Overview (100 words)

​The project consists of two elements, the Bluetooth sensor and the receiver. The sensor is planted a person’s neck, this is done without surgical aid. The sensor should be in the form of a small circle, roughly 1.5cm in diameter, 2mm thick. There, it will measure biometric data through contractions of muscle caused by the Golgi tendon organs and body temperature, speech vibrations and perspirations. The bio-signals associated with each emotion as previously defined by scientists allow the sensor to pick up exactly what emotions the patient is feeling. The receiver, in turn, will pick up the signals as transmitted by the Bluetooth sensor. Once the correct signals are acquired, the receiver matches the data with a database that allows the receiver to translate the signals into emotion. Once this is achieved, the receiver will make the appropriate decision to cater to the patients emotion, such as playing a song that fits the patient’s mood or connecting the patient with a help line without them having to do so.

Motivation (100) words)

Beyond Blue states that ‘*1 in 5 Australians experiences a mental health condition every year’* and that almost half the entire population (12,386,123 people) will experience a mental health condition in their lifetime.

The Australian Bureau of Statistics states that ‘*an average of 8 Australians take their life everyday…*’, demonstrating the devastating and significant impact of depression on our society.

The Bureau also claims that 3 million Australians are currently living with depression and/or anxiety.

The consequences of mental health issues are well-known, and it is my conclusion that any project(s) that aim to combat mental health should be pursued in their entirety.

Description (500 words)

The sensor should be in the form of a small circle, roughly 1.5cm in diameter, 2mm thick and situated on the patient’s neck. It will measure biometric data through contractions of muscle caused by the Golgi tendon organs and body temperature, speech vibrations and perspirations. Indicators such as heartbeat can signify elements such as excitement or arousal, so it is important for the receiver, upon collecting the signals, to correctly differentiate between the alternatives. The perspiration of the patient can be collected by connecting two electrodes to the skin, which will test the patient’s conductivity, thereby indicating their level of perspiration. The sensor will also be able to pick up speech vibrations and be aware of when the subject is talking. The receiver will notice any irregularities and analyse whether the patient is calm/relaxed or nervous. The bio-signals associated with each emotion as previously defined by scientists allow the sensor to pick up exactly what emotions the patient is feeling. The receiver, in turn, will pick up the signals as transmitted by the Bluetooth sensor. Once the correct signals are acquired, the receiver matches the data with a database that allows the receiver to translate the signals into emotion. Once the emotion is determined, the receiver is obliged to respond accordingly. If the subject is feeling happy or in need of cheering up, the receiver will play a song, utilising the database to collect data on what genre/type of song is appropriate for the current mood. It is worth noting that the beats per minute (BPM) encoded within each audio file should exactly match either the patient’s current or desired heartbeat. The modulation of beats per minute within song generation was designed to mimic heartbeat, so finding a match should not be a problem. The receiver will also generate a smart playlist of similar songs. It is crucial that the receiver is notified of outside elements that will affect the patient’s mood (such as if the patient is a minor or if the sensor is not correctly positioned) and take it into account. If the patient’s current emotion is outstandingly negative, the receiver will respond accordingly, such as a phone call to mental health consultants/ help lines, recommendation for counselling, etc. The response should also connect the appropriate help line (i.e. Indigenous reserved help, teenager or elderly specific mental health consultants. The project is designed to recognise mental health rather than directly combat it, as a virtual mental health consultant might prove to be more harmful than useful. Comparatively, worst case scenarios of the proposed project and virtual mental health consultant differ in severity, the proposed project, at its worst, would cause a patient to be incorrectly recommended mental health consultant advice where it is not required. This scenario is easily overcome. Alternatively, the virtual mental health consultant, at its worst, could offer the wrong mental health maintenance strategies and potentially accelerate the patient’s illness.

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Tools and Technologies (100) words)

​ The receiver should take the form as a piece of hardware, a small focused computer, which shouldn’t be too big, approximately a cube/box with 30cm x 30cm sides, capable of containing the databases used to match input. The receiver could be more affordably accomplished as software on a device such as a Raspberry Pi 3. The sensor should be in the form of a small circle, roughly 1.5cm in diameter, 2mm thick. Technology similar to the Moodmetric Ring and improved sensors found on many monitoring devices such as the Apple Watch in cohesion with biometric data collection methods are required to put the project into motion.

Skills Required (100 words)

​A detailed understanding of Bluetooth, audio, mental and sensory technologies are pivotal to the requirements to build the project. It is also a requirement to be able to build the necessary hardware (the sensor and receiver if Raspberry Pi alternative is not used). For the software, the engineer must be capable to the extent that he/she can make various reliable databases that can be accessed via the Bluetooth sensor. The most crucial requirement is that the data regarding mental health is reliable and correct, so a reliable consultant is also required for reference.

Outcome (100 words)

​The outcome or end goal of the project is to efficiently and effectively construct an interface that responds depending on the subject’s mental health. The project is designed to operate without manual user input, hence the sensor technology, as self-diagnosis of mental health conditions is largely unreliable.