Original Research Paper Volume-9 Issue-3 March-2019 PRINT ISSN - 2249-555X Management A NOVEL APPROACH FOR EMOTIONS BASED HOME NETWORK SYSTEM		
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ABSTRACT Human computer interface technology used to automate the digital environments with sensor based inputs. In this paper a novel approach proposed to improve the Home digital Network System with data mining techniques over captured from human emotions data. Image processing techniques assisted with emotion recognition and inference engines applied for data processing. The paper overviews the knowledge engineering based emotion data analysis techniques and their applications. Data Mining Techniques support more improved automation over traditional approach. The integration of data mining module with current system and its functionalities discussed.		
KEYWORDS: Emotions, HCI, Home Digital Network, Cognitive, decision making, Data Mining		

INTRODUCTION

Emotions are considered as vital communication barriers among humans. They are used to interact with others or machines. The effective interaction with HCI devices achieved by studies/approaches based on human emotion detection [2]. The classification of facial expressions provides basic information about human moods but it is hard to justify the classification in some situations [3][4]. BCI (Brain Computer Interface) systems are introduced to accurately register the emotions related to various classes [5]. Recently Speech Recognition Engines used to process speech signals for capturing emotions [1][2]. Human activities like walking, picking up, eye movements, lip movements and hand signals are some Bio-metric oriented emotion recognition techniques currently in use in areas like training the handicapped[5]. The level of emotions judge the intensity of human acts which can be estimated with bio-metrics like Cardiovascular, Brain neuron signal, Blood pressure and Electro-thermal body signals. Image based emotion recognition used to classify the moods of humans but they can't be used for complete emotion estimation. Brain is responsible for signal generations of all emotions hence the application systems must incorporate with Neuroscience and Cognitive Psychology to deal emotion recognition much better [5][1]. B-Dimensional Valance-Arousal model introduced to recognize emotions of human face recognition system [3]. The Knowledge engineering techniques like multi-model based multimedia acquition techniques used to better estimate the emotions from facial expressions [4][5].

In Section 2 Emotions recognition methodologies discussed. Section 3 describes the functional model of proposed approach. The Section 4 explains the cognitive decision model to inference emotions followed by future scope and conclusion.

EMOTIONCAPTURE TECHNIQUES

Human Computer Interfaces

The interfaces which acquire input data from humans directly are HCI devices. HCI devices are highly sensor technology based they collects data from peripherals attached are get contacted with human organs. Nowadays preference based computing playing a key role in digital computing. Emotion based computing highly adaptive in HCI automation based systems. Human emotions generated from complex brain Neuro chemical reactions. Modern research invented various approaches to capture and analyze these emotions.

Capturing Techniques

Face Recognition System

"Face is the Index of Mind" hence for inferencing the emotions facial expressions are processed during key emotion estimation based act generation process. Face recognition captures almost all human face nodal points (approx. 80). The numerical representation Face-print with Face-database forms the Face Recognition System. This system used as fast basic emotion capturing scenarios.

Bio Metric Systems

Apart from human face latest technologies depending on various other

human body characteristics to identify behavior of emotions. Some widely used bio-metrics are Finger print, Hand geometry, Voice Patterns, Palm print, Muscle moves, DNA and pulse rates. The classification technologies used for HCI with Bio-metrics are shown in Fig 1.



Figure 1: Bio-metric Systems Classification

EMOTIONCAPTURE MODEL

The proposed approach serves to recognize human interactions with machines more precisely with Knowledge Data Engineering (KDE) support. The Data Mining Techniques interlaced in the system enhances the system capabilities than traditional system. The overall system model is shown in Figure 2 given below.



Figure 2: Proposed System Model

Camera View

The model should implemented on the data acquition based on 3D-Stereoscopic aligned 360° rotation flexible HD-recording Cameras maintaining 3 views basically front-view, head-view and bottom-view. Each camera interlaced with other during object identification, scene generation and sequence imaging tasks to produce a high 3D realm environment around the human user. Unlike traditional face

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recognition system which maintains static faces capturing mechanism. The new arrangement gives dynamic capturing with high flexibility.

Brain Band

The electronic digital device attached to human head for tracking neural-emotions. It supports brain machine interaction and neuralcontrol interface. The collected data subjected to machine learning techniques. These devices provide information for proposed system to more accurately extract emotional data from human interaction with Home Network System.

Infra Structure

System supports secured network structure with two modes of communication Blue-Tooth and Wi-Fi based. The system integrated with three servers each handling some specific clients in the network with associated services. All the smart home appliances (Smart doors/curtains, Smart-Refrigerator, Smart-power system, smart washing machines...) are clients for Home Appliances Server. The Multimedia based digital home devices (HDTV, music systems, laptops, mobiles, scanners, printers & Fax systems...) are connected to Multimedia Devices Server as clients. Finally the security systems (Security Cameras, Alarms and signaling systems) employed in a home are connected as clients to Security Server. The central server Home Network server (HNS) controls and co-ordinates with these sub servers to establish a high end emotion based digital equipment controlling within a house.

Home Network System

The electronic device integrated communication zone in home to automate digital equipment operations using bio-metric data. The modules and their functionalities are described as below

HCI-Module - The primary module having vital functionalities like Data Acquition, Inference Engine, Act sequencer and control flow. This module interacts with digital equipment/ electronic equipment using Wi-Fi network signals. Synthesizing the incoming data and organizing the acts takes place here. The processed data submitted to next module in pipeline. All the Sub-Server(s) I/O data handled through this module.

Work Module - The module where all the event driven procedures along with device handling codes are organized. This module also supported with Data Mining procedures to assist knowledge engineering and other data analysis activities. DSP interfacing codes are interlaced in this module to support HNS management effectively. DSP-Module - The associative module for Work module which holds the Wi-Fi interfacing services, Electronic Device management services and signal processing/conversion codes.

COGNITIVE MODEL

The proposed system supports a novel cognitive approach with data mining interfaces. The Fig 3 shows the interaction diagram of system emotion processing at various levels of abstraction. Captured emotion data undergoes various data mining activities resulting range of knowledge generations to support HNS effectively as shown in Table 1.

Table 1. Cognitive HNS Model

DM Technique	Supported Operations
ARM (Association Rule Miner)	 * Associations among emotions * Session based associations, * Rule mining and Rule generation
D-Tree (Decision-Tree)	 Mood Classification Emotion classification Event based decisions Branching Logics.
Bayesian Network	 * Future decision generation * Probabilistic dependencies among emotions and their related acts * Coherence factors to estimate emotion chains * Preference based event tagging * Role based networks and mood classifiers
Clustering	 * Grouping emotions among users * Preferences clustering and event set clustering



Figure 3: Interaction Diagram for System



Figure 4: Behavior Diagram of Proposed System

CONCLUSIONS

The proposed approach is an enhancement of existed system with machine learning capabilities. It improves the data acquition and data analysis functionalities of HNS. The integrated Data Mining module turns the traditional atomic emotion recognition system into a high scale knowledge engineering based system. The data mining techniques give a broader scope to self analysis based decision support systems. More enriched automaton achieved with accurate decision making, preference based emotion tagging, classifier learners, self organizing maps and many other mining techniques to make the system analyze statistics of emotions in a new dimension of KDE (Knowledge Data Engineering). In future proposed model implemented in real time environment. The statistics and results are to be analyzed to justify the model advancements over traditional model practically.

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