Design of Flight Cadet Emotion Intelligent Prediction System Based on Mobile Phone Software Data

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Abstract: With the further development of big data technology, the use of big data technology to collect the data of mobile phone software, applied to the analysis of flying cadets' mood, can help flight cadets, flight coaches and flight doctors to understand the emotional state of flight cadets, find the signs of bad emotions in time, help them get rid of bad emotions, and have a good effect on improving cadets' learning enthusiasm and mental health. In this paper, through the literature method, analysis method, system method and other methods, the relevant mobile phone software data, as well as more mature and practical hardware and software, are reasonably selected to design the emotional intelligent prediction system. The system describes how to design the emotional intelligent prediction system according to the principle of emotion prediction, the design of the intelligent prediction system, and the application prospect of the intelligent prediction system, etc. We also provide a theoretical basis and application scope for the next step of developing the emotional intelligent prediction system.

1 INTRODUCTION

In his congratulatory letter to the Fifth World Internet Conference in 2018, President Xi Jinping stressed that "today's world is experiencing a larger and deeper scientific and technological revolution and industrial transformation. Modern information technologies such as the Internet, big data, and artificial intelligence have continuously made breakthroughs, the digital economy has flourished, and the interests of all countries have become more closely linked. To add new features to the development of the world economy, we urgently need to accelerate the development of the digital economy." Flight cadets have great learning pressure, long training time, difficult operating subjects, high intensity of physical load and other characteristics, which makes flight cadets have higher requirements for emotional management and control than ordinary college cadets. Big data technology is a product of the deep development of scientific and technological revolution and industrial transformation. Accelerating the application of big data technology is inevitable to keep up with the development of The Times, as well as the inevitable acceleration of military development. As high school cadets just entering college, they need an adaptation process. During this period, if you can better understand the emotional state of the flight cadets, you will better help the cadets to control their emotions. Instructors, aviation doctors and others can also timely enlighten the bad emotions of flight cadets, which is helpful for improving the enthusiasm of flight cadets to learn and train and maintaining mental health. This not only conforms to the law of the development of the times, but also meets the requirements of military informatization construction.

2 THE PRINCIPLE OF SENTIMENT PREDICTION FOR MOBILE PHONE SOFTWARE DATA

With the development and popularization of mobile phone 4G technology, mobile phone users have become more and more easy to obtain Internet information through mobile phones, and people are more and more willing to use mobile phone software to obtain text, pictures, music, videos, and other information on the Internet. A lot of data is generated

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during the use of the mobile phone software. Through a series of data processing and analysis, it helps to predict the emotional state of mobile phone users.

2.1 Classification of Mobile Phone Software Data

We divide mobile phone software data into mobile phone software data, user interaction data and user personal data. Mobile phone software data mainly refers to the data provided to us by the mobile phone software itself, including text, picture, audio, video and other four forms. The software data refers to the data provided by the software company; User interaction data refers to data such as text, picture, audio and video generated by users in the process of using software. For example, user comments, uploaded photos, music, video, etc., are open and interactive to a certain extent. It is important to note that this kind of data is publicly available to other users, which is different from personal data. User personal data refers to some non-public data generated by users during the use of software, which can be divided into expressive data and recorded data. Expressive data mainly refers to the data that users convey their ideas in the form of text, picture, voice, and other forms in software. These data are public and private. Recorded data mainly refers to some track-based data generated by users in the process of using software, including tour records, use time, voice, expression, etc.

2.2 Mobile Phone Software Data Input

We set up MySQL relational database management system on the computer. The SQL language used by MySQL is the most common standardized language for accessing databases. The data storage is divided into basic data and cadet data. The basic data includes mobile phone software data and user interaction data, while the cadet data refers to the user's personal data.

