Estimation of Human Responses to predict their behavior

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Abstract :

Behavior in personal and professional life depicts everything about us. It becomes easy to find someone's personality if we know that person very well. But it becomes difficult to predict personality if we don't know that person. Only by meeting once or twice we cannot predict someone's personality. So to predict the personality of any person we will use an indirect way. So to achieve this, we are creating a system which will predict the behavior of the user. Behavior analysis plays an important role in finding personality of any person. Our likes and dislikes also tell many things about us. So by keeping this thing in mind, user need to enter some of the details which we will use for analysis purpose. In our system we will allow user to choose favorite color, select some images and lastly answer some questions. Each question will have some rating and user need to rate it according to his/her opinion. After gathering all this data we will apply a Machine learning algorithm. Machine learning algorithm will help us to predict behavior of the user. By using our system, user will be able to know what type of personality traits they follow. This system will provide an effective way of finding behavior of user using machine learning. It will be helpful for mentally stressed or depressed people to go back to their normal or tension free life.

IndexTerms **- Behavior analysis, Machine Learning**.

I. INTRODUCTIO

Behavior can be defined as the actions-reactions mechanism of a people in response to a situation. Behavior is a way in which human beings or animals react in a particular situation. A study on human behavior has revealed that the population can be classified into various personality types like Optimistic, Pessimistic, Trusting, Envious, happy, sad, stress, depression Optimistic: An optimistic person stays positive in all situations and keeps trying no matter how hard situation get. Pessimistic: A pessimistic person may tries to see only negative side of the situation. Trusting: One of the major traits of trustworthy people is to trust others. They do not need a major reason to believe others. Envious: It's quite difficult for these people to accept someone's success. Stress: These people are always in pressure and constantly worry about something. Depression: These people think negative about themselves and constantly worry about future. Behavior analysis is important to know the mental health of the person. Mental health determines how we handle out emotions and how we think and feel. It is important for every age group as we cannot predict if a specific age group is stressed or not. When people are mentally stable, they focus on their life i.e., how to make it happier. But when person is mentally or emotionally disturbed, they are not able to concentrate on anything that is going in their life. We try to help the people who are facing such problems. An alternative way of measuring such natural reactions by linking images, colors, music preferences to their personality. By keeping these things into mind, we try to create a project which will help maximum people to improve their life. To understand the behavior of our users we are going to ask them some questions. After gaining all information, we will able to analyze their behavior. Our main focus is to find out people who are stressed, are suffering from depression, are unhappy, etc. Once we know the user's behavior and if it matches with any of the behavior like stress, depression, etc. we will try to help that person to make his life better.

II. Model

For analysis purpose we will use supervised machine learning algorithm. From all supervised machine learning algorithms we will use linear regression. Linear regression is a statistical method which study the relationship between two variables. So in this, one variable is independent variable and other variable is dependent variable. Linear regression can be used only when we have two variables. But in our model there are more independent variables so we will use multiple linear regression. Multiple linear regression is extension of linear regression. Multiple linear regression models the linear relationship between independent and dependent variables.

Formula of Multiple Linear Regression –

$$yi=\beta0+\beta1xi1+\beta2xi2+...+\beta pxip+e$$

where,

for i=n observations:
yi = dependent variable

xi = explanatory variables
β0 = y-intercept (constant term)
βp = slope for explanatory variable
e = the model's error term (also known as the residuals)

III. Implementation:

Front end of our project consists of three parts. First part is selecting favourite colour from given colour grid. Second part is answering some questions. Each question will consists rating from 1 to 5. 1 means strongly disagree and 5 means strongly agree. And third part is selecting images from predefined set of gallery. Each image consists an emotion. You have to select an image which relates you the most. Our android application will collect the data. All this data is stored at backend. In backend we have used Google sheets to store data. In Google sheets data is stored using Google app script. App script will act as intermediate connection for android application and Google sheet. Once data is stored we will use it for analysis purpose.
In our systems there are total 8 emotions which are divided into two phases. For Question-Answer section there are four emotions, and for images section there are four emotions. For each phase we are implementing multiple linear regression model. We are going to implement this regression using tensorflow. Tensorflow is open source library for numerical calculations and large scale machine learning. This library of Google is used in android for implementing machine learning. It enables on device machine learning interface using a low latency.

