THINK INDIA JOURNAL

ISSN:0971-1260
Vol-22- Issue-14-December-2019

"Mood Detector"

***Sharan Roji Priya* [1], *Shashikiran KC* [2], *Kavitha R S* [3], *Veerendra Patil* [4], *Anand G R* [5]**

[1] *Professor, Department of Computer Science and Engineering, Sri Sairam College Of Engineering,*

[2345] *UG Scholars, Department of Computer Science and Engineering, Sri Sairam College Of Engineering,*

Anekal, Bangalore-562106

***Abstract*: Understanding human thoughts since times always remained a mysterious challenge for the scientific discipline as is the circumstance with the emotions of human beings. The numerous techniques of Emotion detection has already been discovered, one among which we here have discovered is the detection of emotion which is here done using IoT and Machine learning technique. This paper is being proposed to present the design and implementation of a Mood Detector application, which has been designed to detect the mood and emotional state of a person by examining the triad physical constraints (temperature, pulsate, motion and skin electro-conductance) by using a machine learning algorithm which is trained with data provided by the mood detector application developer. This application has been tested redundantly unless and until the results generated by the learning algorithm have been validated to 100%, thus affirming that the machine learning algorithms provides the accurate results. This application also coordinates a music recommender framework, which recommends the user to listen to the vague playlists, which has been designed to the recognized mood. In this paper, we design a probabilistic data collection mechanism and on the collected data we perform a correspondence analysis. Finally we design a statistical model to anticipate the human temperament and recommend a music playlist in accordance with their current temperament.**

I. INTRODUCTION

The emotions represent the specific mood of a particular person. Emotions are affected by a person's personality and temperament.

They can identify the behavior of a person that is being firmly related to a sensory system. As defined by Daniel Schechter, [1] the emotions can be categorized in both positive and negative aids that are linked with a specific form of psychosomatic action.

In this environment, the affinity in technology is skewed mainly towards mounting applications that escalate the ease of people and the interface between humans and computers. The whole enchilada becomes more preoccupied to the mobile applications. Our tenacity was to develop a real-world mobile application which identifies the mood of a user, based on numerous vital physical parameters collected from sensors.

Furthermore, the application performs as the recommender system, by recommending a user with the musical items according to their respective mood. According to medical science and psychology, the emotions are produced by the similar central sensory system which controls the complete human body, so if a person is experiencing with different sorts of moods, then the System increases or decreases the oxygen levels in the muscles, temperature or pulse.

It works like an automatic system. A team of researchers from Aalto University, Finland has found that body temperature changes depending on the mood of the individual due to system response and nervous emotions, as set out in.

Furthermore, their research is resumed in a diagram of the human body showing how temperature changes in different emotions, as shown in figure 1.

ISSN:0971-1260
Vol-22- Issue-14-December-2019

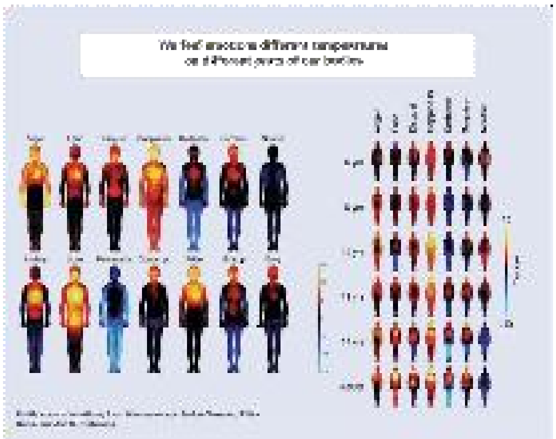

Figure 1: *The body temperature map which is basedon emotions.*

Other studies classify human emotions and create models that scale the emotions and fit them into categories according to their degree of positivity or negativity.

Such a simplified model will be used in this paper to establish the possible four main moods:

i. Happiness
ii. Sadness
iii. Excitement /stress
iv. Boredom /sleepiness

Identified as the extreme points of the diagram in figure 2.

