Increase Humanity with the Help of Human Computer Interaction

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Abstract - *Although human-computer interaction is a multidisciplinary field of research, it has primarily concentrated on improving the usability of modern technology to date. In our research we will use this field of study for the entirely opposite purpose.*

In this study, we'll look at how to increase mental stability in the face of modern technology's influence. In this process, human inputs will be taken, processed in the machine, and the result will be used as input to the human mind in order to improve the overall stability of human thinking.

This study consists of three main research subjects which are human psychology, human computer interaction and in default case we will take music therapy.

First, we'll examine the many elements, then combine them all and build a thesis about the process. Finally, we'll demonstrate how it works using an example.

Key Words: Human computer interaction, Humanity, Mind stability, Technology, Safety.

1. INTRODUCTION

1.1 Importance

The thesis is focused on the relationship of new technology with the actual human world, and how this interaction can be used to raise humanity's level. Unlike most recent ventures, which are solely for commercial purposes, this study is entirely focused on how modern technology can manipulate the level of emotions in the human mind, allowing an individual to think before acting destructively.

1.2 Lacking in current knowledge

Human-computer interaction (HCI) is a multidisciplinary area of study that focuses on the design of computer technology, specifically the interaction between humans and computers. This includes the use of advanced artificial intelligence, machine learning, deep learning, and neural language. Technology is now being used to improve the precision of results in all aspects of everyday issues, but there is one major flaw, technology cannot be used to increase the level of emotional reactions in human minds. So that people can make precise decisions about their actions.

1.3 Objective

The main goal of this study is to use new technologies to make the world a better place for all living things. Since humans are already the most dominant beings on the planet, eliminating negative feelings in their minds will easily reduce crime rates. This study can be applied to every aspect of human technology evolution in future research. The later effect will also be shown in this research paper as well.

2. Main Concept

The basic purpose of human-computer interaction is to obtain correct output from the computer without exerting excessive effort while providing input. Here input has been given by the human and the output has been generated by the computer. In this topic of study, we will employ the polar opposite of human-computer interaction, in which the computer provides the input and the human generates the output.

2.1 Atkinson–Shiffrin model

Let us look at how it works. First, humans will get input from the outside environment through several input-output channels such as the visual, auditory, hepatic, and movement channels. This information will be preserved in the memory of humans.
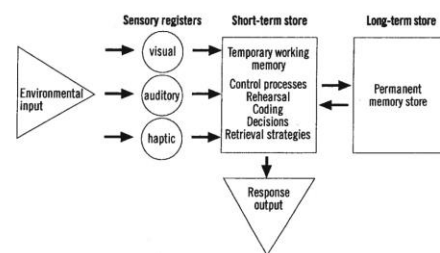
Figure-1: The flow of information through the memory system, Atkinson and Shiffrin.

The **Atkinson–Shiffrin model** (also known as the **multi-store model** or **modal model**) is a model of memory proposed in 1968 by Richard Atkinson and Richard Shiffrin. The model asserts that human memory has three separate components:

1. A sensory register, where sensory information enters memory.

2. A short-term store, also called working memory or short-term memory, which receives and holds input from both the sensory register and the long-term store.

3. A long-term store, where information which has been rehearsed (explained below) in the short-term store is held indefinitely.

Sensory register- When the senses perceive an environmental input, it is temporarily stored in the sensory registers, as described by Atkinson and Shiffrin (also sensory buffers or sensory memory). Though this store is commonly referred to as "sensory memory" or "sensory register," it is actually made up of numerous registers, one for each sense. The sensory registers detect and keep the information carried by the stimulus, rather than processing it for use in short-term memory. The registers are referred to as "buffers" by Atkinson and Shiffrin because they prevent massive volumes of data from overpowering higher-level cognitive processes. When information is given attention, it is transmitted to the short-term memory; otherwise, it decays quickly and is forgotten.

Short-term store- While much of what is stored in sensory memory decays and is forgotten, some is remembered. The information that is attended to is moved to a short-term storage facility (also known as working memory).

Long-term store- The long-term store (also known as long-term memory) is a storage system that is more or less permanent. Information can be "copied" and transferred to the short-term memory, where it can be accessed and changed.

