



ENHANCING EFFECTIVENESS OF HCI USING VARIOUS EMOTIONAL RECOGNITION

K.Arulmozhi¹, Dr. R.Ponnusamy²

¹Research Scholar, Department of Computer science, Mother Teresa University, Attuvampati, Dindigul, Kodaikanal-624101.

²M.Tech., Phd, Principal, Rajiv Gandhi College of Engineering, Nemili, Sriperumbudur-602 105.

Abstract: - Human computer interaction is a user friendly system in which a user can interact with a computer system avoiding the additional peripheral device usage. In this survey, we review the approaches of HCI, providing an overview of the field from a computer vision perspective. Considering in particular, the paper should interrupt the emotional state of humans and adapt its behaviour to them delivering an exact response delivering for those emotions. We focus on some well-known methods capturing facial expression, body posture and gesture, while a microphone might capture a speech, various other emotional cues measuring physiological data like skin temperature and galvanic resistance is also used. The main attempt is exploring the emotional speech knowledge incorporating all the above aspects to make the human computer interaction effective one.

Keywords: Affective computing, multimodal HCI, emotional recognition and speech knowledge.

1. Introduction

Nowadays emotions are considered as a way of communication in our daily life. Certainly, in human computer interaction emotional information detection starts with passive sensors that captures information regarding user's physical condition or behaviour without interrupting input. The information collected is analogous indicating humans use to perceive emotion in other.

For instance, a video camera that might express facial reactions, gesture and posture of body, voice recognition and other applications.

Affective computing used to study and develop neuroscience that deals with design of system and devices that interpret recognition and validate emotions of human. Affective computing (AC) is inter disciplinary method spanning cognitive science, psychology and computer science. The main aim is to stimulate empathy interpreting emotional state of humans and responding them. The information are collected through identifying emotions, extracting and matching meaningful patterns as required. Recognition is done by parsing the information through several processes indicating the natural language process, facial reaction detection and audio recognition at which all are dependent on human factor. When an automatic emotion recognition matures, several challenges can be faced. Therefore, major aspects are addressed viewing potential applications in the field the system bridges the gap between present performance and commercial interest which indulge realistic emotions, continuous speech, microphone condition and individual dependent speakers.

2. Recent survey of various recognition

An intelligent human computer interaction must enhance the provision of delivering emotions humans via computer. Currently much more applications and interactive methods are used to improve the interaction between user interface and computer interface. Two channels distinguished in human computer interaction is transmission of implicit and explicit messages to tackle signal processing and analysis techniques. An automatic emotion recognizer can be constructed depending on sense of emotion replies. To improve HCI various emotion-recognising techniques are constructed listed below.

2.1 Face recognition

Face recognition is a challenging process in every industry including image analysis and computer vision Face recognition is first step of intelligent human computer interaction. HCI enhance frontiers of face based interface and also uses vector mechanism demonstrating an efficient method to recognize emotions by facial expression. Face recognition uses various domains such as biometrics, human computer interaction, access management, and information security.

Face recognition undergoes several technical challenges to be assured. For accurate detection the process to be checked are pose, illumination, expression, time delay, occlusion, image condition and other structural component.

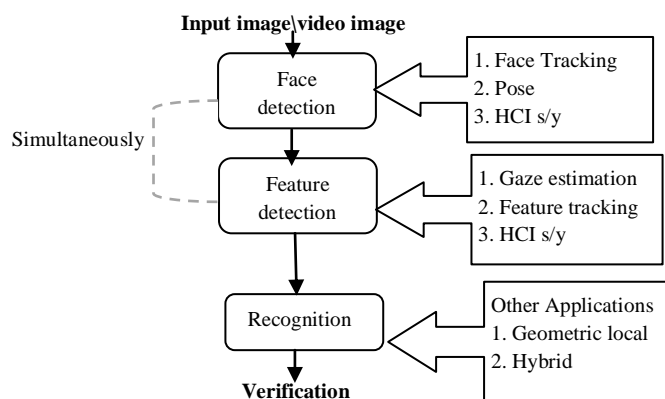


Figure 1. Face recognition system

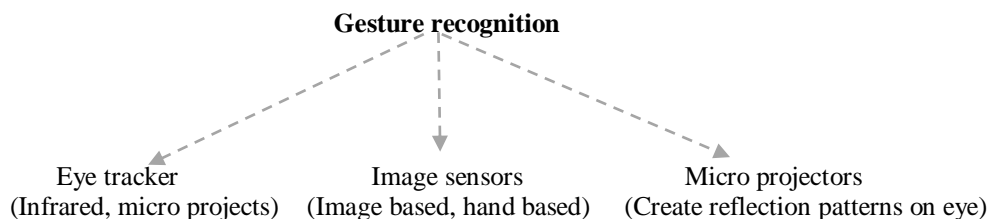
Face detection differentiate a human face from a real time video or a background of the image. Feature detection tracks and record the features of an interaction system. Face recognition does the work of comparing it to database.