2.2.1 Input of Mobile Phone Software Data.

Mobile phone software data is divided into four forms of text, pictures, music, and videos, which we process separately. For text data, we directly store it in .txt format to MySQL. For image data, we convert the image into binary data stream and save it to MySQL. For music data, we store music text information, including song name, singer, lyrics, music introduction, music style and other information, into MySQL as text data. For video data, we divide it into video text information and video voice information. Text information, including video name, video author, video introduction, video style, and text information in a video, is stored to MySQL as text data. For the voice information in the video, we use speech recognition software to convert it into text information, and then store it in MySQL as text data.

2.2.2 Input of User Interaction Data.

There are four forms of user interaction data, namely text, picture, music, and video, which are divided into user interaction comment data and user interaction sharing data. User interaction comment data is divided into comment text, comment emoticons, comment voice, comment emoticons pictures and other data. Comment text is stored in TXT format to MySQL. The comment memes of the mobile phone software are all corresponding text to summarize the meaning of the memes, and we store the corresponding text of each expression in TXT format to MySQL. Convert comment speech into text-based data and store it in TXT format to MySQL. Because the resolution of emoticon pictures is low, the content is more complex, the total amount is small and concentrated in WeChat and QQ chat software, and the current picture recognition technology is difficult to convert it into text-based data, we do not enter such data. Interactive shared data mainly refers to the text, picture, music, video, and other data uploaded by users on mobile software platforms, which can be viewed and forwarded by other users.

2.2.3 User's Personal Data Input.

We divide the user's personal data into expressive data and input data. For expressive data input, we process the user's data in the form of text, picture, voice and other forms in the software according to the above input method of mobile phone software data and store it in the cadet database of MySQL software. As for the input of recorded data, we convert the tour records, usage time records, voice and facial expressions generated by users in the process of using the software into words in TXT format and store them in the cadet database of MySQL software.

2.3 Analysis of Mobile Phone Software Data

After we input the data of mobile phone software into the database, we need to analyse the data to get the mood prediction. We divide the database into the basic database and the cadets' database.

2.3.1 Selection of Emotion Judgement Vocabulary.

We selected eight basic emotions (joy, trust, fear, surprise, sadness, disgust, anger, and hope) and feedback emotions from the psychologist Plutchik's emotional wheel model, in which feedback emotions are an extension of one of the basic emotions. We use eight basic emotions as the basic emotion vocabulary. After classifying 500 common emotion words on the Internet as appropriate feedback emotions, feedback emotion words with feedback emotion meaning are formed.

2.3.2 Basic Database Data Processing.

We tagged the number of basic sentiment words and feedback emotion words for text, images, music, and videos. According to the proportion of basic emotional vocabulary accounting for 70% and feedback emotional vocabulary accounting for 30%, a value is calculated, and then the basic emotion of the text, pictures, music, and videos is judged and marked. For example, a music file contains 30 basic emotion words for "joy", 70 feedback emotion words for "joy" and 100 feedback emotion words for "surprise". According to the calculation, the weight number of "joy" emotion words is 30*70%+70*30%=42, and the weight number of "surprise" emotion words is 100*30%=30. Because 42 > 30, we judged the music to be emotionally happy, labelled as the basic emotion of "joy".

2.3.3 Data Processing in Cadets' Database.

Expressive data is treated the same as a basic database. After marking relevant basic emotional words on the text, picture, music and video of the cadet's tour, the proportion of expressive data of the cadet was calculated according to the number of basic emotional words and the total number of all emotional words. For example, the total number of expressive data emotion words of a cadet in one day is 100, among which the basic emotion word "joy" is 20 and the basic emotion word "fear" is 10, then the proportion of expressive data of the cadet "joy" is 0.2 and the proportion of expressive data of the cadet "fear" is 0.1.

