



# Student Stress monitor

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## **Topic:**

Monitor student life with mobile data to predict stress and mood.

## **Introduction:**

A student's daily life may contain many hectic situations. Life has become so fast that it is possible that the student may lose interest, get depressed or just be overwhelmed by all the assignments, quizzes and deadlines. Looking towards the brighter and smarter students we also compare ourselves and lose confidence and motivation. A student has to handle many subjects at once and may also fail to manage time equally among courses.

The percentage of a student becoming depressed is increasing in Pakistan rapidly. However the number of Psychiatrists and Therapists is not enough. It is human nature that we want to hide our feelings and our problems. We feel uncomfortable when going to a therapist or a psychiatrist. It is easy for our users to let the app monitor their activity and predict the changes in their behavior.

Depression is prevalent on college campuses, and is also the most frequent precursor to suicide. The fact that 18–24-year-olds have the highest incidence of suicidal ideation, and suicide has become the third leading cause of death among college-aged individuals is the major concern of our young generation.

## **Proposed Solution:**

Our app will provide a student their own personal therapist just on a click. We want to assess a student's life. Provide them relief and relax them so they may excel in their studies. We want every student to work hard and have a bright future. The suicide rate has increased due to stress and as result parents lose their child, friends lose each other and siblings forever mourn their loss. We want to be able to provide initial relief, predict their stress, and monitor the activity through different means and alert them.

## Methodology:

Since we are students who are developing our first mobile application project, we had a huge learning curve to overcome. We started off rather slowly, because we had to learn some of the basic functionality of Android Studio. We had to learn a new set of tools that was poorly documented and thus, we faced many major issues.

### 1. Text Emotion:

Firstly, we had to solve how to use the API to grant us access to their servers to use the WatsonToneAnalyzer. Secondly, using the WatsonToneAnalyzer required those requests sent to the IBM servers to be implemented as background tasks. Learning the API was nearly impossible from a mere trivial usage test of the API. After overcoming these two hurdles, we were finally able to develop a working command line interface that could take the user's input, and return a JSON output with various analysis results based on the input. Having gotten this far, then main challenge was processing this dataset, figuring out how to parse through all of the data and pull the information we wanted, and then keeping it light weight to make sure it would run on an android device. We had to learn how to use the standard Java libraries to parse through the API Response, and got a rough draft working for the inter impresentations.

Next, we focused our attention to making the individual components. We started with "MoodEntry", then we worked on the "SMSAnalysis", then we added graphical visuals like the pie chart and the timeline. Lastly we added an aesthetically pleasing intuitive design. The user can make their own private entries directly into our app, acting like a "SmartDiary". The user is able to select contacts from their phone to analyze text messages to identify sources of positivity or negative sentiment. We kept the two main features of analyzing diary entries and reading the user's messages, which were implemented in parallel with the progression of the course (namely learning about permissions and running tasks on a separate thread). Also, we collectively decided as a group that reading someone's SMS conversations would give a better insight, So we have made an optional feature inside it from where user can predict mood using someone else's SMS. To predict someone else's SMS, you must grant permission to access your contact list and read text from it.

## **2. Face Emotion:**

The purpose of this feature is to utilize the Microsoft Face API to not only detect individual faces in an image, but also for each face provide information such as emotions, the estimated age, gender, and more. Possible applications for this feature are at amusement parks, classrooms, and residential homes. The Face API can perform emotion detection to detect anger, contempt, disgust, fear, happiness, neutral, sadness, and surprise, in a facial expression based on perceived annotations by human coders.

To be able to look at the face and do some prediction. it needs access to camera and external storage to save a picture. After prediction it shows the result on GUI:

## **3. Speech Emotion:**

In this feature, the user has to speak and then press the button for a result. To be able to record and analyze for emotions from a given audio file, your app must tell the user that it will access the device's audio input and read from external storage.

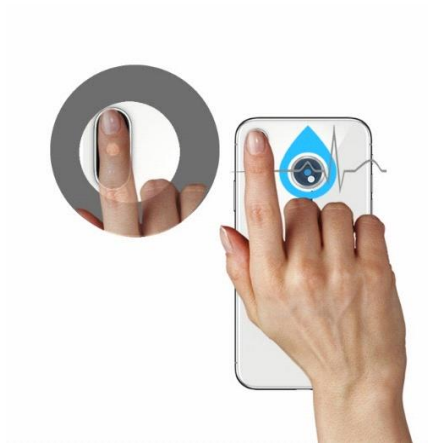
Recording of voice from the audio input hardware of the device is automatically handled by the library, so you need not to worry about using can use async method to analyze for emotions on a background thread. But only if you wish to handle voice recording by yourself, or want to voluntarily process any audio file to extract emotions

One Important thing is that Vokaturi currently supports audio file of Wav format only. Trying to process audio file of any other format will result in receiving an exception.

