

Mind Reading Machine is Co-ordination of Human Psychology and Computer Techniques

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Abstract

People express their mental status, including emotions, thoughts and desires, all the time through facial expressions, vocal nuances and gestures. Mind reading machine is co-ordination of human psychology and computer techniques. Some equipment are used to gather data & then analysed. To use those data for further predication of mind is known as theory of mind reading. Existing Human-computer interface are mind-blind, they are unaware to the user's mental states and intention. Drawing Inspiration from psychology, computer vision and machine learning, the team in the Computer Laboratory at the University of Cambridge has developed mind reading machines-computer. That implement a computational model of mind reading to infer mental states of people from their facial signals. The goals to enhance human-computer interaction through empathic responses, to improve the productivity of the user and to enable application to initiate interactions with and on behalf of the user, without waiting for explicit input from that user. There are difficult challenges: Using A digital video camera, the mind-reading computer system analyses a person's facial expressions in real time infers that person's underlying mental state, such as whether he or she is disagreeing, interested or bored, thinking or confused.

Key words: Introduction, what is Mind Reading, flow chart of mind reading, process of mind reading, Techniques, Advantage and Disadvantage of mind reading.

➤ Introduction

People express their mental states, including emotions, thoughts, and desires, all the time through facial expressions, vocal nuances and gestures. This is true even when they are interacting with machines. Our mental states shape the decisions that we make, govern how we communicate with others, and affect our performance. The ability to attribute mental states to others from their behavior and to use that knowledge to guide our own actions and predict those of others is known as theory of mind or mind-reading.[1] Mind reading computer may be defined as a machine that infers the human being's mental states. The understanding of a human's thoughts is one of the most complex tasks. No one knows what a person would do in the upcoming second by executing his present thoughts or what would a person thought about any other person or what would a person desires and many more. But a mind reading computer could give answer to all these questions[2]

➤ What is Mind Reading ?

Mind reading computer system technology can be used for checking the mental state of a person he doesn't need to type or speak anything system will understand this by default. University of Cambridge is also working on a model of mind reading. Mind reading can be done by scanning facial expressions.[3]

Using a digital video camera, the mind-reading computer system analyzes a person's facial expressions in real time and infers that person's underlying mental state, such as whether he or she is agreeing or disagreeing, interested or bored, thinking or confused. Prior knowledge of how particular mental states are expressed in the face is combined with analysis of facial expressions and head gestures occurring in real time. The model represents these at different granularities, starting with face and head movements and building those in time and in space to form a clearer model of what mental state is being represented. Software from Nevenvision identifies 24 feature points on the face and tracks them in real time. Movement, shape and colour are then analyzed to identify gestures like a smile or eyebrows being raised. Combinations of these occurring over time indicate mental states. For example, a combination of a head

nod, with a smile and eyebrows raised might mean interest. The relationship between observable head and facial displays and the corresponding hidden mental states over time is modeled using Dynamic Bayesian Networks. [2].

➤ **Why Mind Reading ?**

Imagine a future where we are surrounded with mobile phones, cars and online services that can read our minds and react to our moods. How would that change our use of technology and our lives? Mind-reading can also support on-line shopping and learning systems. There are many uses of minreading (See table 1)[4].

Table 1 . Different working areas of mindreading

WORKING AREAS	USES
MILITARY AREAS	A science fiction fantasy – the “Thought Police” – where the government reads people’s memories and thoughts and then rehabilitate them through torture before they ever even commit a crime based on a statistical computer.
MEDICAL AREAS	<ol style="list-style-type: none"> 1. Mind-Reading Computer Gives Voice, Movement to the Paralyzed: New technology may help those who are locked inside their own bodies (like in lockedin-syndrome). 2. Mind reader computer can communicate with the patients in coma: Canadian researchers have developed an interesting Computer which can read mind and could be helpful to communicate with the people who are in coma. This can be called a Computer Mind reader.
GADGETS	Mindreading technique can also used in mobile phones, cars, keyboards and mouse etc.

