

# A Review of Wearable Computing

## Emotional Intelligence

Muhammad Saleem  
Department of Computer Science  
Virtual University of Pakistan  
[Saleemtahir555@gmail.com](mailto:Saleemtahir555@gmail.com)

Mirza Naveed Jahangeer Baig  
Department of Computer Science  
Virtual University of Pakistan  
[ms160402266@vu.edu.pk](mailto:ms160402266@vu.edu.pk)

**W**earable computing is surprising enlisting growing exponentially. It is astounding mankind with extraordinary progressions, awesome technologies and wearable computing devices. These devices are helping man to manage their everyday work. These devices not only helping man to deal with their consistently work but they can also recognize human behavior and respond acceptable attitudes. Wearable computing is Ubiquitous plan to serve humanity. Emotional Intelligence EI has a solid committed association with wearable computing. Human can offer guidelines to wearable devices and through his faculties and devices will execute these directions through exceptionally delicate sensor and detectors. Distinctive strategies are procedures are explained in this paper that shows the role of emotions in computing how instructions pass to different wearable devices. These devices are developed to perform explicit assignments that utilization processing and continue human life. Various new devices are introduced that can empower mankind and perform each day errands with brand new ideas

**Keywords**— Emotional Intelligence (EI), Wearable computing, Geometry box (G), Wristwatch, PDA

### I. INTRODUCTION

Human brain has a mind-boggling design. It has three principle parts that control correspondence between various organs the main and the most important part of the brain is called neurons that are responsible for Information conveying Human brain has around 100 billion neuron cells. They are perceiving information to human body. These cells are working every time and never give up. If we see computer functions and functionality, we found that they are simulations of brain activities. A neuron transmits data to various organs and conjures tasks. Neurons are associated with each other and sending and getting data for mind execution. A neuron is much the same as an on-off switch. It has on or off state. This data can be perused with superb detecting locators and can be changed into processing devices input. On the other word we say that the brain is like a powerhouse or power station of electricity and it can give energy and it can give vitality than can edify 60-watt bulb. EI is an innovation that passes information to wearable devices. This info is utilized as input by device data preparing unit. Wearable devices take directions and execute relating activity. EI is appropriate on a huge number of devices like tube light, optical pen, vehicles, fans, therapeutic supplies for diagnosing of various maladies, cap, top, dresses, beautifying agents, divider for security, cameras, PDAs, furniture, plants, creatures, robots, substantial machines,

production lines, aero plane and so forth these devices have installed registering framework that perform essential calculations and help to do day by day assignments. Optical can compute separations, clear picture, catch picture and help to clear vision. These can ascertain speed too. Hearing devices can clear stable, center around a voice and change voices into various pitch and recurrence. Therapeutic devices can quantify heartbeat, filter physical appearance of inner organs. Test substance piece of organs, blood DNA and so on. Wristwatch having embedded computing can check atmospheric pressure, blood pressure, and time set updates, take images like camera and set reminders. Tracking devices can track locations using GPS system therefore these are using in security purposes. By using embedded system, we controlled aero plane. Electrical devices have diverse circuits that utilization calculation. Hair get, bangles, rings can likewise be utilized for implanted figuring and might be utilized as account purposes, still pictures and check pulse. Light transmitted diodes with shading lights can pull in individuals.

All these devices are wearable and can be used for embedded computing. These devices can be controlled with emotional intelligence technology. Eyes are the most unmistakable wellspring of looking for data. These can pass data to and from mind. Tactile organ data encoded and go to devices. A neural system can deal with the correspondence among human and separate devices. Remote systems administration is appropriate for correspondence. Sharp sensors that can send and get guidance to and from registering devices encode and unravel directions. Brian considers and offers guidelines to related organs to execute directions. This procedure can be comprehended with basic system when contact a hot thing we in a flash draw back our hands since it's destructive. This data streams among brain and hands. The data that is passed can be perused and changed into a shape that can be prepared by a device. Mind data streams into cells called neurons. Billions of neurons are associated with one and other and convey directions. When we contact anything, its data is sent to brain which choose and gives further directions to feel about the thing. The thought is her to present that brain given guidance ought to be caught and discharge for a registering device to perform distinctive undertakings. Consider a globule. We need to on or off it when we see that knob. This brain given guidance can be given to the devices through eyes and verbally. Sensors that can recognize and encode data are go-between segments that can build up an enthusiastic association with brain framework. This can save time and energy resources and human efforts as well.

