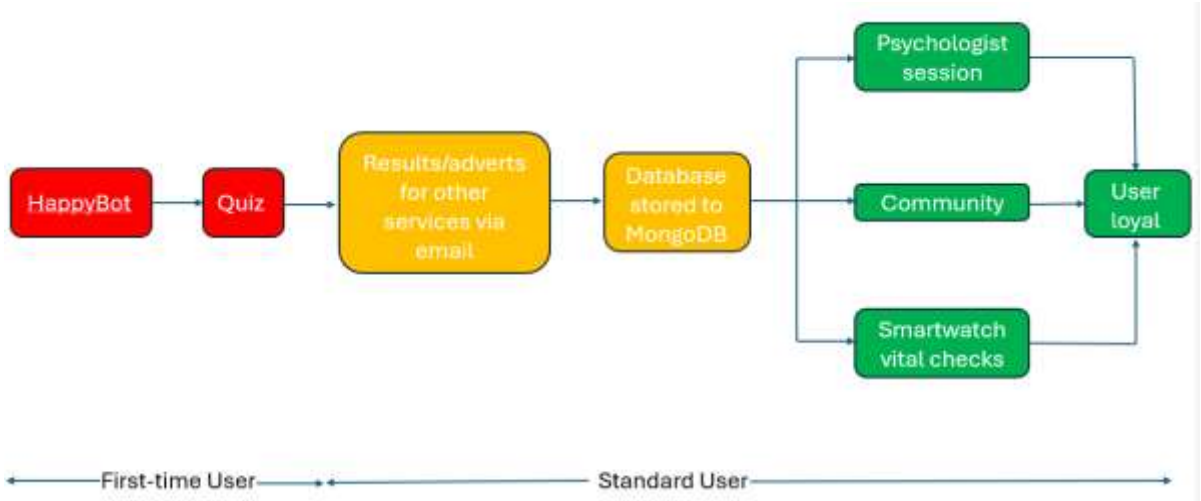

Figure 1: Conceptual framework

As can be seen further below in Figures 9 and 10, on clicking the HappyBot icon, there appears a conversation box for communicating. After pleasantries have been exchanged, the HappyBot triesto detect the emotional mood of the first-time user. In the situation where the first-time user responds to be in a bad mood, the HappyBot enquires the reason and tries to turn around the mood into a lighter one. Once this has been achieved, the HappyBot then precedes to advice the first-time userto make use of platform's mental health quiz for a medical review of mental health status based off the medically acclaimed ICD and DSM-5 standards. Notwithstanding, in the situation where the first-time user responds, to already be in a lighter mood based off the initial conversation, the HappyBot would first find out the hobbies and interests of the first-time user, then proceed to advocate signing-up on the platform straightaway as standard userswith the same hobbies and interests commonly make use of the application. Finally, the HappyBot would round off the conversation by advising the first-time user to take the mental health quiz as sometimes mental health distress could be quite unrevealing. When a first-time user then decided to take the mental health quiz, the result would be sent directly to the respondent's Email for confidentiality. Additional to the mental health result, other services on theplatform would be advertised like the booking of a psychologist for a constant mental health check-up, connecting the data collected from a smart watch'sconstant vital checks into the platform such that the psychologist can have further representation of the user's wellbeing. This also helps navigates the HappyBot's future conversation with the user.

If the first-time user then registers on the platform, there exists the community service where different group of users engage themselves based on their similar interest and categorizations. For example, communities like the ones for married individuals, professionals, students and Lesbian, Gay, Bisexual, and Transgender (LGBT+) among others, exist and the users in these groups share similar life stories, even further advising on the paths their journey and struggles have taken to be resolved overtime. The chatbot andthe community features were particularly added to this application because mentally distressed people often find it hard to communicate but with the HappyBot and the people in the communities, integrated by AI, there would always exist an option of who to converse with.