## **4. Through HRV:**

This feature Collects Heart Beat data and will show the result as beats per minute along with graph. This feature will also save the result with time and date so that user can look after his stress level. User has to hold the tip of his index finger over the camera lens of his phone. Within ten/fifteen seconds it will compute your heart rate and update the number next to the app.

This feature uses camera2 API for HRV analysis.



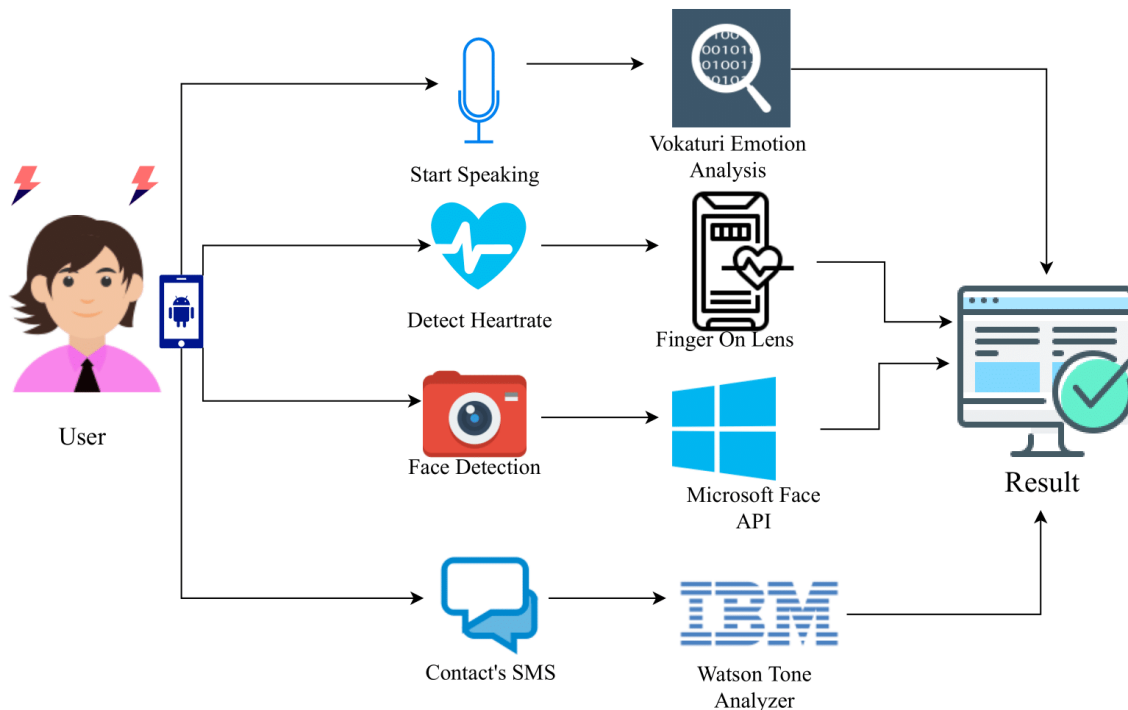
### **5. Stress Prediction Through Movement of Smartphone:**

Psychologically, when we are in a stressful situation, our hand movement is increased. So this was the idea to use this feature in our app for perfect stress analysis.

This app also focuses on the movement of the smartphone and if the smartphone has higher level of movement then it will vibrate and show a message as "You Seem Stressed".

Then implement a code that will observe the movement of a smartphone in Three Dimensions and if it crosses the given threshold limit then The Smartphone will start vibrating and show a message as "You Seem Stressed".

### **Flow Diagram:**



## Conclusion:

As a group, we consider the final product delivered in the time we had as a great success. We had many challenges throughout the quarter not just as developers but as university students and yet we managed to overcome these challenges and produce an amazing product. One of the big challenges that we faced was working with the Machine Learning: IBM Watson Tone Analyzer, Vokaturi Speech Emotion Recognition, and Microsoft Face API. The coding for these algorithm were extremely difficult to understand, as these were very technically tedious and robust. The difficulty was even more amplified by the fact that none of us had prior Android programming nor mobile application development experience. As a result, many of us ended up being confused along the way, and we spent many nights just trying to figure out tiny issues preventing us from delivering the product we wanted. However, we all feel that we did a good job and definitely put forth our best effort. We focused five different features to make a perfect app. Accelerometer Sensor (To look after the movement of a Smartphone, Camera along with Flash Light (To measure heartbeat), Camera (For facial expression detection and prediction), and Microphone (For speech emotion prediction). We have also focused on mood prediction through text messages because that allowed us to show the true emotions that people may have within

their closest and personal relationships. We also wanted people to be able to enter their own text into a journal and be able to see how their emotional state is growing overtime, which we were able to implement successfully although the presentation of that diary data could have been more advanced if there were some more members in our group to develop the application. Being able to apply what we learned and what we haven't was a very satisfying experience.