## II. BACKGROUND STUDY

Emotional intelligence is important than the mathematical and verbal intelligence. The ability to recognize the emotion is discernable than others. Machine ought to have the enthusiastic knowledge to show the outcomes and to execute diverse directions. The capacity can be work in machine is to perceive the physical appearance. Many quick calculations are required to make passionate insight in machines. Researchers give conclusion that enthusiastic knowledge is the fundamental segments of insight. Passionate insight comprises of numerous capacities like perceiving, express thoughts and having feelings and their controls, and uses them for useful purposes. Passionate insight abilities are contended to be a superior indicator than IQ for estimating angles. Machines require passionate abilities to connect with individuals at most some dimension. Human sentiments about climate, lands, plants creatures and every single other need an enthusiastic domain for control and the executives. Passionate control can be viable and quick than others.<sup>[1]</sup>



Sensing technique means getting input directly from the user. Wearable computers have an exceptional identity to sense and process information. Wearable Computers can see as the client see, hear as the client hear and reaction as the client presumably will react. Logical data is progressively critical towards enthusiastic insight. The logical data like outward appearances, mental state, and client anticipated reactions, ecological changes, and time changes and so on mode dynamic musings under contemplations are critical to make enthusiastic knowledge in a machine. Item passionate faculties' acknowledgment makes keen wearable devices. Object interactions with all possible objects, their relationships and needs of communications knowledge can be observed with EI. By watching client context can foresee the future enthusiasm of the client. Thus, emotional intelligence can make a functioning, quick, dependable and trustable condition for wearable devices. Behavior reorganization becomes easy with contextual information passes with instructions.<sup>[2]</sup>

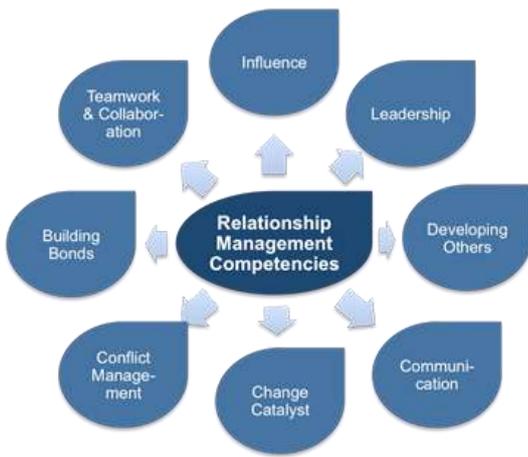
Emotional Intelligence Domains and Competencies

SELF-AWARENESS	SELF-MANAGEMENT	SOCIAL AWARENESS	RELATIONSHIP MANAGEMENT
Emotional self-awareness	Emotional self-control	Empathy	Influence
	Adaptability		Coach and mentor
	Achievement orientation	Organizational awareness	Conflict management
	Positive outlook		Teamwork
			Inspirational leadership

Computer hardware should be little in size yet expanded handling power. Measure decrease requires innovation that makes effective human recalcitrant device parts. The primary motivation behind lessening size is to put preparing power in human hand. Bigger the little size simple the human body to convey the device and correspondingly little vitality utilization. Client setting is particularly vital to comprehend and execute perspective. Machine ought to be enthusiastic to comprehend a passionate guidance. Body motion conveys a ton passionate data and keeping in mind that connecting with machines these feelings ought to be transferable and reasonable by the machine. It is having to comprehend what really a client think and why needs to execute the guidance. This could be comprehended by emotional intelligence technology. This makes a devoted association with wearable computing.<sup>[3]</sup>

High quality sensors device can easily observe the change in user environment. Video cameras and Camcorders can capture user environment effectively can feel change in it recoding and putting away pictures in the system. 2D and 3D graphics plays wonderful role in it. Infrared, Bluetooth, WI-Fi and other bio senses devices can feel minor changes in the environment. Desktop computers are favorite for working in places like supermarket, offices, CAD, CAM systems etc. can-do substantial employments rapidly. There is quite needed to do numerous errands movably. These computers can do heavy jobs quickly. For this purpose, smart devices are required that can be easily transferred from one place to another. The interesting thought is to make abilities daily useable devices like Laptops, mobile phones, Fax, office tables and chair so on this will illuminate everyday work. Emotional intelligence can feel and update changes. This can regulate and automate processes.<sup>[4]</sup>

Human correspondences are valuable in wearable computing. It is essential to make human associations and send it to a device. A proper interface is required for customer collaborations to give machine an authentic direction. Simple to utilize interfaces can pass information to the customer for working application. To pass information to application the interface must be pleasing and use least customer collaboration. Thus, device should be hand free, minimal size, mobility, dumbfounding sensors, always helpful, less error prone and quick as needs be. Setting free application demands are extending well ordered with the passage of time.<sup>[5]</sup>



Now a day's computing services becomes available on mobiles for their users. These services are presented by giving computation power to the users. We can do all the task that just perform on a desktop computer mean technology grow very fast speed desktop is a hug machine it's not built on pervasive idea .Desktop computing is getting bored and need to shift into a mobile by using pervasive computing idea. Mobile computing is reliable and cost effective. It increases the user interest and improves the performance. It works application quicker and makes it easy to use. GUI creates attraction attention for the user and guides him/her to utilize the ideal application in the easy to use and agreeable condition. GPS system get the information about the location it reads the user movement and update its status. It makes direct for the client and helps him/her to find his/her destination. Many SMART phones, PDAs are operating such applications for the user. A well programmed system for the user to search the locations can be developed for cell phones. User environment will be observed and put away by the devices and user will use it for later use this information is visible for him/her. It gives the Ubiquitous thought that set up and correspondence framework between the client and the application. Cyber Desk enables the application not to store user information but rather additionally to exchange it to other client and refresh it setting. User context is observed by the application through sensors and user is unaware of it. [6]