The mental health monitoring application remains relevant to standard users as they can virtually meet with their psychologists from distant geographical areas. Some users would prefer to book psychologist from particular geographical areas based on their expertise compared to the ones the users reside in. Also, with other communities like soccer,

music, movies, etc., trending topics would always be up to aid conversing with people as users can even decide to take community conversing to private chatting on the application.

3.1 Concept of Automated Email Response to Quiz

The requirement for recurring Email responses led scientists to assume that NLP technologies using ML and deep learning (DL) algorithms play a significant role in reducing time and labour. Utilizing intellectual response techniques, focuses on enhancing the Email system [21]. An automated Email response design is produced by Parameswaran *et al.,* [22], used in combining a classification algorithm based on ML with evaluated vocabulary and correlation assessment. One example of this, the Gmail intelligent estimating function's auto-reply mechanism was improved by Google engineers in May 2018. In this mechanism, based on the placement of the previous words in the sentence, it anticipates the next keyword a client could input. The mental health quiz developed for the web-application, which first-time users respond to can be seen in Figure 2.

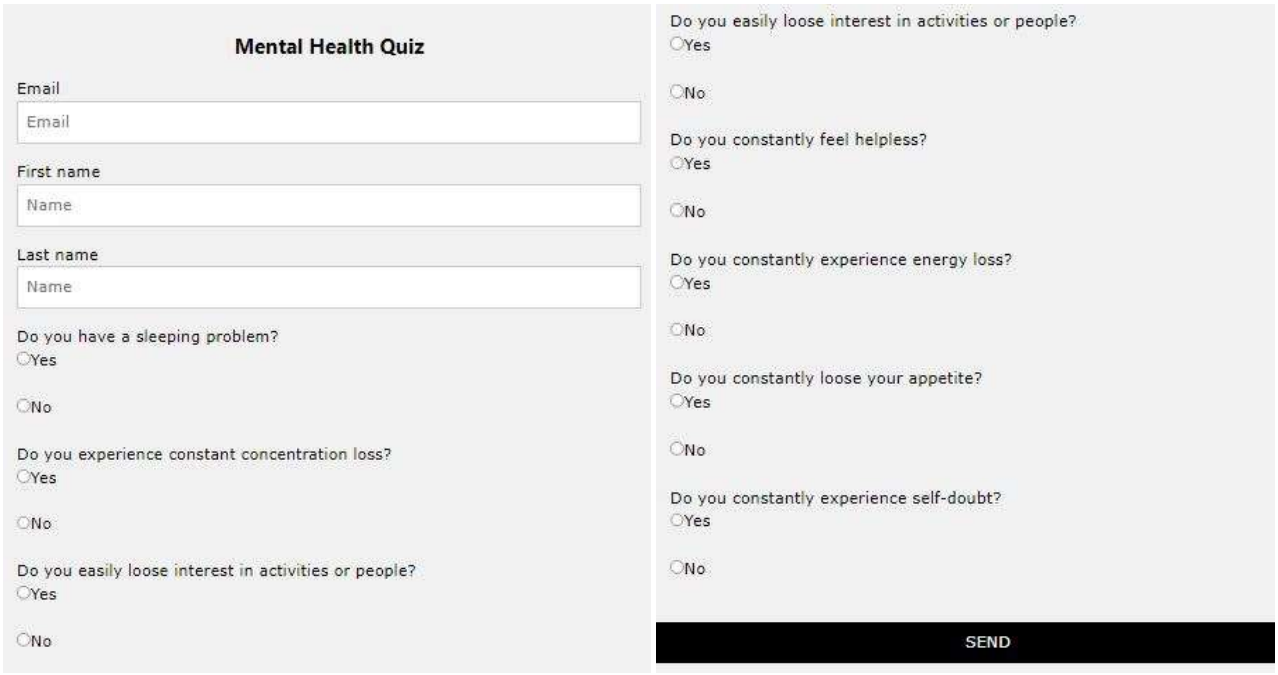

Figure 2: Front end quiz – A and quiz - B

3.2 Database and Web-Application

In developing our App, a robust database system is essential to preserve and analyse the data from the App users [23]. MongoDB was used to achieve this. MongoDB [24], a scalable document-based NoSQL datastore, is used for our platform. This, in addition to essential plugins were used in the development of the website and web application to help them run faster, much more engaging, and respond better to mobile devices. Correspondingly high operations are expected from these websites, as people want them to be something akin to what they would experience when using a native mobile application [23].