➤ **How Does it works**

- Futuristic Head Band

The system of it contains a head band that is repeated by send light emission to the tissues of the head where it is active. The band first measures the oxygen and then measures the blood around the people's brain which uses a technology called as Functional NearInfrared Spectroscopy(FNIRS). The user who uses this mind has a Futuristic Head Band.[5]

➤ **Flow Chart of Mind Reading Computers**

FLOW CHART OF MIND READING COMPUTER

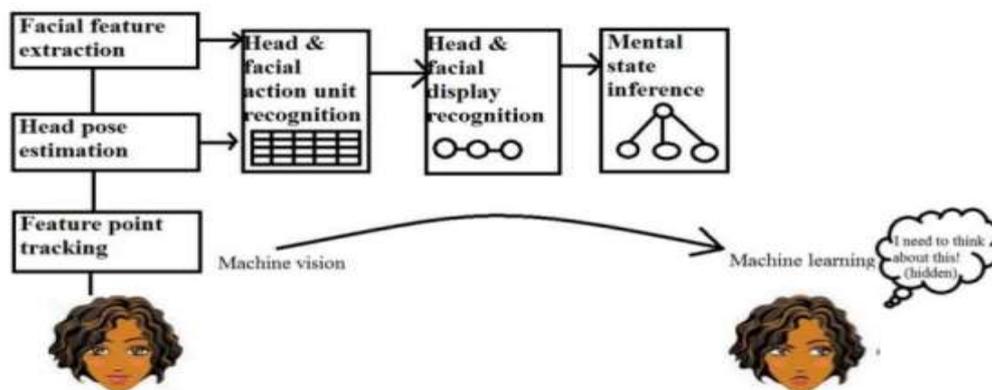


Figure : 2

➤ **Process of Mind Reading Computer**

PROCESS OF MIND READING COMPUTER

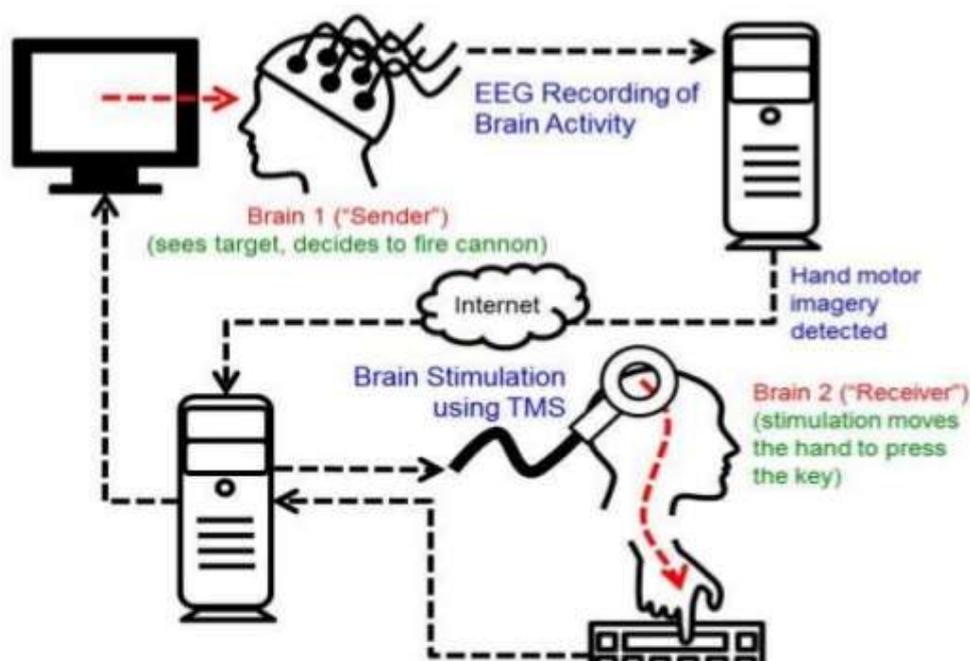


Figure : 3

➤ **Web Serach**

For the first test of the sensors, scientists trained the software program to recognize six words - including "go", "left" and "right" - and 10 number. Participants hooked up to the sensors silently said the words to themselves and the software correctly picked up the signals 92 per cent of the time. Then researchers put the letters of the alphabet into a matrix with each column and row labeled with a single-digit number. In that way, each letter was represented by a unique pair of number co-ordinates. These were used to silently spell "NASA" into a web search engine using the program. "This proved we could browse the web without touching a keyboard". [1]

➤ **Techniques**

➤ **Facial Effect Detection :**

It is done using hidden Markov Model, Neural Network processing or active appearance model.