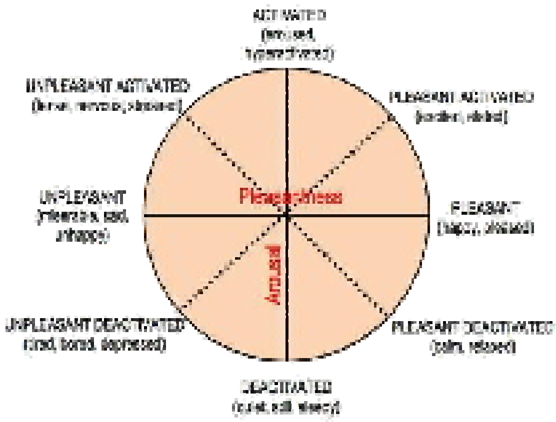

Figure 2: The Modeldepicting emotional states.

b) **Evaluation of Finger Tapping Test Accuracy using the Leap Motion and the Intel Real Sense Sensors**

C. Ferraris & D. Pianu

Finger Tapping (FT) is among the least reliable items of the motor subscale of the Unified Parkinson's Disease Rating Scale (UPDRS) [1], commonly used to rate motor impairment severity in Parkinson's Disease (PD). This is probably due to difficulty in scoring contemporary different features of the movement (speed, amplitude, rhythm).

II. PROBLEM STATEMENT:

To detect the mood of a user so that it helps if a detected mood is stressed than to calm down to normal mood, by which the user can take care of his health if the user is a patient who has some heart related diseases. The problem statement in this paper is to detect the possible four main moods: happiness, sadness, excitement / stress and boredom /sleepiness.

ISSN:0971-1260
Vol-22- Issue-14-December-2019

a) **Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales.**

David Watson and Lee Anna Clark:

We have presented information regarding the development of brief scales to measure the two primary dimensions of mood—Positive and Negative Affect. Whereas existing scales are unreliable, have poor convergent or discriminant properties, or are cumbersome in length, these 10-item scales are internally consistent and have excellent convergent and discriminant correlations with lengthier measures of the underlying mood factors. They also demonstrate appropriate stability over a 2-month time period. When used with short-term instructions (e.g., right now or today), they are sensitive to fluctuations in mood, whereas they exhibit trait like stability when longer- term instructions are used (e.g., past year orgeneral).

The scales correlate at predicted levels with measures of related constructs and show the same pattern of relations with external variables that have been seen in other studies. Thus, we offer the Positive and Negative Affect Schedule as a reliable, valid, and efficient means for measuring these two important dimensions ofmood.

Advantages:

- ✓ Reliable and Have excellent convergent or discriminant properties.

Disadvantages:

✓ They are sensitive to fluctuations in mood. This explains the growing interest among the neurologist community for its objective assessment. The paper presents preliminary results on the evaluation of the accuracy of two representative devices: Leap Motion and Real Sense.

Advantages:

- ✓ Low-cost
- ✓ Provides accuracy.

Disadvantages:

- ✓ Show difficulties in reconstructing the fingertips trajectories.
- ✓ Is not sufficient for a reliable reconstruction of FT trajectories.

c) **Creation of an infrastructure of intelligent objects that sensorize the campus classrooms.**

Azeez Olusegun Odumosu:

In this report, a design and implementation of an infrastructure to sensorize the campus has been presented. The first stage was to learn how to use Unity3D, both the graphical and scripting part.

The next phase of the project was to understand how the selected sensors work by going through their datasheets, mounting the circuit and finally programming the logic of both the Client and the Server.

Finally it can be concluded that the creation of a prototype to design and implement an android client application with an Arduino base server to sensorize the campus has been achieved.

Advantages:

- ✓ Don't require large amount of resources.
- ✓ Required lowpower.

Disadvantages:

- ✓ Functionalities implemented i.e. the calibration of the sensors are not accurate.

d) **IDS on Raspberry Pi: A Performance Evaluation**

Andreas Aspernäs & Thommy Simonsson:

In this study we examined the possibilities of using a Raspberry Pi as IDS in a home network. Our premises was to measure the performance of the two latest models of Raspberry Pis and see if they could satisfy our requirements of not reducing network throughput by more than 30%. We also wished to compare our results to a previous study on the subject in order to see if we could avoid the limitations they discovered. Our conclusion is then that a Raspberry Pi can indeed be used as an IDS but only under certain circumstances, the first of which is the users' throughput demands. Using a Raspberry Pi as an IDS did have a negative effect on the network throughput. All though the effect was less so on the Raspberry Pi 2 model B, because of its improved hardware over the previous generation it is evident that the capacity of both the Raspberry Pis suffers from their limited hardware. Even with the IDS software disabled the best throughput performance measured in our tests was 94 Mbit/s with the Raspberry Pi 2 model B. We believe that on a 100 Mbit/s connection a loss of only 6 Mbit/s could be acceptable for most users, but not on a 1000 Mbit/s connection as the loss would be over90%.