Utilising the tried-and-true technology: MongoDB, ExpressJS, ReactJS, and NodeJS (MERN), a framework instrument [25], helps reduce setup time and accelerates learning [26], being a generic software. MongoDB, as earlier stated, is an open-source document database that provides persistence for App data and is designed with both scalability and developer agility in mind [25]. With capacity and programmer efficiency in mind, MongoDB enables durability for data-information [25]. Crucial databases, that are quick and versatile, and basic databases, which provide a wide range of functionality, are bridged by MongoDB [25]. Here, information is kept in key-value pairs rather than a grid of columns and rows. ExpressJS is a software development kit for NodeJS and is a lightning-fast, unpretentious, compact web framework. It offers a wide range of attributes that make creating web applications very quick and simple, compared to when using solely NodeJS [27].

ExpressJS is created with the help of the connected middleware module for NodeJS that incorporates the http module. Several middleware modules now enable combining with ExpressJS. React (React.js) is a JavaScript framework that creates user interfaces. It was developed by Facebook, Instagram, as well as a group of independent programmers and businesses [28]. React makes it possible to create huge software that enable the ability to receive dataset without refreshing the page, increasing efficiency and giving users a better browsing experience. This allows for integration with other JavaScript libraries and frameworks and correlates to the Model-View-Controller (MVC)

pattern's graphical interface. It is worthy to note that backend applications are run in the JavaScript using NodeJS (via ExpressJS) [27].

The foundation of NodeJS is the Google V8 JS JavaScript engine. It offers a lot of functionalities, particularly networking protocols like HTTP, that are crucial for creating software applications. Additionally, using 'npm' (node package manager) to install third-party modules is supported. Because NodeJS is a reactive, exhibition engine, the implementation can send requests and then operate across other important activities without waiting for responses [27].

3.3 Community

Figure 3 presents observations from Facebook stories or WhatsApp statuses, where users typically write what they are feeling, which can be quite helpful in predicting a person's emotional state [12]. Psomakelis *et al.*, [19] brought forth a creative hybrid strategy to uncover the sentiment concealed in each Tweet. Additionally, they have demonstrated the value of initial analysis by removing halt and corrective words, slang/abbreviations, prefixes and suffixes, and other words. A sentence's feelings, opinions, and attitudes were correctly classified by Kirkbride *et al.*, [29] using information from news stories. Our web-application uses the similar technology (AI) applied by these popular social media platforms, to better engage our users while satisfying their emotional demands. The community provides features like groups, "what is on your mind", online friends, to keep the App's users entertained and invested, as seen in Figure 3.