2.2 The main model to implement the whole process

2.2.1 Theoretical aspect

As per the basic understanding, we can easily conclude that till now the human action basically depends on the information stored in the short term memory store. In this study, we will observe how to manipulate the information stored in the short term memory storage with the use of the computer so that a person can make precise decisions before committing any action.
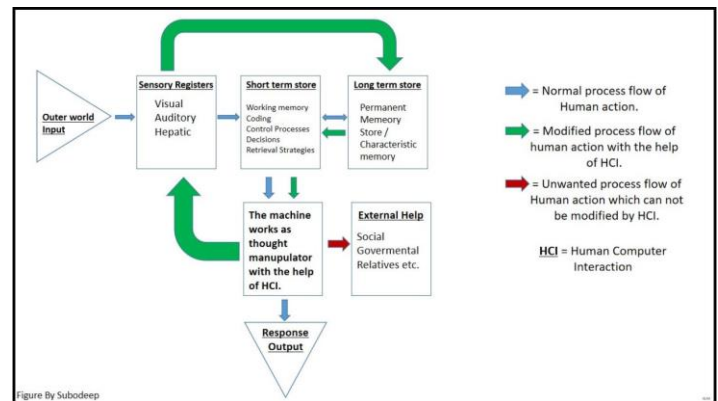
Figure-2: The flow of information in memory system and manipulation of response output with the help of human computer interaction, Subodeep Ray.

From the above figure we can observe how modern technology can be used to manipulate the flow of information so that human mind have control over his negative emotions. Let me elaborate the the process how technology is working here, we can see there are total two types of information which has been sent to the computer from short term memory store. The blue arrow denotes normal information that has no significant impact on changing human behaviour from normal to outrageous, therefore it will skip the system and the human will respond accordingly. The green arrow, on the other hand, represents a unique type of knowledge that has a significant impact on human behaviour and can cause a person to experience shock or excitement. This information will be captured by the computer before the person can act on this, this information needed to be modified in such a way so that the negative impact can be reduced. As soon as the computer detects this type of information, it will send a signal to the human sensory registers, which will retrieve the person's distinctive data from the long-term storage and send it to the short-term storage, where it will be processed accordingly. In this way, the person will either calm down or remain in the same state, and if the computer detects that the information has been modified and the person is calm, the information will be passed on to the acting stage normally; otherwise, if the computer detects that the person is still excited and is about to do something wrong, it will send an emergency message to governmental bodies, relatives, and so on for help. Here long term memory has been defined as a characteristic memory because the information stored in here can build the person's character, morality and the level of humanity.

2.2.2 Mathematical aspect

Let us see how to define the above explanation in mathematical format:

Here we will check the factors which can be used to detect the human behaviour by the computer.

Consider body temperature (T) and heart rate (HR) as characteristics that can be utilised to determine a person's emotional state; the explanation for this will be discussed later in this paper.

Research shows, for adults every increase in T of 1 °C, the HR increases by approximately 7 bpm and for children every increase in T of 1 °C, the HR increases by approximately 10 bpm.

Let us consider α is detecting factor(DF) by which the computer can assume the emotional condition of a certain person and the normal range for this factor will depend on the person's health condition, age and gender.

Where,

$$\alpha = HR * T,$$

The above equation represents a person's mental state, and in a normal state, the computer's range has already been preset so that it can understand a person's usual behaviour.

For certain information through outer world input if the value of α increase or decreases, then the computer can immediately assume the next action going to be done by that particular person, Artificial intelligence modules can be used here to get a more accurate result.

Here α is directly proportional with value of HR and T hence, if any of them increases the value of α will be increased.

If the value of α increase then the person will go into excited state and if the value decrease then the person will go into shock state.

Here we will introduce a factor ß called as wellness factor(WF), it will work inside the computer to normalize the value of α.

Let us consider the normalize value of α is α'.

Where,

$$\alpha' = \alpha * ß,$$

The value of ß= 1 (α is in normal range);

   ß > 1 (α is lower than normal range in shock state);

   ß < 1 (α is higher than normal range in excited state);

In practical scenario wellness factor is a sort of signal which has been generated by the computer in order to reduce the impact of outer world information in the person's usual behaviour, this signal will directly sent to the sensory registers and the rest flow has already been discussed earlier.