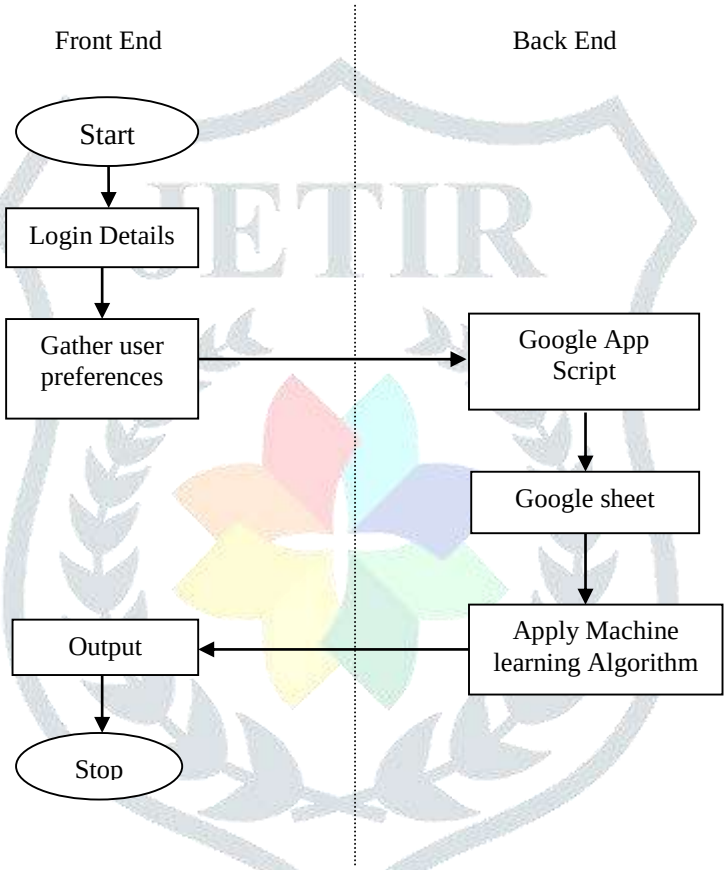


Fig. 3.1 Working of model

For writing code we will use Google colab. In starting we will import all the necessary libraries like pandas, numpy, tensorflow. After importing necessary libraries we will then handle categorical variables. As we are using linear regression we need to encode categorical variables. Then we will split the data for training and testing purpose. After splitting we will fit the regression model. Last step is to convert this model in tflite format. This converted file is our machine learning model. And we will import this model in android studio.
In android studio we will use tensorflow library. We will import our machine learning model in android studio. Lastly we will pass our input data to this model and model will predict the output. Once we got an output, according to the output we will display the user's behavior.