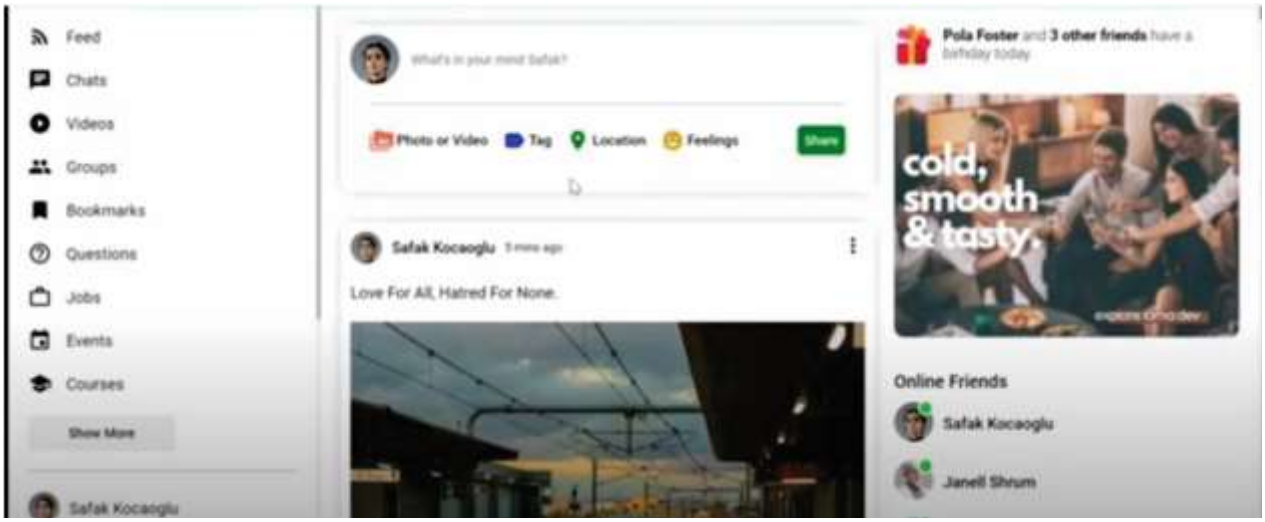

Figure 3: Frontend community snippet

4. METHODOLOGY AND DESIGN

In this section, the development and utilisation of the backend to connect and modulate the frontend is shown. Our models were developed on the Visual Studio Code IDE, which was the development platform that was used to fully create the web-page functional mental health platform. Just like previous sections have shown, the systematic processes are as present.

4.1 Development of the Dave the HappyBot Algorithm

In Figure 4, a folder is created on the Visual Studio (VS) Code to contain all the files to actualisethe AI, and the codes to be imputed into each of the files. Our files include the app.py, chat.py, train.py, model.py, intents.json, base.html. The 'py' files represent the Python files which have their imputed codes for functionalities. The 'JSON' represents the JavaScript object notation. The 'html' represents Hyper Text Markup Language, the file where the codes to the actual webpage (frontend) are written. The model.py file contains the central command which the chatbot functions on.The app.py is used on the terminal to make the codes written in all the files come alive. The intents.json file is used by the developer to edit all possible conversations that could conspire between a user and the AI chatbot, hence 'Dave the HappyBot'.

To initialise the chatbot to function on a one's personal computer (PC), some modules/dependencies first have to be installed. In the terminal, you have to type in "pip install Flask torch vision nltk". After the VS Code installs all these modules, you have to run the train.py, chat.py, and lastly the app.py. Now, a PORT dedicated to the chatbot will be listed on the terminal. This PORT links the html file PC's local host and will open through a browser. To enable the chatbot's AI Python Model seen in Algorithm 1, represented in Figure 4 above, the torch package library is first processed as a neural network (nn) architectural module. The Model is then initialised into fully connected layers as 'Linear' to setup the input size and classes. The activation functions are also processed as 'ReLU'. Finally, the computation output is generated using the 'forward' and 'return' functions.

5. ALGORITHM AND TECHNOLOGY

This section breaks down the technologies used during the processes ofthe conceptual framework. These processes take place on the frontend (the interface the user is usually familiar with), but the backend (codes for software used by the developers) is where the web-app is altered to affect the functionalities on the frontend. This section focuses on the frontend, providing graphical representations from the platform to be used for better illustrations.

Following the application's setup, the user is presented with the program interface, where a message of acknowledgement is displayed before the user is asked for a reply. The user is then instructed to respond to a couple of queries on how they overcame their medical problem. The user is promptedto respond till he does by queries that also contain their preferred method of interaction. AI enters the scene with the aid of ML whenever the user answers. On each reply, the HappyBot provides is generatedusing ML, which was developed with the Python language, as soon as the user initiates a conversation with it [16]. The processes are as outlined in the following sections.