Visit records and usage time records in recorded data are marked according to the basic mood words corresponding to the text, picture, music and video in the basic database. For example, cadet A watched "joy" video for 15 minutes and "surprise" article for 10 minutes today. Then the proportion of recorded data of the cadet was calculated according to the proportion of the duration of each basic emotion to the total duration of the tour. For example, take one day as a measurement unit, cadet A watch "joy" articles for 20 minutes, listen to "sad" music for 30 minutes, "joy" videos for 60 minutes, "fear" pictures for 10 minutes. The duration of the tour is 20+60=80 minutes for the joy class, 30 minutes for the sadness class, 10 minutes for the disgust class, and the total duration of the tour is 120 minutes. The proportion of recorded data of cadet's "joy" was 80/120=0.66, the proportion of recorded data of "sand" was 30/120=0.2; and the proportion of "hate" recorded data was 10/120=0.08.

2.4 Prediction of Flight Cadets' Emotions

After processing the data of the two databases, we select the data in a period of time to calculate the proportion of expressive data and recording data of cadets' basic emotions, and then calculate the proportion of expressive data *60%+ recording data *40% of the same basic emotions, so as to obtain the predicted value of each basic emotion. The eight values are sorted to find out which basic emotions the cadet has more during this period. At the same time, the heart rate, pressure, blood pressure and other physiological indicators of the traineess wearable devices during this period can also assist in the judgment of basic emotions, and finally predict the emotional state of the flight trainees during this period.

3 DESIGN OF STRUCTURE AND FUNCTION OF FLIGHT CADETS' EMOTION INTELLIGENT PREDICTION SYSTEM

After analysing the principle and combining the existing hardware, software and technical conditions, we designed the emotion intelligent prediction system as shown in figure 1:

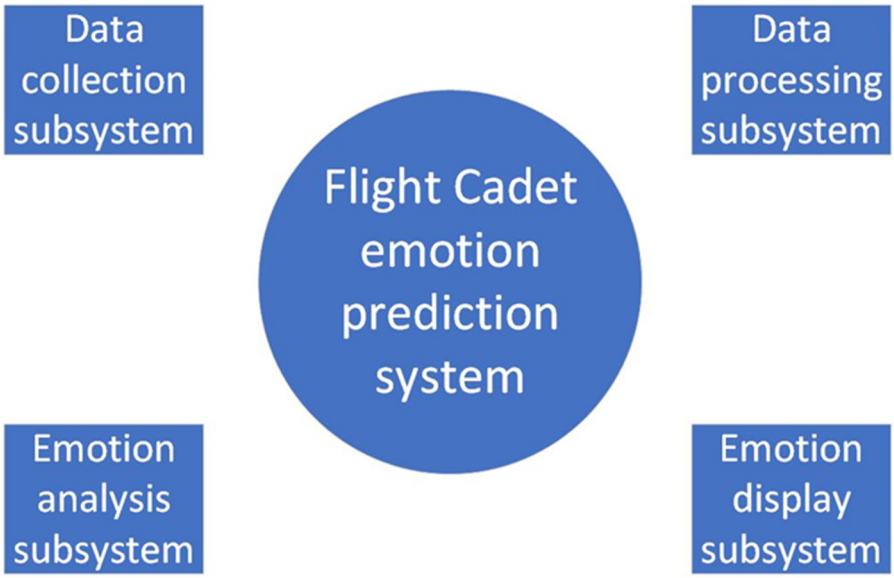

Figure 1: Emotional intelligence prediction system.

3.1 Data Collection Subsystem

The data collection subsystem consists of hardware and software. The hardware includes the mobile phones of flight trainees and smart monitoring bracelets, and the software includes information mobile software, social mobile software, shopping mobile software, music mobile software, video mobile software and so on. Flight cadets use mobile software through mobile phones and monitor physiological index data through wristbands. The hardware is collecting data as well as generating it. This data is obtained by negotiating with the handset software vendor for an API. This subsystem is mainly the media of data generated by the daily use of mobile phone software by flight trainees, and the original data we need to collect.

3.2 Data Processing Subsystem

The data processing subsystem consists of hardware and software, including a hardware laptop computer, a mouse and MySQL software. We use MySQL software to build basic database and user database. Then the data obtained from the API port of mobile phone software and smart wristband are input into the basic database and user database according to their respective categories. Then, the contents of the two basic databases are retrieved to match the emotion words with the data, so as to prepare for the next step of analysis. The subsystem mainly injects the data generated in the daily use of mobile phone software into two databases for certain processing.