Advantages:

- ✓ Is lightweight and uses low system resources.

Disadvantages:

- ✓ Memory capacity is limited.

e) **Interoperable Services on Constrained Devices in the Internet of Things**

Hauke Petersen, Emmanuel Baccelli, and Matthias Wahlisch:

The Internet of Things (IoT) promises billions of constrained devices connected to the Internet in the near- future. The efficient integration of these massively deployments into service-oriented architectures requires light-weight and highly automated mechanisms for device configuration and setup on all layers of the network stack. In this paper we highlight how the set of existing solutions for configuration and service management (i.e.: discovery, description, invocation) are insufficiently analyzed in the context ofthe IoT on one hand, and on the other hand do not fit all the specific requirements and attributes of constrained devices, in terms of memory usage and power consumption in particular.

Advantages:

- ✓ Provides light-weight and highly automated mechanisms for device configuration and setupon all layers of the network stack.

Disadvantages:

- ✓ Existing solutions for configuration and service management are insufficiently analyzed in the context of theIoT.

f) **An IoT Concept of the Small Virtual PowerPlant Based on Arduino Platform and MQTT Protocol**

Dmytro Zubov:

In this paper, a new IoT concept is proposed for the small VPPs.The main principles are as follows:

- ✓ To usethe low-cost reliable Arduino open- source soft- and hardware for the smart control of the power grid.
- ✓ To usethe low-voltage devices like there lay module SRD-05VDC-SL-C for Arduino (output voltage is up to 250 V AC) for the control ofthe high-voltage power lines.
- ✓ Communication between the different parts of the small VPP based on MQTT IoT protocol using specific topics and possibility of the secure TCP connection (passwords and SSL cryptography).

The remote control of the small VPP components is based on the relays and commands sent by the Mosquito open- source message broker that implements the MQTT IoT protocol. For this purpose, C# Windows form app and Arduino sketch were developed with MQTT publisher and subscriber, respectively.

Advantages:

- ✓ Implements the secure TCP connection based on MQTT IoT protocol using specific topics, passwords, and SSL cryptography.
- ✓ Proposed infrastructure can be directly applied to the power off-grid solutions of the smart houses ifgrid-tie inverter is added as well as generation and storage parts are more powerful.

Disadvantages:

- ✓ The small-scale VPPs with unified soft- and hardware are not well represented in literature and Internet.

g) **Implementation Of Wi-Fi Based Home Automation Using Master Slave Communication**

Muhammad Ali Shafique, Umer Shahid, Ijhar Khan, Arslan Waheed, Muhammad Arsalan and Hamza Omar:

ISSN:0971-1260
Vol-22- Issue-14-December-2019

In the nutshell, this system is flexible, reliable and secure. Single master can control switching up to 1100 appliances and also provide 220 pins for dimness purposes.

This system is not confined and with help of multiple masters, number of appliances can be multiplied.

Usually user is very much concern with home's decoration. He avoids all those services that ruin decoration. Our system is not only fascinating and attractive for the user, but also whole system is installed behind the walls. TRIAC switching circuits do their jobs in electric switchboards.

Advantages:

- ✓ System is flexible, reliable, secure, energy efficient, safe to operate and can control large number of appliances.
- ✓ It can control switching up to 1100 appliances and also provide 220 pins for dimness purposes.
- ✓ Our system is fascinating and attractive for the user, and the whole system is installed behind the walls.

Disadvantages:

- ✓ This technology is not very cheap and it has local range.
- ✓ The main problem of using relay for this purpose is the low lastingness of it because relays wear off with the passage of time and start inconvenient knocking at on and off operation.

III. EXISTINGSYSTEM

The existing System for Mood Detection application utilizes face discovery, voice intonation and body languages for the disposition acknowledgment to decide the client's temperament.

Disadvantages

- ✓ Uses only facial expression.
- ✓ Cost is high.

IV. PROPOSEDSYSTEM

The proposed system is to develop a practical mobile application which determines the mood of users, based on several essential physical parameters collected from sensors.

Moreover, the application acts as a recommender system, by suggesting the user musical items according to their mood.

Advantages

- ✓ Used to detect instant mood changes at the level of milliseconds.

- Also used to determine the user's emotion at a particular moment of time.

