Monitoring Social Anxiety with Phone Based Sensors

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1 Status report

1.1 Proposal

1.1.1 Motivation

Social anxiety is a rampant issue in modern society, and incurs a lot of costs in treatment and public healthcare. It can lead to worse situations as well, and it may not be only the affected individual that suffers. Issues such as this can present a toll on those close to the victim. Research has shown that users of mobile phones can be accurately identified by looking at the usage patterns of the devices. With this in mind, the next step would be to see if analysis of mobile device usage patterns allows for accurate prediction of social anxiety within the user.

1.1.2 Aims

This project aims to see if social anxiety can be predicted in mobile phone users based on their usage patterns. If successful, the project will present a model that could be used and improved. The project also aims to maintain user privacy and security in regards to the collected data. The effectiveness of the model will be experimentally validated. The data collection will be done through an Android app that will be installed on the subjects' phones.

1.2 Progress

- Language and testing medium chosen: it will be an Android app written in Java.
- Application structure outlined: persistent notification that will keep track of user sessions and collect data
- Analysis language: Python
- Ensure user privacy: data is stored only on the Android device
- Eliminated another way of creating the application through a small personal trial. This also allowed for a lot of bugs to be fixed within the data collection process itself
- Initial version of the data collector was created
- Initial work started on the second version of the data collector
- Took inspiration from previous research papers on how to create the data collector

1.3 Problems and risks

1.3.1 Problems

- The current implementation of background data processing is broken due to a recent Google update to my phone, hence I needed to restructure my implementation and begin work on a different version that would not be rendered broken by a future update.
- Trying to figure out what sort of data to collect to have enough. If a model is to be trained, it would be best to have a lot of data as well as good data.
- Finding test volunteers is taking more time than expected.
- Understanding how to statistically analyse the data.
- The current data collector stops collecting altogether on a crash. It needs to gracefully restart with little to no impact on the data itself.

1.3.2 Risks

- As usual, Android updates. **Mitigation:** Ensure that the application follows the current standards of development and does not use any methods that may be deprecated or removed in the near future.
- The app may crash on a subject's phone and render the data useless, or stop collecting altogether with no warning. **Mitigation:** Integrating some sort of crash collecting tool within the app that will notify me or the user as to what the problem is.
- Ensuring that data is handled properly and not lost. **Mitigation:** The user has to be told to not clear the app from memory or clear its internal data.
- Losing test subjects between trials. As I want to do trial runs to fix bugs and improve the application, I need to make sure that the subjects remain. **Mitigation:** Make the subjects do no work besides giving feedback and installing the application.
- Too much noise in the data or model features are not significant enough. **Mitigation:** No current mitigation has been found for this. A solution may appear after the intial trial runs are finished.

1.4 Plan

Semester 2 *Subject to change*

- Week -1 (Winter break): Develop the next version of the data collector and do a personal trial to find bugs. **Deliverable:** Version 2 of the data collector ready to be trialed with larger audience.
- Week 1-2: Do trial run with larger audience for a couple of days and see what needs to be improved. Look at federated learning so that data can stay on the user's phones. **Deliverable:** Application with fixed bugs and any new updates.
- Week 3-4: Do a second trial run with the updates and gather feedback as well as look at how the data analysis can occur. **Deliverable:** Final version of the application.

- Week 4-7: Do actual experiment with trial subjects for 2/3 weeks. Prepare for the data analysing so that it can happen as soon as the trial is done.
- Week 7-9: End experiment, gather data, analyse it. **Deliverable:** Some sort of result based on the analysis
- Week 9-10: Discuss results with supervisor.
- Week 1-10: Continually work on the report. **Deliverable:** Initial draft of the report before the deadline.