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Review Article

The Review towards Technique using Futuristic Head Band Approach to Human Mind

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Abstract

A computer can, in a very real sense, read human minds. Although the dot's gyrations are directed by a computer, the machine was only carrying out the orders of the test subject .The computer mind-reading technique is far more than a laboratory stunt. Though computers can solve extraordinarily complex problems with incredible speed , the information they digest is fed to them by such slow, cumbersome tools as typewriter keyboards or punched tapes. People express their mental states, including emotions, thoughts, and desires, all the time through facial expressions, vocal nuances and gestures a computer can, read it very real sense. Although the dot's gyrations are directed by a computer, the machine was only carrying out the orders of the test facial expression. The computer mind- reading technique is far more than a laboratory stunt. The key to his scheme: the electroencephalograph, a device used by medical researchers to pick up electrical currents from various parts of the brain. If we could learn to identify brain waves generated by specific thoughts or commands, we might be able to teach the same skill to a computer. The machine might even be able to react to those commands by, say, moving a dot across a TV screen. So far the S.R.I, computer has been taught to recognize seven different commands — up, down, left, right, slow, fast and stop .these review is focus mainly on mind reading and use this technic for handicapped person by using futurestic band.

Keywords: *Facial expression analysis, Mind Reading, Mental state analysis, Dynamic Bayesian networks, Brain Activity*

1. Introduction

Mind reading is defined as Interpretation of human thought/cognition by brain activity without depending on speech. This is true even when they are interacting with machines. Our mental states shape to take the decisions that we make, govern how we communicate with people and affect our attainment. The ability to attribute mental states to others from their behavior and to used that knowledge to guide our own actions and prediction those of others is known as ''mind reading''. Existing human computer interfaces are mind-blind unaware to the user's mental states and intentions (S. Baron-Cohen.(1994)). A computer may wait indefinitely for input from a user who is no longer there or decide to do irrelevant tasks while a user is frantically working towards an expectant deadline. As a result, existing computer technologies often frustrate the user, have little influential power and cannot initiate interactions with the user (S. Baron-Cohen, S.

Wheel wright, J. Hill, Y. Raste, andI. Plumb. (2001)). Even if they do take the initiative, like now retired Microsoft Paperclip, they are often misguided and inappropriate and simply frustrate the user With the increasing complexity of computer technologies and the ubiquity of mobile and wearable devices. There is a demand for machines that are aware of the user's mental state and that adaptively respond to these mental states (Bello, P., & Guarini, M. (2010)). It's long been the stuff of science fiction, but scientists say a mind reader may be closer than previously thought Neuroscientists from the University of California Berkley have invented a computer program which can decode brain activity and translate it into words (H. Wellman.(1990)). It may be a breakthrough for those whose speech has been affected by stroke or degenerative diseases, but the technology has also raised concerns about the potential to eavesdrop on people's thoughts (A. Garg V. Pavlovic, and T. S. Huang, (2003)).

2. Literature Review

2.1 Introducing Brain computer Interface Technolog

A group of technologies exploring the possibilities of alternate control interfaces using the brain as the initial signal generator are called brain computer interfaces. A BCI is a system that acquires and analyzes

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neural (brain) signals with the goal of creating a high bandwidth communications channel directly between the brain and the computer to better understand BCI one must understand the technology that comes together to create all of the different BCI systems. There are a few basic components to all brain computer interfaces, and they are signal capture system, signal processing system, pattern recognition system, and device control system (J. R. Wolpaw, N. Birbaumer, D. J. McFarland, G. Pfurtscheller, and T. M. Vaughan, (2002)).Each system must have a way to gather and hold data in order to respond to humans' commands. The signal capture system includes the electrodes themselves & the isolated electronic amplifiers. The signal is obtained by any brain function mapping technique such as EEG (Electro encephalogram),MEG(Magneto encephalogram), PET (Positron Emission Tomography) or FMRI (Functional MRI). Generally EEG is preferred to measure brain activity. It is proved that according to different brain activities, EEG patterns will be different (G. R. M¨uller-Putz, R. Scherer, G. P furtscheller, and R. Rupp,(2005)). Interfaces have been developed to control many different devices in device control system. Various software or tracking technology can be used to control the motion of output device. The display unit can be auditory, tactile or visual but there must be a way to show the data to the user so that they may respond and interact with the technology (J. Kalcher, D. Flotzinger, C. Neuper, S. G&ouml,lly, and G. Pfurtscheller,(2001)). While existing technologies are still available to control a BCIs improve upon the computer interface to allow even the most severely handicapped to communicate with a computer .Thus Brain computer interface is the developing technology that can provide a new way of communication and control for paralyzed persons. It is a powerful technology that uses brain computer interface.