Hardware Requirements:

- ✓ Processor : Intel i3 and above
- ✓ Speed: 2.4GHz
- ✓ RAM:2GB(min)
- ✓ Hard Disk :80GB
- ✓ Arduino Uno.
- ✓ Bluetooth module
- ✓ Heart Beat Sensor.
- ✓ GSR Sensor (Galvanic Skin Response).
- ✓ Temperature Sensor.
- ✓ Android Phone

Software Requirements:

Operating system: Windows 7/8

ISSN:0971-1260
Vol-22- Issue-14-December-2019

Language: JAVA / J2EE, Android, Embedded C
Database: My SQL, Tomcat Server
Tool: Net Beans, Navicat, Android Studio

Functional Requirements:

Functional requirements are the principle things that the client anticipates from software. The functionality that the system should provideis,

- ✓ Receive data from the sensors.
- ✓ Analyzing and classify the collected dataset.
- ✓ Identify the emotional state.
- ✓ Recommend the music list for detected mood.

Architecture diagram:

The data is collected from four different sensors and sent to data collector. This collected data is sent to smartphone via Bluetooth module. The smartphone send the data to server. The server manages the resources at one end and to the other end admin. The mood detector recommends the music playlist.

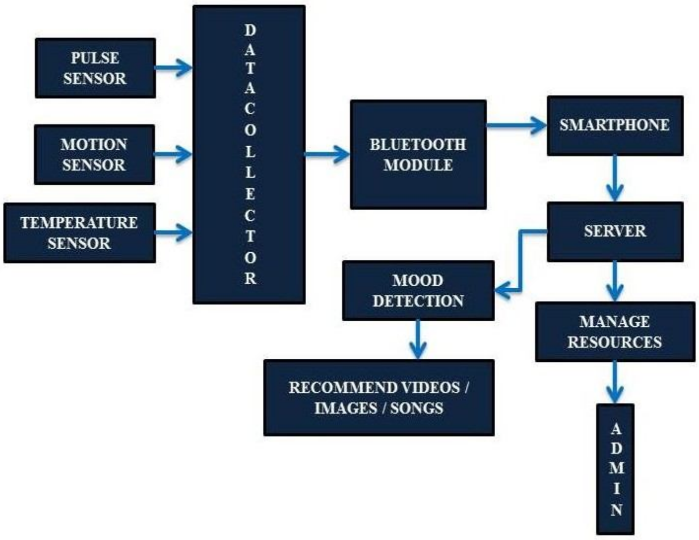

Figure 3: *Block Diagram.*

V. HARDWARE AND PROGRAMMING

Heart Rate (Pulse) Sensor:

Pulse is the sound generated by the valves of the heart during contraction and relaxation as and when the blood is pushed from one chamber of the heart to another while pumping of the blood. It is the interval that keeps the person alive. Heart beat is measured by the number of times the heart pulsates every moment and is known to be the rate of the heartbeat. This heartbeat can be felt in any part of the artery which is closer to the skin in the form of pulses. The heart beat sensor works on the guideline provided in the study of the photophlethysmo graphy.

ISSN:0971-1260
ssue-14-December-2019

Figure 4: *Heart Rate Sensor.*

Figure 5: GSR Sensor.

GSR Sensor (Galvanic skin response):

One of the most sensitive measures for emotional arousal is Galvanic Skin Response (GSR), also referred to as Electro-dermal Activity (EDA) or Skin Conductance (SC). GSR originates from the autonomic activation of sweat glands in the skin.

The sweating on hands and feet is triggered by emotional stimulation: Whenever we are emotionally aroused, the GSR data shows distinctive patterns that are visible with bare eyes and that can be quantified statistically. Whenever sweat glands are triggered and become more active, they secrete moisture through pores towards the skin surface. By changing the balance of positive and negative ions in the secreted fluid, electrical current flows more readily, resulting in measurable changes in skin conductance (increased skin conductance = decreased skin resistance).

This change in skin conductance is generally termed Galvanic Skin Response (GSR). Galvanic Skin Response reflects the variation in the electrical characteristics of the skin.

GSR is also known as Skin Conductance (SC), Electro-dermal Activity (EDA), Electro-dermal Response (EDR), and Psychogalvanic Reflex (PGR).

GSR activity is typically measured in "micro- Siemens (µS)" or "micro-Mho (µM)".

There is a wide variety of GSR applications:

1. Psychological Research
2. Clinical Research &Psychotherapy
3. Consumer Neuroscience & Marketing
4. Media & Ad Testing
5. Usability Testing & UX Design

Temperature and Humidity sensor (DHT11):

The DHT11 is a basic, ultra-low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermostat to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data.