3.3 Emotion Analysis Subsystem

We compared the data in the basic database and user database of MySQL software, mainly quantifying the emotion of each user within a certain period according to our weight formula. Quantified results were used to predict the mood of flight cadets. The subsystem mainly calculates the data generated by the flight trainees' daily use of mobile phone software according to a certain weight and predicts the emotional state of flight trainees within a certain period.

3.4 Emotion Display Subsystem

The subsystem of emotion display consists of hardware and software, including a monitor, a mobile phone and supporting software. By designing supporting software, we can call the data stored in MySQL software in real time and display the results of mood analysis subsystem through HDMI cable connected to the computer of mood analysis subsystem for mood prediction results. The computer of mood analysis subsystem transfers data to supporting software. The software will transmit the results of intelligent prediction to the mobile phone through the Internet for real-time display, the results of intelligent prediction will be conducive to the

flight cadets and other relevant personnel to understand their emotional state for reference.

4 APPLICATION PROSPECT OF FLIGHT CADET EMOTION INTELLIGENT PREDICTION SYSTEM

4.1 Help Flight Cadets Understand Their Emotions Better

We know that flying is a high-risk job, especially for flight cadets, only by having a clear understanding of themselves and a good state can they better learn to fly and operate flight. Our usual cognition of our emotional state is sometimes inaccurate and too subjective, and there is a lack of quantification of relevant data. The emotion intelligence prediction system can help flight cadets have a quantitative understanding of their own emotions. Through the supporting software of the emotional intelligent prediction system, cadets can observe some of their own data, so as to better understand their emotions and quickly adjust their emotional state, which will greatly improve the safety of flight.

4.2 Help Flight Instructor to Understand Trainees' Emotional State

Flight teaching can achieve better teaching efficiency under the condition that flight cadets have a good emotional state and a high degree of concentration. To improve the efficiency of flight instruction and better complete the teaching, flight instructors often need to understand the emotional state of flight cadets. Flight cadets with negative emotional states are prone to distraction, inattention, and decreased observation during flight, which makes learning less efficient. Through the emotion intelligent prediction system, the flight instructor understands the emotional state of the flight cadets before the flight teaching, which is conducive to adjusting the learning content, optimizing the learning method, and improving the learning efficiency.

4.3 Help flight Doctors to Understand the Emotional State of Trainees

The flight cadets' operation of the aircraft is not only related to their physiological state, but also to their psychological state. To ensure the safety of the flight, the flight doctors will often test the psychological state of the flight cadets before the flight. In the past, they all judged the status of flight cadets through psychological scales, psychological interviews, etc. Through the more accurate and objective emotional intelligent prediction system for detection, it can greatly improve the efficiency of the flight doctors' detection of the psychological state of the flight cadets and improve the safety of the flight.

5 CONCLUSION

The rapid development of big data technology and artificial intelligence technology shows that it is feasible to apply its ideas and methods to the psychological training of flight cadets and conform to the law of development. In order to better combine the big data technology and artificial intelligence technology with the characteristics of the flight cadets, we design the emotion intelligent prediction system, which has a certain theoretical significance. In this paper, according to the principle of emotion prediction, the design of intelligent prediction system, the application prospect of intelligent prediction system, etc., we describe how to design emotion intelligence prediction system, laying a solid theoretical foundation for the next practical application. Although the emotion intelligent prediction system is designed in this paper, the research is still in the theoretical stage and is still in the preliminary research stage. We have not yet applied validation of the intelligent emotion prediction system, nor have we dialectically examined the relationship between the subsystems. In the next step, we will conduct environmental construction and application verification of intelligent prediction systems and strengthen the dialectical dialectic of the relationship between various subsystems of environmental construction.

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