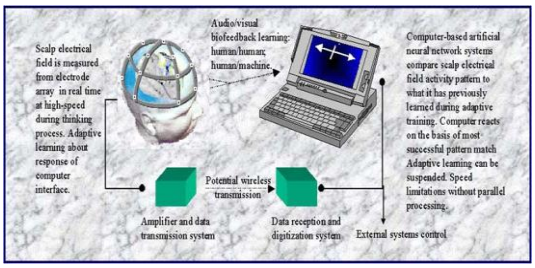

Fig 2.1 A block diagram of brain computer

interface is shown in the figure above For measuring brain function, neuroimaging modalities such as fMRI, EEG and MEG are providing clinicians and neuroscientists with a variety of powerful tools(J. Kalcher, D. Flotzinger, C. Neuper, S. G&ouml,lly, and G. Pfurtscheller,(2001)). Without a doubt EEGs have been the best tool so far for this type of research. From the different parts of the brain such as frontal, occipital, parietal & cortical different brain activities are measured with either invasive or non-invasive real time techniques. After obtaining EEG signals they are applied to signal processing unit, which includes amplifier, special function filters, ICA components (artifact rejection), ADC etc. Now our task is to classify different EEG patterns according to its features such as frequency and amplitude in different states of consciousness like alertness, lethargy and dreaming. Our approach is generally based on an artificial neural network that recognizes and classifies different brain activation patterns associated with carefully selected mental tasks. Then the classified signal is translated into the control command signal using software to perform mental recognized task and is applied to the control device. By watching the control action of the device on the computer screen, visual feedback from the eye is given to brain and the next control action can be decided by the user. Whole close loop system is known as brain computer interface.

3. Computational Model of Mind Reading

Our approach combines machine vision and supervised statistical machine learning to model hide mental states of a person based upon the observable facial and head displays of that person. An overview of the automated mind reading system is shown in Figure 1. Video of the face is recorded at 29 frames per second and input to the system in real time. We assume a full frontal view of the face, but take into account variations in head pose and framing inherent in video-based interaction. reading system is shown in Figure 1. Video of the face is recorded at 29 frames per second and input to the system in real time.

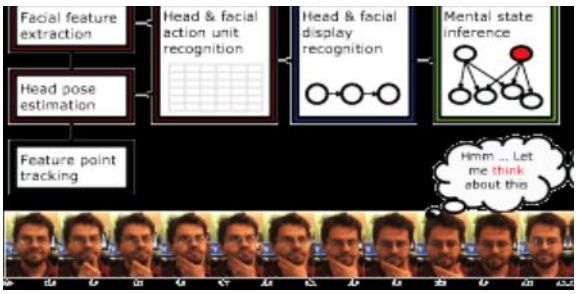

Fig 3.1 Processing stage in mind reading computing

Reading system is shown above, fig. of the face is recorded at 29 frames per second and input to the system in real time. We assume a full frontal view of the face, but take into account variations in head pose and framing inherent in fig. based interaction. The vision-based component recognizes dynamic head and facial displays from video. It locates and tracks fiducially landmarks across an images, then estimates head pose from expression-invariant feature points. The head pose parameters depict head action units. Facial feature motion, shape and color descriptors identify facial action units. Head and facial actions are come together temporally in a hidden Markov model (HMM) framework to recognize displays. The inference

component makes use of dynamic graphical models, specifically dynamic Bayesian networks (DBNs) that represent high-level cognitive mental states given observed in displays. A separate model of each mental state is learned allowing the system to be in more than one mental state at a time. This is particularly useful for model mental fig, The physical structure on Face station, a feature point tracker, that supports both real time and offline tracking of facial features on a live or recorded video stream. The tracker represents faces as face bunk graphs or stack-like structures which efficiently combine graphs of individual faces that vary in factors such as pose, glasses or physiognomy. The tracker outputs the position of twenty four feature points, which we use for head pose estimation and facial feature extraction.

3.1 Why Mind Reading

The mind-reading computer system read your mental state as easily as keyboard and mouse present in text and commands form. visualize a future where peoples are surrounding with advanced services that can be read our minds and react to our state of mind. How would be changes our uses of technology and our lives? We are working with automobile sector in major car manufacturer to implementing this system in new cars to detect/show driver mental states such as drowsiness, distraction and anger. Current projects in Cambridge are considering there further inputs such as body posture and gestures to improve there the inference. Then use the same models in animation film avatars. We are also looking at use of mind-reading to support online shopping and suggest improvements in human interaction about e-commerce. The Affective Computing Group at the MIT Media Laboratory is developing an emotional-social Intelligence prosthesis that explores new technologies to augment and Improves people's social interactions and communication skills with this technology.