In the following part, the aforesaid strategy is demonstrated using a real-life example.

3. Real Life Example

In this example, we'll look at how to increase mental stability in the face of modern technology's influence. In this process, human inputs will be taken, processed in the machine, and the result will be used as input to the human mind in order to improve the overall stability of human thinking. This study consists of three main elements which are human psychology, human computer interaction and in default case we will take music therapy. First, we'll examine the many elements, then combine them all and build a thesis about the process. Finally, we'll demonstrate how it works using an example.

3.1 Detecting Factor(α)

As previously said, human inputs will be used, therefore we are taking into account changes in blood pressure when committing a crime, observing the changes in human psyche as a result of living in a dangerous environment is equally important.

A research of 53,402 people found that a spike in violent crime in Chicago in 2015, which included more homicide, assault, and robbery, was linked to a 9 percent higher risk of high blood pressure among individuals in low-crime areas compared to those in high-crime regions.

The findings imply that the environment has an impact on heart health, and that violent crime that occurs elsewhere in a city can have an impact on those who live there, even if they are not directly affected. Researchers wanted to see if there was a link between crime exposure and high blood pressure. They also wanted to see if crime had a larger impact on heart health and if stress responses varied by neighbourhood.

Overall, low-crime neighbourhoods had 22.5 percent lower rates of high blood pressure than high-crime communities (36.5 percent), and growing violent crime rates were linked to a 3 percent higher risk of high blood pressure. The association between an increase in violent crime and a proportionate increase in high blood pressure among persons living in safe neighbourhoods, however, surprised researchers.

The preceding statistics and conclusions reveal that blood pressure is intimately related to human behaviors and the physiological state of the human brain. Using this information, we may estimate the time of the crime. Here rate of change in blood pressure will be considered as detecting factor.

3.2 Wellness Factor(ß)

So, I'm sure you're aware of how music can affect your mood, but can it also effect your whole health and well-being? Let's speak about our brains and how the various sections of the brain work together. Musical activity is processed by the cortex and the limbic system beneath it. When we close our eyes and listen to music, the occipital lobe in our cortices develops the visuals that transport us to the ocean or a mountain. Our frontal lobe is processing the music and providing us with data that tells us what this piece of music is, who might be playing it, and what keys are used in it, as well as when we are performing music.

The parietal lobe senses our hands on the strings, and the auditory cortex is in the temporal lobe, which is where we process sound, so the temporal lobe is very active, but beneath the cortex is the limbic system, which is the state of our emotions, memories, and the automatic reactions that help us breathe and pace our hearts. You've probably heard of neurochemicals like serotonin and dopamine, which occur in a very primitive section of the brain yet are automatically activated by a piece of music that means a lot to us. These are feel good pleasure chemicals that are released when we listen to this music that we just love, research has found music activates the pleasure and reward areas of the brain, whether we are listening to it, singing it, playing it, writing it, or simply talking about it.
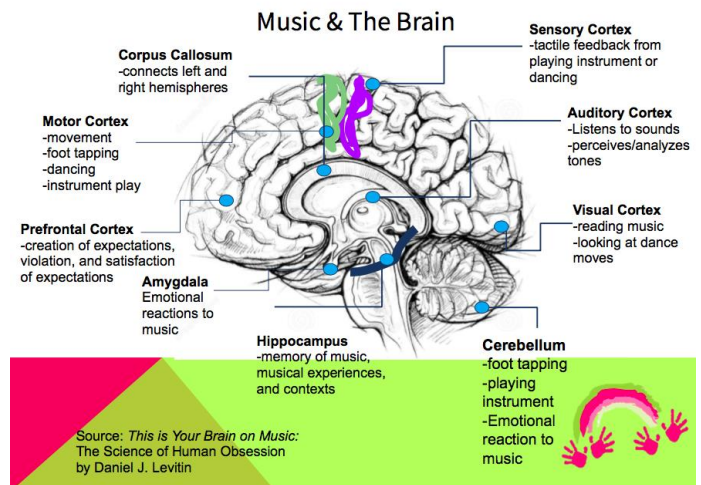
When we listen to music the autonomic nervous system is regulating our internal organs and helping us to survive the parasympathetic nervous system, is a part of this automatic nervous system that deeply relaxes us, it allows us to recover recuperate and if you ever listen to a piece of music that is familiar and comforting and associated with wonderful places and great people, then you know that your parasympathetic system is being active. Relax and enjoy yourself while you listen. On the one hand, the parasympathetic nervous system relaxes us, on the other hand, the sympathetic nervous system stimulates us. That's the section that deals with the fight, flight, or freeze reaction, which is our stress response mechanism, and chronic stress from being in a situation of threat is what causes diseases like hypertension, which leads to heart attacks and heart disease, gastrointestinal diseases, but music can not only relax us, but it can also bring us back to a state of equilibrium. When we listen to music, the pain signals are weaker because they come up from the source of the pain, which is an insult to our body, and then they are processed in the brain but if the brain is experiencing music at the same time, these things delay the pain signal on its way down to offer a bodily response to it. In this way, music really defuses the agony, saving the whole brain and allowing us to integrate our bodies, brains, and spirits.