2.2 Gesture recognition

Gesture recognition are rapidly increasing recognition in human computer interaction. Gestures play important aspect in human interaction both through man-machine interface and interpersonally. Gestures implies movement of hand, face and other body parts. Gestures includes several types gesticulation (movement of hands and arms with speech), pantomimes (depict objects or actions), emblems (familiar gesture), sign language (linguistic and other language). Gesture recognition is valuable in applications interacting human/robot. For instance, even a child is being sensed by gesture recognition only initializing hand movements. Gesture recognition (GR) are classified into two more gesture classifications:

- **Hand gesture recognition:** HGR consist of a single camera capturing the gesture by user and hand image which is used as an input.

- **Vision based gesture recognition:** vision based GR is a perceptive that allows system to acquire explicit and implicit information about the user. Several other vision based GR has attractive sensing modality that carries wealth of information sensing colour, shape, pixel value, motion and also involves 3D model based detection.



Gesture recognition is a fast growing technique in human computer interface, it tracks user needs by sensing user eye, image, touches, hand and even infrared sensible. GR is also used in micro projectors creating reflection pattern from eye.

2.3 Speech recognition

Voice recognition is an improving process in human computer interaction considered as main approach analysing user voice where HCI is evaluated. In earlier days they use precise speech method, recently mobile devices had enough processing power and storage that performs voice processing. In recognition system text independent operation is handled that user can speak various phrase in enrolment. Though it is more challenging to perform but provides flexible way the system use. Voice recognition can be distinguished as speaker recognition, speech recognition and language recognition. Speech recognition has been featured involving extraction and matching methods that the user transverse to the system.

3. Emotional recognition

Emotion recognition is relevant application of human computer interaction. It is a perfect challenge to construct an automatic system with neutral ability of human to recognize emotions. Though humans are quite good in identifying emotions we are not that much skilled dealing with large amount of emotion interaction. Only a computer with enormous memory and robustness can overcome user's limitations. Emotion recognition (speech recognition, face and gesture recognition) is a solution for this problem.

3.1 Research direction to enhance HCI

Emotion is basic component of a person with various reaction may be joy, anger, and pride that motivate actions adding meaning virtually to all human experience. Human computer interaction always viewed as ultimate exception; user should discard their emotional working efficiently with computers.

Recent research in technology and psychology prefer a different view of interrelation between computer, emotions and human. The earliest work related to this subject includes explosion of research on psychology of emotion on 1999. The literature on emotion and computer interaction has grown to an extent in past years by advancement in technology. Effective and inexpensive technologies enable computers to access physiological division of emotion increasing speed and quality of signal process that allows even personal computers to make judgement about user emotional state on real time (pi-card, 1997a, 1997b). kleinginna and klein, 1981 states an aspect emotion stands out (a) emotion is reaction to events relevant to goals or concern of a user. (b) It encompasses affective, behavioural, physiological and cognitive components.

LeDoux in 1996 examined 3 key regions of brain (a) thalamus-all sensory input from external devices is received by thalamus functioning basic signal processing. (b) Limbic system is seat of emotion evaluate relevance of inputs. (c) Cortex biasing attention to other process like cognitive, affective etc., emotions has implication for memory as it focusses on enhancing stimulus defined as stimuli that are remembered better than un-emotional events stated by herson and friestad, 1985).

Negative action that tends to arousing are remembered than the positive event (necohagen and reeves, 1993, 1996). Memory emotionality improves memory for background defined by spackman and parrott, 2000). Ekman says that facial expression and gesture are most common way to manifest emotion in screen based

character-cassell et al., 2000, skelly). Although humans may not have accurate emotion detectors whereas computer interface (HCI) has ability to do that work with accuracy.

3.2 social sensing/emotional learning in social dilemmas

Dong wang et al (2012) addresses the challenge for sensing noisy social data signals by using truth discovery technique focussing on binary measurements whereas, at early stage information approached the solution in heuristic manner. Hence optimal solution is suggested to overcome truth discovery issue. Social sensing emerge social data's for collecting sensory readings and forms a sourcing task. The truth discovery that is initiated by believing those observation that are simultaneously reported by several sources. This attempt is done to understand basic factors affecting the behaviour of emerging social networks. These type sensing received attains significant attention interacting mobile sensors owned by user phones with GPS, camera etc. Internet connectivity is processed to upload and share data WIFI and 4G networks can also sense varying positive and negative events. This paper uses expectation maximization algorithm for detecting likelihood estimating likelihood guideline in statistical model and to find optimal solution where data are incomplete involving latent variables by sensing data particular one possibility to remove duplicate observation for dependent source and place original one.