Algorithm 1: HappyBot Python Model

```
import torch
import torch.nn as nn

class NeuralNet(nn.Module):
    def __init__(self, input_size, hidden_size, num_classes):
        super(NeuralNet, self).__init__()
        self.l1 = nn.Linear(input_size, hidden_size)
        self.l2 = nn.Linear(hidden_size, hidden_size)
        self.l3 = nn.Linear(hidden_size, num_classes)
        self.relu = nn.ReLU()

    def forward(self, x):
        out = self.l1(x)
        out = self.relu(out)
        out = self.l2(out)
        out = self.relu(out)
        out = self.l3(out)
        # no activation and no softmax at the end
        return out
```

5.1 Automated Email Response to Quiz

To make the automated email functional from responding to the quiz only requires one html file. The detail here is all in the codes written in the html file as can be seen in Algorithm 2 of Figure 5. In the html model, the 'rel' (relation) and 'href' (hypertext) functions are used to link the html file to online CSS and font stylings The Google Sheet where all the information impute from the frontend web-app interface, is stored through the 'form' function in the html file. This further links the web-app's developer Email where all the auto responses will be sent from. The 'div' function is used to quote a group of codes for reference purposes. Functions like 'class', 'type', 'placeholder', 'id', 'required name', 'name', are used for more complex reference purposes. Finally, in the html file, JavaScript codes are used to create a command with which the Email will initiate theauto response. Figures 5 demonstrate the codes used to obtain the email automated response algorithm designed for this research work.

5.2 Database and Community

As stated earlier, the MERN was utilised to build this application, and this is quite a relatively complex tool. To create our database, MongoDB is utilised because of its ability to combine more complex information like user-name, login details, biography, interests, psychologist journals, vitals from smart watch, and so on, into a robust database suitable for our application.

To use the MERN tool, two PORTs have to be created, as illustrated in algorithms 3. One PORT for the Application Programming Interface (API), where the JavaScript codes are imputed and the second PORT for the JSON codes where the details of the Node dependencies are stored. The JSON codes links both PORTs together. To run these PORTs, two terminal programmes have to be open and "npm start" would be imputed in each so they run simultaneously.

Algorithm 2: Email automation algorithm screenshot – A

```
        <div id="quiz7">
      <label>Do you constanly self-doubt?</label>
      <input class="" type="radio" placeholder="quiz7" id="self-doubt" required name="entry.199165810_sentinel"
name="radio">Yes<br><br>
```

```
        <input class="" type="radio" placeholder="quiz7" id="self-doubt" required name="entry.199165810_sentinel"
name="radio">No<br><br>
      </div>

   <div>

</div>

   <div class="w3-section">">
      <button class="w3-button w3-block w3-black w3-margin-botton" type="submit">SEND</button>
   </div>
   </form>
</div>

<script type="text/javascript">
function validateName() {
   var name = document.getElementById("name").value;
   if (name.length == 0) {
      alert("Name must be filled out");
      return false;
   }
   if (!name.match(/^[a-zA-Z]{3,}(?:[a-zA-Z]+){0,2}$/)) {
      alert("Please enter your correct name");//Validation message
      return false;
   }
}
</script>
```

Algorithm 3: API port

```
const express = require("express");
const app = express();
const mongoose = require("mongoose");
const dotenv = require("dotenv");
const helmet = require("helmet");
const morgan = require("morgan");
const multer = require("multer");
const userRoute = require("./routes/users");
const authRoute = require("./routes/auth");
const postRoute = require("./routes/posts");
const router = express.Router();
const path = require("path");

dotenv.config();

mongoose.connect(
  process.env.MONGO_URL,
  { useNewUrlParser: true, useUnifiedTopology: true },
  () => {
    console.log("Connected to MongoDB");
  }
);
app.use("/images", express.static(path.join(__dirname, "public/images")));
```

6. RESULTS AND DISCUSSION

In the course of creating the mental health monitoring application, this research developed a functional chatbot named ‘Dave the HappyBot’. The codes used to achieve this development are presented in algorithm 4.