➤ **Emotional Classification :**

Classification by Paul Ekman Anger, Fear, Happiness, Disgust, Sadness, Surprise

➤ **Facial Electromyography :**

It is used to measure electrical activities of Facial Muscles. The muscles used are "Corrugator Supercilli Muscles". [5]

➤ **Applications**

• *Applications of “mind-reading” technology*

Overview, previous approaches, limitations – deCharms (2008) discusses how real-time brain imaging (e.g., with fMRI) allows access to both subjective experience (to an extent) and to objective observations and quantitative measurements of brain activity. He outlines some past approaches to “mind-reading” as well as limitations to current approaches. This leads to a discussion of the applications of current neuroimaging research:

• *Lie detection*

a) Langleben (2008) argues that blood oxygenation level-dependent (BOLD) fMRI could be sensitive to differences between lies and truth. The key, he claims, is that BOLD fMRI can only *compare* states rather than positively identify deception. He discusses how many popular science articles conflate how much fMRI can do.

b) Mertens & Allen (2008) discuss whether ERP-based procedures could detect deception, instead of or in addition to fMRI.

c) Moreno (2009) discuss ethical issues in lie detection and how the law should be influenced by cognitive neuroscience, specifically in cases where neuroimaging could be used to determine truth, lies, and guilt.

• *Pain detection*

a) Marquand et al. (2010) suggest that supervised machine learning algorithms can be used to decode fMRI data. They use this kind of technique to show that fMRI can be used to predict participants’ subjective pain ratings and propose that it will be a useful method for producing qualitative predictions about brain states.

• *Brain-computer interfaces*

a) Direct brain communication in paralysis, motor restoration in stroke – Birbaumer & Cohen (2007) evaluate the use of EEG and fMRI in brain-computer interfaces, focusing on applications for paralyzed patients and for motor restoration in the case of stroke. Although currently, our understanding of the information flow in the brain that is required for such interfaces to work is incomplete, such interfaces will eventually be able to be used for direct brain communication and will allow otherwise “locked-in” patients to interact with the world.

b) Daly & Wolpaw (2008) also discuss advances in the analysis of brain signals and training patients to control those signals, focusing on EEG techniques specifically for patients with severe motor disabilities.

• *Pattern analysis and future research*

a) Norman et al. (2006) argue that fMRI data can be used in conjunction with sophisticated pattern-classification algorithms to decode the exact information represented in a patient’s brain at a particular moment in time. They discuss factors that would boost the performance of this method — it is possibly the most promising research toward actual mind-reading.

➤ **Advantage and Disadvantage of Mind Reading Computer**

a) Advantages of Mind Reading

The use of mind reading has many advantages and some of it is as follows:

- It can be implemented on the wheelchair and the wheelchair can be moved through the mind control. It permits the people who cannot use the normal wheelchairs and other wheelchairs easily due to their disability.
- This will aid the spacewalking astronauts and physically disabled persons.
- This type of system can send instructions to the rover on the other planets and also aid injured astronauts to control devices.
- This can be availed to exchange information on sly, people can avail them on crowded buses without the problem of being overheard

b) Disadvantages of Mind Reading

Along with the wide range of applications and advantages, the mind reading has some of the disadvantages and they are as follows:

- Before implementing the systems the scientist needs to train the systems about all the patterns to predict the result.
- Because of this scientific development, the scholars are questioning on the theories of criminal justice of the system.

➤ **Conclusion**

Mindreading is the ability to infer other people's mental state and use that to make sense of and predict their behaviour. In this paper we conclude how mind reading is done using some techniques. And different working areas of mindreading computer.

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