Project Specification

For

Criminal Assessment System

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1. Introduction.

1.1 Purpose

Our software will be able to assist experts and diagnose mental illnesses in victims while they are being interrogated by making use of responses to questions such as “how are you feeling?” etc and noticing the verbal and non-verbal communications of the victim. The input will be in the form of audio, video, and sensors. The software will then make use of AI to deduce results.

In 2002, a victim Imdad Ali was sentenced to be hanged for murder, his wife couldn’t afford a psychological expert to attest to his illnesses, as a result the trial took 10 years and it finally diagnosed him with ‘paranoid scizophrenia’.

In 1989, Kanizan bibi was arrested for the murder of 6 people and sentenced to death in 1991. But after 26 years, Punjab Institute of Mental Health (PIMH) found her to be suffering from schizophrenia. She is still languishing in jail.

1.2 Document Conventions.

Formatted upon the IEEE standards and how it was outlined in project details.

1.3 Intended Audience and Reading suggestions.

The report is intended for our course instructor and any interested psychology students who want to understand the reason for the software and how psychology has been incorporated in the software.

1.4 Product Scope.

The scope of the product is to help ensure a fair trial for suspects who are mentally challenged and get wrongly penalized. The product is targeted for the justice system. We have developed the software to ensure that the trial is fair for suspects, investigators, judges and makes use of technology to make the best decisions.

1.5 Product Pre-requisites.

The product has some requirements. It is based for human users and needs support of a professional in the psychological field, they also need to be certified to use this software. The software product requires some external hardware to function. It will require sensors, remote sensors, pressure sensors for heartbeat rates, temperature sensors, cameras, neural hardware, a screen for display and a power source.

2. Overall Description.

2.1 Benefits of our software.

1. Can make use of emotional intelligence to ensure that the criminal trial does not suffer from issues such as racial profiling, use of excessive force which may arise due to problems of the officers. Helps ensure a fair trial.
2. Help in diagnosing mental illnesses in victims for e.g making use of acoustic sensors to diagnose illnesses by judging reactions involuntary that can be used to diagnose criminals as unfit to stand trial.
3. Decrease load on the interrogator and provide an alternate to ensure no biasness. Provide ideas to interrogator.
4. Has a high rate of accuracy, we have a long way to go but AI can correctly diagnose illnesses, detect subtle changes by up to 80%.
5. Provide a multiple frame of reference. For instance, an interrogator can focus only 1 aspect, but the software will be focusing on multiple aspects to deduce results. Multitasking.
6. Data can be collected and used in future for reports, researches, and for use for psychologists, psychiatrists at the same time.

2.2 How Psychology is incorporated in our software.

Social culture and cognitive theory.

Firstly, the investigator should run a background check on the criminal he is assessing using the software as it is linked to the health database. The interrogator can check history, gain knowledge on his impulsivity and temperament which by the way can also be checked by the sensors incorporated with the software, have an idea of how the criminal thinks, substance abuse(if any) and any family/relationships/childhood problems. As we studied the Genie Wiley case in which the father used to strap her daily on a toilet strap and forbade anyone interacting with her along with keeping her malnourished severely, that

child later went on to face difficulty in communicating and interacting socially. Severe cases like these can often cause brain damage, intellectual disability and enable a person to think differently hence, making it more important to study their past so as to make sense of their thinking and reason behind committing several crimes.

Communication styles.

Several styles of communication will be stored in the database and using machine learning algorithms, the responses from the criminal will show the investigator the communication style of the criminal which is of utmost importance so as to tackle and interrogate the criminal in the best way possible. If, for example, the criminal starts to speak in a loud tone and refuses to cooperate on the questions being asked, then our software will generate a number of responses on the screen for the investigator to choose and carry the investigation forward accordingly. It can, for example, suggest threatening the criminal regarding his peers and families, or maybe suggest some surface-level questions before moving onto the difficult and complex questions so the criminal goes with the flow in an orderly way. There is no best response to a given situation and choosing it depends on the investigator's skill and experience.

Stress Management.

Software can help in stress tests, by advising the interrogator a short test for ease of the suspect. The software can advise the interrogator things such as suspect is stressful, remind him for deep breaths and some questions that can decrease stress etc.

Mental and Physical Health.