Fig 3.1 Futuristic headband

3.2 How Does It Work?

The mind reading actually involves measuring the volume and oxygen level of the blood around the subject's brain using technology called functional near-infrared spectroscopy (FNIRS). The user wears a sort of futuristic headband that send light in spectrum into the tissues of the head that where it is absorbed by active blood-filled tissue. The headband measures how much light wasn't absorbed, letting the computer gauge the metabolic demands that brain is making active or not . if light is not absorbed that means there are oxygen and blood level it doesn't measured. The results are often compared to an MRI, but can be gathered with lightweight, noninvasive equipment Wearing the FNIRS sensor, experimental subjects were asked to count the number of squares on a rotating on screen cube and to perform other tasks. The subjects were then asked to rate the difficulty of the tasks and their ratings agreed with the work intensity detected by the FNIRS systems up to 83 per cent of the time. We don't know how specific we can be about identifying users' different emotional states. cautioned Sergio Fantini a biomedical engineering professor at Tufts. Wearing the FNIRS sensor, experimental Measuring mental workload, frustration, distraction is typically limited toque qualitatively observing computer users or to administering surveys after completion of a task, probably missing valuable insight into the users' changing experiences.

The mind-controlled wheelchair developed from the University of Electro-Communications in Japan lets you feel like half Professor X and half Stephen Hawking—except with the theoretical physics skills of the former and the telekinetic skills of the latter. A little different from the Brain-Computer Typing machine, this thing works by mapping brain waves when you think about moving left, right, forward or back and then assigns that to a wheelchair command of actually moving left, right ,forward or back. The result of this is that you can move the wheel chair solely with the power of your mind. This device doesn't give you MINDBULLETS (apologies to Tenacious D) but it does allow people who can't use other wheel chairs get around easier. The sensors have already been used to do simple web searches and may one day help space-walking astronauts and people who can not talk. The system could send commands to rovers on other planets, help injured astronauts control machines, or aid disabled people. In everyday life, they could even be used to communicate on the sly - people could use them on crowded buses without being overheard The finding raises issues about the application of such tools for screening suspected terrorists -- as well as for predicting future dangerousness more generally. We are closer than ever to the crime-prediction technology of Minority Report. The day when computers will be able to recognize the smallest units in the English language—the 40-odd basic sounds (or phonemes) out of which all words or verbalized thoughts can be constructed. Such skills could be put to many practical uses. The pilot of a high-speed plane or spacecraft, for instance, could simply order by thought alone some vital flight information for an all-purpose cockp it display. There would be no need to search for the right dials or switches on a crowded instrument panel.

Fig 3.4 A man setting on wheel chair

4. Application of mind reading

[1] By virtue of Mind reading computer one can play games without mouse, keyboard or joystick.
[2] Wheel chair technology is useful for handicapped person and person who unable to talk.
[3] Mind reading computer gives idea to interact with the people according to their mood.
[4]Using Mind reading technology, a car can tell whether the driver is drowsy or not, potentially warning him or her to take a break.
[5] Scientists are researching ways to monitor motorists' brain waves using mind-reading computer to improve reaction times in a crash. So that in an emergency stop situation, the brain activity kicks in on average around 200 mili-seconds before even an alert driver can hit the brake.
[6] In future, using Mind reading technology, people will be able to open doors and turn on their televisions with their minds.
[7] it is also used in speech detection system the pilot with high speed planed or space craftWeb searching is also a very important application of Mind-reading Computer.
[8] Mind reading computer can send commands to rovers on other planets and help injured
astronauts.
[9] Mind reading technology is used in crime that means criminal who does not want to talk at that time using futuristic headband read their mental states.

Conclusions

Mindreading is the ability to read the people's mental state and use that to make sense of how to interact with their Impairment in the theory of mind (mind blindness) is the primary inhibitor of emotion understanding and social intelligence in individuals with autism.

In this paper we conclude how mind different working areas of mindreading computer. A mind-reading architecture based on an Eye Language Interpreter and Baron-Cohen's Mindreading System is developed for the recognition and prediction of complex emotion states. And also proposed one more use of mind reading computer in real world. We believe that seamless, non- obtrusive and implicit mindreading capabilities in mainstream interfaces will open new possibilities for intelligent and effective interfaces

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