This DHT11 Temperature and Humidity Sensor features a calibrated digital signal output with the temperature and humidity sensor capability. It is integrated with a high- performance 8-bit microcontroller. Its technology ensures the high reliability and excellent long-term stability. This sensor includes a resistive element and a sensor for wet NTC temperature

ISSN:0971-1260
Vol-22- Issue-14-December-2019

measuring devices. It has excellent quality, fast response, anti-interference ability and high performance.

Each DHT11 sensors features extremely accurate calibration of humidity calibration chamber. The calibration coefficients stored in the OTP program memory, internal sensors detect signals in the process, we should call these calibration coefficients. The single-wire serial interface system is integrated to become quick and easy. Small size, low power, signal transmission distance up to 20 meters, enabling a variety of applications and even the most demanding ones. The product is 4-pin single row pin package. Convenient connection, special packages can be provided according to users need.

Specification:

- ✓ Supply Voltage: +5V
- ✓ Temperature range :0-50 °C error of ± 2°C
- ✓ Humidity :20-90% RH ± 5% RHerror
- ✓ Interface:Digital.

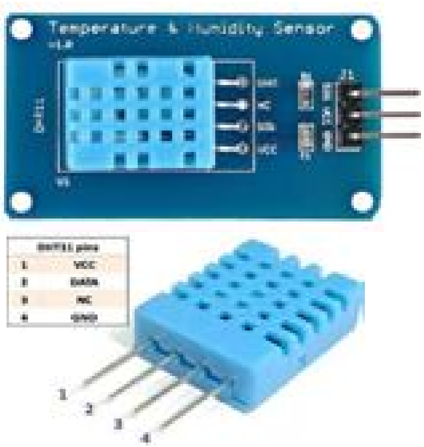

Figure 6: Temperature and Humidity sensor

Bluetooth Module:

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.

This serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04- External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

ISSN:0971-1260
Vol-22- Issue-14-December-2019

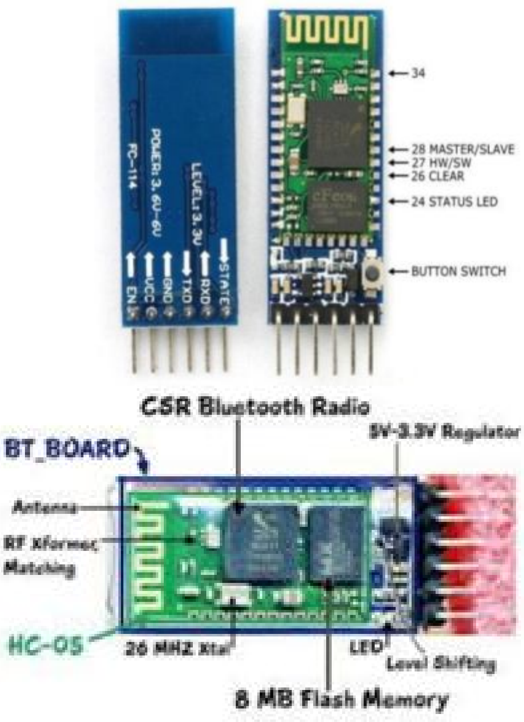

Figure 7: *Bluetooth module*

Hardware characteristics:

- ✓ Typical -80dBmsensitivity.
- ✓ Up to +4dBm RF transmits power.
- ✓ 3.3 to 5 V I/O.
- ✓ PIO (Programmable Input/Output)control.
- ✓ UART interface with programmable baud rate.
- ✓ With integrated antenna.
- ✓ With edge connector.

Software characteristics:

- ✓ Slave default Baud rate: 9600, Data bits:8, Stop bit:1,Parity:No parity.
- ✓ Auto-connect to the last device on power as default.
- ✓ Permit pairing device to connect as default.
- ✓ Auto-pairing PINCODE:"1234" as default.

VI. MODULESDESCRIPTION Registration Module:

This is the first module of our system. In this module the user ofthe body sensor network should register in the smart phone using the android app while registering user enters the relevant personal information such as User Id, password, name, E-mail ID, mobile number. These details are forwarded to the database.

Data Collector Module:

In this module the data is collected from the sensors. The collected data is sent to the server. This sensors used in this project are GSR sensor, heart beat sensor, motion sensor, temperature sensor. The sensors are connected to an Arduino board and the details ofthe data collected by the server transferred using Bluetooth.

Server Module:

The server manages the resources at one end and to the other end admin. The mood detector recommends the music playlist

ISSN:0971-1260
Vol-22- Issue-14-December-2019

from the server. The user can browse the resources to their respective mood which is detected by the mood detector.