The software will continuously be collecting data which can also be provided to physiologist and psychologists to get the most out of the data. The AI algorithm, and the experts can use all data at disposal to diagnose illnesses.

Non-verbal communication.

In a criminal investigation, it is important to make sure if the suspect is lying or giving statements based on truth, therefore when asking questions regarding the crime scene and other related things, it is essential to make sure that every move,

every single gesture and the way of response of the suspect is noted and captured. Once these gestures are carefully observed, we can apply the psychological principles and make conclusion through our observations about whether the suspect is lying or not, whether he's responding under pressure or freely.

Attitude.

The "Attitude" which basically means evaluating the suspect's behavior, belief and response positively or negatively towards the questions asked.
Understanding through his attitude will help us predict his behaviors and past actions that may have happened.
The three components of Attitude are very essential and valuable for our Criminal Assessment System. The first component which is the cognitive component is important in a way that the questions that are being asked to the suspect will help us note down his values and beliefs about the incident that had happened.
Understanding the second component of attitude which is the behavioral component will reflect on how the suspect behaves/acts upon to relevant questions and scenarios he's asked about the incidents that he may have been involved in.
The third component refers to the affective component which focuses on the feelings of the suspect which may not be easy to understand directly therefore we'll take help from the second psychological aspect used by the CAS which would be "Emotions".
To understand these feelings, we can focus on the expressive component of the emotions to carefully observe how the suspect is showing his emotions for example the suspect is smiling while answering, or sighing, responding uneasy feelings or being angry regarding the questions asked.

Persuasion.

Furthermore, we can use different techniques such as providing interrogation questions that can help the interrogator look trustworthy, where the suspect can comfortably add their responses without being too much pressurized or nervous due to the aggressive interview nature. However in certain cases when needed for observations, this method could be changed and done both ways (a calm and

an aggressive) to calculate the difference of responses of suspect in each environment.

Emotion of fear.

Liars can feel extra fear from worrying to be discovered than truth-tellers, and according to the "leakage theory," the fear is almost impossible to be repressed. Therefore, we assumed that analyzing the facial expression of fear could reveal deceits. It is an easy job for computer vision and machine learning as compared to laypeople. The leakage theory of deception predicts that when lying, especially in high-stake situations, people would be afraid of their lies being detected and therefore result in fear emotions. These fear emotions could then leak and have the potential to be detected.

- **Blood pressure and heart rate increase**.

Normally the blood pressure of a adult is defined as a systolic pressure of less than 120 and a diastolic pressure of less than 80 while in fear condition blood pressure is increase's up to 40% to 45%.

- **Breathing Rate.**

When a person is in fear condition they start breathing faster then normal person.

- **Voice Effect.**

Voice is experiencing unusual problems

If the suspected person is criminal then their voice would be shaky, crackly, raspy or more raspy than usual, voice would be broken, where some words are more quiet than others, or that they don't come out at all.

- **Eye Moment.**

If a suspected person committed any crime that they will make less or no eye contact with the investigator.

- **Sweating Body.**

Body of the suspected person start sweating.

2.3 Operating Environment.

The software needs to have an integrated hardware system for all components. The user of the software can be investigators. Thus they need to have some training such as being aware of basic psychological principles.

2.4 Execution Steps.

To execute the project we plan to follow these mentioned steps:

1. First of all, find all the hardware and agree upon certain types.
2. Then take consultancy of psychologists and physiologists about rates of change and incorporate their experiences.
3. Search for a data set to base our machine learning and artificial intelligence algorithms on.
4. Develop the software code and integrate it with hardware.
5. Apply machine learning and artificial intelligence to provide predictive intelligence.
6. Test the whole system in completeness.
7. Solve any problems and carry out some test trials.
8. Take any added consultancy from experts of law, psychology etc.
9. Implement and make the system ready.

3. Conclusion.

The system can help shape the future for a fair justice system. It can elicit the criminals and demark them from suspects. Also, it saves those mental patients who are completely unfit for trial and can get wrongly penalized as seen in history. The systems benefits are many and can solve real world problems. The concepts of psychological concepts alongside the latest technologies are integrated to make a system that shows the advancement of the world into acceptance of mental health issues and also use psychological tricks to capitalize in pursuit of the truth for the justice system.