Lae-Dep

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**Abstract**

One of the core aspects of maintaining a healthy lifestyle is mental health. Unfortunately, many individuals suffer from depressive symptoms in their day to day lives, which unchecked, may lead to more serious physical and mental problems down the line. However, many of those experiencing such symptoms may not seek professional health for one reason or another, while others may not suffer to a degree where it is necessary to receive such help. In order to assist individuals in these situations, technological advancements have made it feasible to allow users to alleviate their symptoms privately and in a practical manner.  Research studying the effects of certain stimuli on the human brain have supported the idea that shapes, colors, and fonts can be linked with certain human emotions and states of mind. Building upon these studies and ideas, we have built an application for Android mobile devices capable of assisting a user in gaining self-awareness by analyzing their state of mind through the use of these factors. This awareness is also used to support the user through positive messaging techniques based on the user’s current mind state, in order to assist in dealing with depressive symptoms that the user may experience.

**Background**

The title for our app Lae-Dep stands for Laevo Depressio, meaning to uplift depression in Latin. The inspiration for our logo, Acumen Animus, is also Latin, signifying an ability to understand the soul, mind, heart, and feeling. The terms were selected by Seth Krinsky, our art provider and consultant, for their soothing origin and uplifting meaning. This application seeks to uplift the user’s spirits when they are experiencing negative emotions, maintain a healthy mental state when the user is experiencing a positive outlook, and provide both advice and motivational phrasing to the user to enhance their quality of life. The implementation of augmented reality is designed to enhance the user experience while remaining completely optional for the user in order to maintain client convenience during the experience.

**Method**

Since augmented reality mapping works best with objects that are strongly outlined, such as cartoons and figures, we had to find an appropriate medium to map. Our original idea for this application stems from the concept that basic colors are known to have an effect on a person’s mood. An example of this is the calming effect of the color green, or the tendency for the color yellow to induce anxiety. We extended this concept to include different fonts and shapes as well. Using this concept, we decided to make custom cards of various shapes, colors, and fonts that would be used for the mapping. The augmented reality will display an embedded video animation that pertains to users dealing with depressive symptoms. Additionally, we realized that a travel mode would also be necessary for users who didn’t have access to their cards.

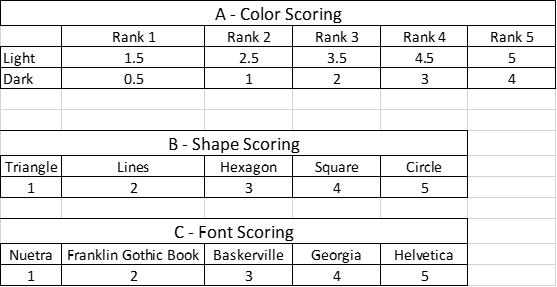
Two of our biggest challenges stemmed from implementing the libraries and technologies necessary for the augmented reality to function, and designing an algorithm for choosing the motivational phrases for the “travel mode” of the application. In order to get the augmented reality portion of our application to function, it was necessary to import Unity and interface it with the prototype we created. After that was accomplished, our graphic designer mocked up some 3D images to display. The second challenge was creating an algorithm that assigned a value for each shape, color, and font to create a scoring system. This score ranks the users depressive state from high to low (not depressed to very depressed) and assigns an appropriate motivational phrase. Additionally, the ranking of these shapes, fonts, and colors will not be shown to the user. This is to prevent any bias toward the user might have. For example, if the user knew that the circle shape corresponded to a higher rating, they might choose it to get a specific result, thus nullifying the purpose of this application.

With the previous challenges in mind, we structured our application to provide a simple user interface with an emphasis on the aforementioned shapes, fonts, and colors. This allowed us to focus on the functionality of the augmented reality as the main objective and gave us room to implement other small features. These features include an alarm clock that would display a motivational phrase at a user designated time interval and play a soothing tone as an alert; and a people depository for entering both positive and negative interactions that the user might experience on a day to day basis.