Using expectation maximization (EM) scheme social sensory measurements are made. These social sensory are identified by truth discovery technique. Discovery scheme and EM technique provides efficiency over social sensing the methodology used makes the performance deliberate so this causes time delay. To overcome this and to fasten emotional outsourcing in social dilemmas **Chao yu et al in 2015**, emphasis how agents can achieve cooperation in social dilemmas from local experience considered as a critical problem is been discussed. In this possibility of out coming emotions in agent learning to facilitate cooperation in dilemmas. Social dilemmas is considered to study impact of interaction on emergent in entire system. A double layered emotional multi-agent reinforce framework proposed to endow agents with cognitive and emotional capabilities. Emotional MARL framework to solve dilemmas is challenging problem hence agents not only need to study outlet of interaction game that need to learn how to play optimally in non- stationary atmosphere. Appraisal of emotions are classified into 3 regions.

- (1) Appraisal of social fairness: on which an agent needs to access its own situation in environment by neighbourhood formulated in emotion deviation process.
- (2) Appraisal of individual wellbeing the agent should care about their own wellbeing in terms of maximizing utilities. The approach are absolute value based variance based and aspiration based.
- (3) Derivation of emotions includes reaction based emotions depending on every individuals.
- (4) Altruistic behaviour relating FW function which derives reaction of user which pays attention to social fairness.
- (5) Egoistic behaviour related to WF function emotion likely as egoist which pays attention to social fairness determining its emotions. WF pursue own benefits the agent be in positive state of joy in high wellbeing state.

The future enhancement is to extend the frameworks and emotional functions with high complexities solving the other social dilemmas making it more useful to identify multi-agent emotions.

3.3 sentiment analysis using weighted multi label and SaaS model

Xin li et al (2016) introduce connection between emotions in a user by varied scale documents effectively, this paper concerns problem of sentiment analysis initiating online news. Weighted multi label modelling is proposed discovering emotional concentration estimating weight of document and tackling the problem of noisy samples for every particular emotion. Chen and das employs manual lexicon within specific domain. Sentimental analysis implements online news from affective text analysis extracted from google news and CNN. Also weight of document is estimated by an index of emotion concentration to a supervised learning. In this paper weighted multi label used for sentiment analysis can be utilized only for knowing online news only on later it can be used in other fields like movies, music and stock prediction can be applied. **Asma musabah Alkaline et al (2016)** to enhance more facility in sentiment analysis this paper explores cloud consumer's reviews which reflects the experience of the user providing software as a service (SaaS) model. From the web portals the reviews are collected and approximately more than 3000 online reviews are analysed using sentiment analysis which are expressed as positive, negative or neutral comments. More than 60% reviews are positive indication which users are likely satisfied with SaaS service. More than 90% indication to perform better in determining sentiment offers research community SaaS polarity data set. Support vector machine (SVM) produced to review sentiments. The methodology involves 3 process. A. Pre-processing reviews- that

are available in blue page receiver collected from public web portal written by public. B. sentimental analysis Aim is to measure emotional tone of each SaaS in our dataset analysis at document level. Reviewing each document. C. linear support vector machine classification supervised machine learner based on training dataset is employed based on training dataset created prior in task.

In future, we planned to use other cloud services such as platform as a service model and different classification model providing more cloud consumer for identifying sentiment.

4. Survey analysis

Using various recognition techniques we got several differentiating ideas about emotional recognition knowledge that emphasis effectiveness of human computer interaction. Research directing to enhance human computer interaction the emotional recognition considered as main source were partitioned indicating several application truth discovery in sensing and outsourcing spatial learning in social dilemmas. MARL framework used to solve challenging problems in social dilemmas. And also to elaborate sentimental analysis tackling the problem of noisy samples for each emotion using weighted multi label classification model for extraction and matching of emotions. Using SaaS cloud service sentiment analysis offering research community SaaS polarity data set SVM produced to review sentiments. On determining the whole survey the earlier techniques and condition used to improve HCI is a hint for developing the process of human computer interaction. Nowadays the scheme and emotional recognition techniques used are more efficient to promote an inter-relationship between the user interface and computer interface it specifically deals with human computer interaction development.

5. Conclusion

Human interaction recognition is performing important place in several sectors as it works well in specific constrained condition. As human computer interaction is improving and used in various fields. Emotional recognition is explored attempting face recognition, gesture recognition and speech recognition all together to enhance user and computer interaction making it easier for humans to perform and to make human computer interaction effective one. A survey human computer interaction is constructed for fulfilling outsourcing need of humans and overcoming the problems of human but providing various recognition methods.

In future more advanced recognition may be introduced and can be followed for betterment of human computer interaction.

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