The above explanation concludes that with the help of positive and calm music we can easily control the aggression of a person. Here music signal will be considered as wellness factor.

3.3 Integration and working of the whole system

3.3.1 Integration

Here we will be using a smart watch in the place of the computer which will act as the bridge between human emotion and human action. The watch is capable of tracking a person's heart rate and body temperature, as well as wirelessly transmitting that information to a smartphone.

Figure By Subodeep
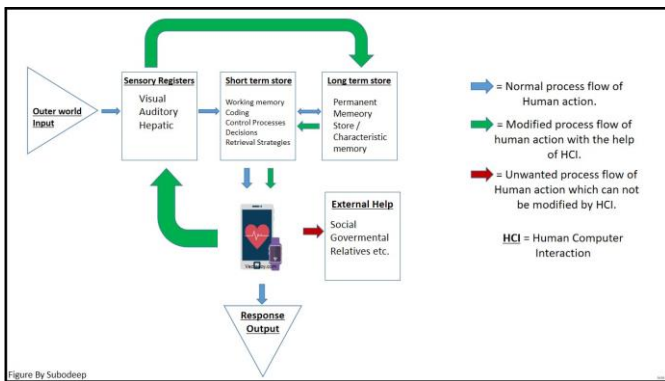
The figure above depicts the flow of data through the system and how it can be modified so that a human can act appropriately.

3.3.2 Working:

Any changes in a person's blood pressure or heart rate will be noticed by the smart watch, and if they are higher than or lower than the threshold, the smart watch will send a signal to the smartphone indicating that the person is either excited or shocked.

The smartphone sends out a wellness factor signal based on the individual's mental state to lessen the influence on the person's blood pressure, allowing the person to think twice before doing anything inappropriate. Simultaneously, if the impact has not been reduced by the wellness factor, the smartphone will transmit the "Help" signal to external bodies like person's relatives, government bodies etc.

If the person is excited, we can use calming music as a wellness factor signal, and if the person is in shock, we can use cheerful music.

In this way, the rate of crime in society will be lowered, and it will also aid in the detection of health issues such as heart attack and brain stroke, and the person's life will be saved by sending an external "Help" signal

4. Conclusion

Finally, I'd like to stress that our research has helped us comprehend how a computer can become a true companion in making life decisions. We've seen how technology can prevent individuals from doing things that can ruin their lives, as well as how it can save individuals in their time of need as a true friend. I'll wrap up this study by discussing some of the research's potential directions.

4.1 Future aspects

A. It can be used to increase mental health awareness.

B. Social security and lowering the crime rate.

C. Physical well being.

D. Social communication.

E. Crime free society.

F. Detecting criminal activity.

G. Increment the level of humanity for greater good.

H. Save children, environment and animals.

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BIOGRAPHIES

Subodeep Ray, an M.Sc. computer science student, has an ambition to create a society that is filled with humanity in all aspects.