**Results**

The algorithm conceived for determining a user’s mood involves summing the provided values for the shape, color, and font selected by the user, then normalizing the result to a scale ranging from one to five, with five representing a positive user outlook and a one representing a poor mood. The app then selects a motivational quote based upon the result and displays it for the user, either as an attempt to improve a user’s mood or to maintain their current mood, depending on their projected current state of mind. We have determined through discussions and meeting with Professor Sakraida, a professional at FAU supervising the health care students and portion of the course project, that ideally the user should be encouraged to provide two checks a day in order to effectively track the state of depressive symptoms over time.

**Caption**: The ranking system for each of the variables the user selects while executing an evaluation. Colors are set by user preferences, so they are marked here by ‘Ranks’ depending on user choice.



AR implementation was utilized within the study to add an interactive component to the app in an attempt to draw the user in, encouraging them to take their experience with the app more personally, with the goal of maximizing the impact of the personalized positive support for their depressive symptoms. Originally, the product would have the user select a color card and overlay the card with a smaller shape card and font card on top. Then, activating the AR scan, the camera on the user’s device would determine the user’s selection and provide an augmented motivational quote on the screen based upon the cards targeted. Experimenting with the AR functionality while coding the system, however, led to our realization that small color cards, shape cards, and font cards did not vary wildly enough by the AR systems to be selected as separate targets, and therefore, the idea had to be compromised while experimenting with different targets. Currently, there exist three images that are able to generate an augmented motivational quote on reality, but these are not based on the research, and are not randomly selected. This, in turn, transformed the apps travel mode into the main self-checker and function for the app in its current release.

**Discussion**

The majority of our application stems from research done from a marketing perspective. Despite  but there is not as much information that relates color to depression in a clinical setting. It is a common practice in marketing to use colors and shapes to subconsciously influence their target audience. For example, market research has shown that the colors red and yellow are linked with an increased appetite in restaurant patrons. This can be seen in many popular restaurant chains such as McDonalds, Burger King, and Wendy’s, all of which heavily incorporate one or both colors into their logo’s and/or establishments.  This practice inspired the core functionality of this application, which is to have the user select cards comprised of different shapes, fonts, and colors in order to display a motivational phrase. This phrase is selected via an algorithm which scores these selections based on our research.

A major point of interest in defining our algorithm for determining the user’s score was the question of how to rank the colors. It is known that certain colors have been shown in studies to impact and reflect on an individual’s state of mind, and that the user selecting a color may give an inkling into the state of their mind subconsciously based on the results of these studies, but then how do we handle a user who’s favorite colors happen to be one’s linked to a negative state of mind? Our app in its current release implements a standard set of values for these colors in the algorithm, but the groundwork for plans allowing the user to select their favorite and least favorite colors has been laid within the code, and was planned to be implemented. More research should be conducted to determine whether user preferences in color choice should affect the rank and value each color is given within the algorithm , and if so, by how much.

The current release of Lae-Dep’s determination algorithm weighs shape, color, and font equally. Since little research has been done within this area of study, it is difficult to ascertain whether one of these factors should have a higher or lower impact on determining the user’s score. For example, if the user selects dark red, the color representing the “lowest” state of mind, and a circle, representing the most positive state of the shapes, it is unknown whether the choice of red takes precedence over the selection of a circle in hypothesizing the user’s overall state of mind.

**Conclusion**

Although this application should not be used as a replacement for a healthcare professional, we seek to provide a user with a means of alleviating their depressive symptoms. Depression and depressive symptoms are a serious matter, but anyone who suffers from them knows it isn’t always easy to seek help. Sometimes these symptoms are alleviated through means of activity, hobbies, companionship, and in more destructive cases self medication. If a user can find relief from their symptoms through use of this application, then it can be seen as a useful tool in helping them. Going forward, our team would like to implement features to increase the database of phrases, as well as increase augmented reality support, and add a more robust logging feature for users to journal their good and bad moments.