Application Module:

The application module is the user assistance module for the user interface directly. The application provides the assistance to the user to analyze the mood of a person and recommend the music playlist.

VII. CONCLUSION AND FUTURE SCOPE

The Mood Detector application is designed to detect the mood of the user by analyzing 3 physical parameters (pulse, skin electro conductivity and temperature) and by using a machine learning algorithm which is trained with data from the users.

The application has been tested repetitively until the results generated by the learning algorithm have been validated 100%, thus confirming that the machine learning algorithms provides the correct output.

The measuring device can be improved in order to obtain smaller dimensions, so it can be worn on the wrist, similar to fitness bracelets designed for athletes. The application can be extended on other platforms such as iOS or Web platform. Also, the music database can be extended to a richer playlist, and the application can be reconsidered so as to recommend things in varied fields such as books, movies, theater, events, or places.

REFERENCES

1. Miyakoshi, Yoshihiro, and Shohei Kato. "Facial Emotion Detection Considering Partial Occlusion Of Face Using Baysian Network". Computers and Informatics (2011):96–101.
2. ^ Hari Krishna Vydana, P. Phani Kumar, K. Sri Rama Krishna and Anil Kumar Vuppala. "Improved emotion recognition using GMM-UBMs". 2015 International Conference on Signal Processing and Communication Engineering Systems.
3. ^ B. Schuller, G. Rigoll M. Lang. "Hidden Markov model-based speech emotion recognition". ICME '03. Proceedings. 2003 International Conference on Multimedia and Expo, 2003.
4. ^ *Poria, Soujanya; Cambria, Erik; Bajpai, Rajiv; Hussain, Amir (September 2017). "A review of affective computing: From unimodal analysis to multimodal fusion". Information Fusion.* ***37****: 98–125. doi:10.1016/j.inffus.2017.02.003. hdl:1893/25490.*
5. ^ *Caridakis, George; Castellano, Ginevra; Kessous, Loic; Raouzaiou, Amaryllis; Malatesta, Lori; Asteriadis, Stelios; Karpouzis, Kostas (19 September 2007). Multimodal emotion recognition from expressive faces, body gestures and speech. IFIP the International Federation for Information Processing.* ***247****. pp. 375–388. doi:10.1007/978-0-387-74161-1_41. ISBN 978-0-387-74160-4.*
6. ^*Price. "Tapping Into The Emotional Internet". TechCrunch. Retrieved 12 December 2018.*
7. ^ Jump up to:[abcdef] *Cambria, Erik (March 2016). "Affective Computing and Sentiment Analysis". IEEE Intelligent Systems.* ***31****(2): 102–107. doi:10.1109/MIS.2016.31.*
8. ^ *Cambria, Erik; Poria, Soujanya; Bajpai, Rajiv; Schuller, Bjoern (2016). "SenticNet 4: A Semantic Resource for Sentiment Analysis Based on Conceptual Primitives". Proceedings of COLING 2016, the 26th International Conference on Computational Linguistics: Technical Papers: 2666–2677.*
9. ^ *Balahur, Alexandra; Hermida, JesúS M.; Montoyo, AndréS (1 November 2012). "Detecting implicit expressions of emotion in text: A comparative analysis". Decision Support Systems.* ***53*** *(4): 742–753. doi:10.1016/j.dss.2012.05.024. ISSN 0167-9236.*
10. ^ Jump up to:[abc] *Medhat, Walaa; Hassan, Ahmed; Korashy, Hoda (December 2014). "Sentiment analysis algorithms and applications: A survey". Ain Shams Engineering Journal.* ***5****(4): 1093–1113. doi:10.1016/j.asej.2014.04.011.*
11. ^ Jump up to:[abc] *Madhoushi, Zohreh; Hamdan, Abdul Razak; Zainudin, Suhaila (2015). "Sentiment analysis techniques in recent works". 2015 Science and Information Conference (SAI). pp. 288–291. doi:10.1109/SAI.2015.7237157. ISBN 978-1-4799-8547-0.*
12. ^ *Hemmatian, Fatemeh; Sohrabi, Mohammad Karim (18 December 2017). "A survey on classification techniques for opinion mining and sentiment analysis". Artificial Intelligence Review.* ***52*** *(3): 1495–1545. doi:10.1007/s10462-017-9599-6.*
13. ^ Jump up to:[abc] *Sharef, Nurfadhlina Mohd; Zin, Harnani Mat; Nadali, Samaneh (1 March 2016). "Overview and Future Opportunities of Sentiment.*