For the Email auto response that should take place after answering the mental health quiz, a functional code is created and linked to the one developed by this platform.

Algorithm 3: Client port

```
  "eslintConfig": {
   "extends": [
    "react-app",
    "react-app/jest"
   ]
  },
  "browserslist": {
   "production": [
    ">0.2%",
    "not dead",
    "not op_mini all"
   ],
   "development": [
    "last 1 chrome version",
    "last 1 firefox version",
    "last 1 safari version"
   ]
  },
  "proxy": "http://localhost:8800/api"
}
```


6.1 Chatbot (Dave the HappyBot)

The chatbot is a software application made to record conversations with people. In the developed design, the platform makes use of AI as described in previous sections, for a more immersive experience. Figures 4 and 5 show the user interfaces of the chatbot.

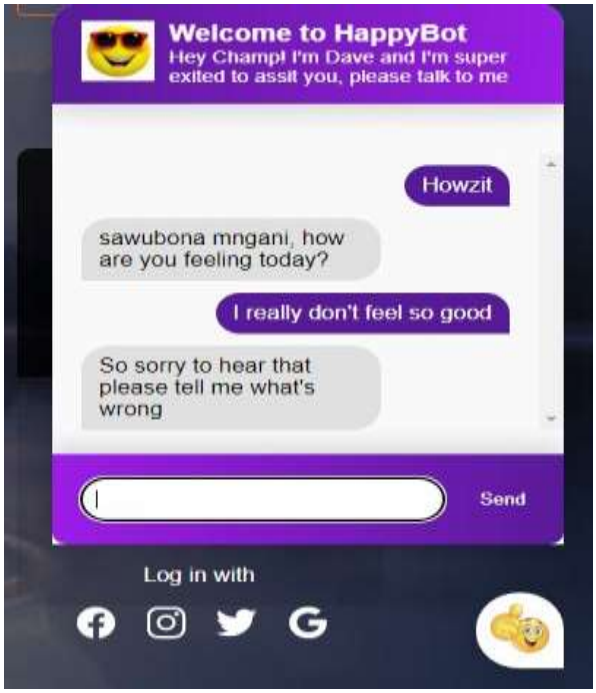

Figure 4: Screenshot of the chat interface of Dave the HappyBot - A

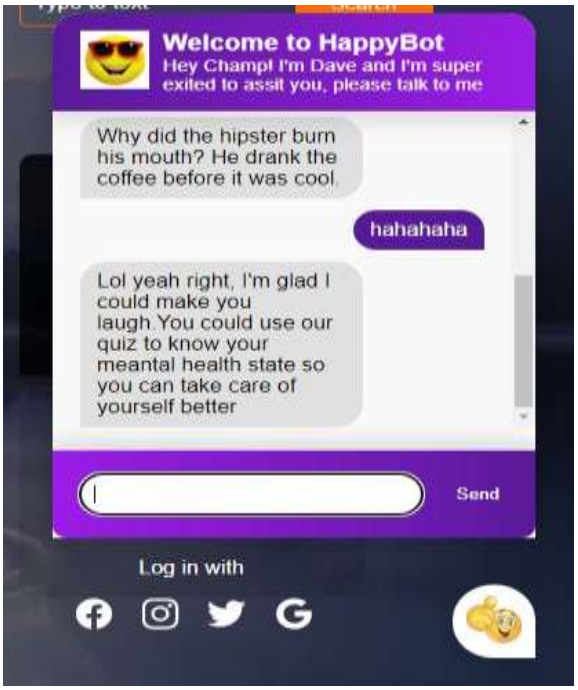

Figure 5: Screenshot of the chat interface of Dave the HappyBot - B

Finally, the community was built up to conversational level. In order to test the functionality of the App, 13 users: students and staff from the University of Johannesburg were picked from various departments and study years. The Table 1 shows the responses of some after using the App., and Table 2 is the legend of responses. From the responses of the users, among other key responses, majority reported that the App changed their moods positively 'Very Much'. Also, majority reported that the App meets their needs of a therapeutic nature, as a virtual psychologist. These important reviews of the App show that it achieved its aim to a large extent.

In a summary, a total number of 143 responses from 11 sampled questions of 13 users were recorded. In the iteration of questions by the classes of A, B, C, D, and E, it was also observed that out of 65 categories, 50 were

answered, while 15 were left unanswered. In this light, the A class response recorded 18%, the B class obtained 31%, the C class got 19%, the D class achieved 26%, and the E class gained 6%. Base on the performance indices highlighted in Table 1, it is concluded that the legend spectrum B of the legend definition of "only a bit" carries the highest user responses in a community of 13 users. These results can be replicated and superimposed in a larger community of users using highly scalable programming tools. The results would surely ease psychologist from the stress of constant mental health monitoring and also assist in proffering quicker solutions on the increasing mental issues recorded in the society.