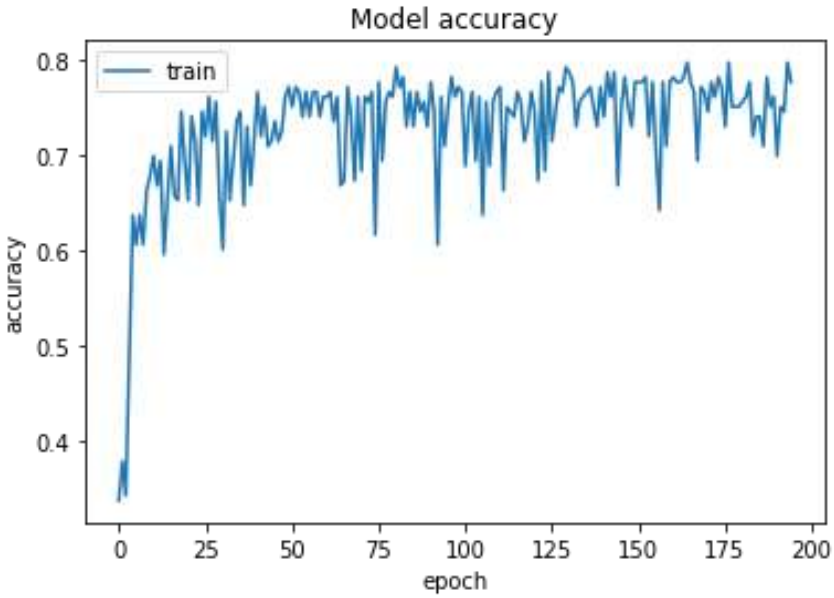
After all this analysis according to user's behavior we need to give output. The output will consist a message which is divided into two parts. If there are any demerits in user's behavior then first part of message will list them all. And the second part will provide ways to improve those demerits.

IV. Result

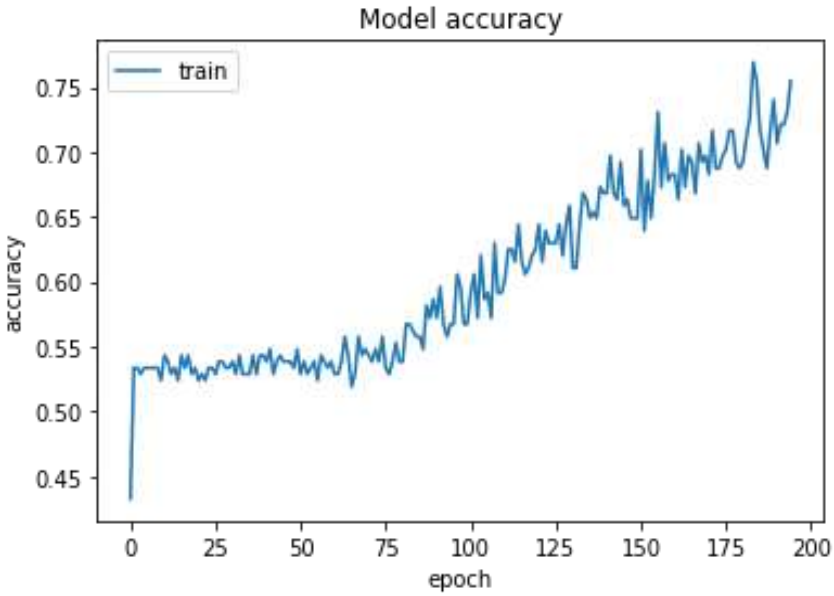
In this paper we have predicted the behavior of user by gathering some information. In our project we have implemented two machine learning models i.e. first for question analysis and second for image analysis. We have implemented question analysis

model with 76% accuracy and image analysis model with 68% accuracy. As for question analysis model there are 4 emotions. So according to that our dataset distribution is near about 12.4% are depressed, 31.4% are stressed, 8.8% are unhappy, 37.1% are happy and 10.3% are having mixed emotions. For Image analysis model there are 4 emotions. So according to that our dataset distribution is near about 53.6% are optimistic, 20.6% are pessimistic, 17.5% are trust, 5.1% are envious and 3.09% are having mixed emotions.

4.1 Question analysis model



4.2 Image analysis model



V. Conclusion

In this paper, we have proposed system which will efficiently analyze the human behavior. Our system contains different parts like choose favorite color, choosing the preferred images from the pre-defined gallery and answering some questions. So we will gather all this data from user. While gathering data, we focused on getting more information in minimum number of responses. While gathering data, we need to ask only those questions which will give us more as well as correct information. Similar rule applies on image set section. We need to provide only those images whose meaning is correctly understood by the user. Then we will apply supervised machine learning algorithm for analysis purpose. Lastly we have imported this model in android app for giving analysis result.

VI. References

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