Table 1: Legends

Legend Spectrum	Legend Definitions
A	Very much
B	Only a bit
C	Indifferent
D	Not really
E	Definitely not

Table 2: Users experience survey

S/N	Question/Users	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9	User 10	User 11	User 12	User 13
1	How efficient do you think this video app is?	A	C	A	A	B	A	B	C	B	D	C	B	B
2	Were the features of this app satisfactory in terms of communication?	A	D	B	B	A	A	D	B	B	C	D	D	C
3	Do you see your-self consistently usingthis app?	B	D	A	E	D	B	A	D	C	B	E	C	D
4	Did this app create any form of excitement when using it?	B	D	A	A	A	A	C	C	B	E	B	B	D
5	Would you like to keep meeting Friends virtually onthis app?	B	B	A	D	B	B	B	C	D	D	C	C	C
6	To what extent do you think this app could be improved?	A	A	A	A	B	C	D	B	B	B	D	E	D

S/N	Question/Users	User 1	User 2	User 3	User 4	User 5	User 6	User 7	User 8	User 9	User 10	User 11	User 12	User 13
7	Do you believe this app would be good enough to constantly meet your psychologist?	B	A	A	A	B	B	D	B	C	B	B	D	C
8	Are you less anxious when using this app?	C	D	A	B	C	C	C	B	D	C	B	B	E
9	Would you recommend this app to yourpeer?	B	B	A	D	C	B	D	D	B	D	C	C	C
10	Do you believe this app could be useful in improving your valuable and professional networking?	B	B	B	D	A	D	B	A	E	B	D	D	D
11	Would you be ready to pay to continue using this app?	D	D	A	E	D	D	C	C	D	D	E	D	B

7. CONCLUSION

Mental health is increasingly being of concern, especially among internetusers. It has been shown that individuals tend to show signs of a mental health state on social media, and as such, social media or AI-based chatbots in particular can ascertain the mental health status by interacting with the individual. Previous studies did not possess the documentation of a web-ap with the combined features for mental health monitoring, powered by AI. To solve the problem, this paper documented the development of a novel AI-power mental health monitoring web-app with features such as: a chatbot named 'Dave the HappyBot', social community, video conferencing and Email automation. All these works to monitor the health status of the platform's users, who were students and staff. The mental health monitoring platform featured inbuilt automated email responses to quizzes. The results of testing the App among selected students and staff at the University of Johannesburg show satisfactory responses by using the App. Furthermore, they stated that they felt somewhat relieved after interacting with the Chabot.

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