Speech input is a faster and growing field of wearable computing. Speech implementation and recognition is important in this context. IBM research shows that the main problem in speech input is noise the user context is recognized by application and executed by the application. Many other problems exist noises also included in the input voice and it becomes difficult to understand the user context. Low and high

pitch voice with different frequencies are hard to recognize. The user interfaces for wearable computing are not favorable for wearable devices. They context is difficult to handle. They are setting are difficult to manage. Sensible interfaces are required to be made so that can without quite a bit of a stretch be reasonable by wearable contraptions like cell phones. Start, instatement and execution process is improvable. In case we productive in giving and reliable talk interface we can deal with issues related to speech recognition with minimum noise detection. [7]

Emotional intelligence is the acknowledgment, understanding and emotional management in machines. EI truly look and formulize all possible out comings from recognition and learning driven systems. The sum we see we can manage that information successfully. Information is the ability to answer each and every possible request in the given game plan of information. In actuality this is the control of data that survey answers. Under given conditions excited information is the appraisal of each and every possible answer that can be engrossed in the midst of examination. The proper reaction should be brisk and correct and strong. At the point when the errands EI built up the control instrument end up attainable and man-influenced intellectual competence to can be made very successfully. [8]

The top requirement of wearable computing is to create a secure and continuous observable environment for residential areas. Wearable computers have ability to analysis and observe the object and take necessary actions against the perceived information. Wearable computers will examine and record information of each and everything in the town and care for it unstably these wearable computers record the information of the living people in the society and recognize them while observing. Wearable computer will read and record information of each and everything in the town and look after it restlessly. The observation should be done through hidden organs and unseen and unaware from society. Wearable computer should feel the natural change, moving toward attacker, atomic ambush, diseases control, etc and careful the living people on time. The all-inclusive community recognizing verification information can be recorded through pictures, names, voices, biometric equipment and different people references. Wearable computer can process the information once complete information is saved. [9]

Wearable computing demand is increasing rapidly in medical field. Numerous life secure types of gear are taken care of by wearable devices. Blood pressure is checked by computerized digital devices. Sicknesses are analyzed by numerous devices. Weight and blood touchy devices are useful to fix patients in ICU. Numerous doctors, therapeutic faculty, specialists, vendors are keeping up their stock utilizing numerous devices with applications. These devices work at low voltage and devour less vitality. Wearable medical computes faces complex data management techniques. These applications assist the patient with recovering and recommend them appropriate treatment. Wearable medicinal registers faces complex information the executive's methods. Wearable ECG application monitor heartbeat and helps to keep up circulatory strain. ECG machine works at extremely low handling setup in this way it consumes less amount of energy. [10]



Wearable computer can identify and distinguishes between different sounds in the environment. Wearable computers can hear environmental voices and can distinguish them as male and female sound, machinery working sound bird sound, vehicle sound, music sound etc. sound sensitive event detector recognize the event and invoke separate technique. Machine can alert about dangerous sounds and can interface with the human. Wearable computers can now recognize voices and react. Intelligence can be built by the construction of sound patterns. Classifications of sounds are important in this context. These sounds should be recognizable, and environment should be detected by wearable computers. Wearable computers should also extend knowledge in order to update information so that future analysis and event detection become easy.<sup>[11]</sup>

### III. RELATED WORKINGS

Wearable computing and Emotional Intelligence blending makes brilliant plans to delight and serve humanity these ideas are applied on computing machines to perform routine tasks of human and help them to make their working reliable interesting. We wish and a desire to create feelings in machines this is becoming very increasing day by day and we use all our force and power in order to fulfill his/her desires about said technology. The idea presented is that we want to create emotional in a wearable computer like writing pen, cell phone, Geometry box, optics watches, writing pen etc.

#### i. Writing Pen as Wearable Computer

Writing is practical instrument that is used for in written information and messages. Pen can be used to read written text and speak them in words. Pen is used by everyone and everywhere. It can also read numbers. Pen can recognize and record the style of text and its format. Wearable computing will be aggressive in Pen like devices. These devices will use a camera and a sensor with image storing and processing technology. Pen can read the text and store them converting them digitally. Digital information can be processed and send through Wi-Fi. The connected same devices can share information with one another. This can be used for creating secure informative environment. It is beautiful idea to read a text using pen and convert it into digital form for processing.

This idea can be used for text translation into another language. It can read and input written instructions to wearable computer. This is an extension of stylus. Pen can read numbers, a mathematical equation and can hint to solve it. It can read stored information and manipulate them for further processes. It can help student how to write and what to write by issuing a verbal instruction. We can optimize Pen working for many ideas like reader, recorder, messenger, translator and teaching.



#### ii. Cell phones and Mode Detection Intelligence

A cell phone application may be constructed to detect human modes. This application can record modes and their recognizable proof and react when these modes are distinguished in people. The modes can be sad, happy, thankful, alone, excited, emotional, naughty, crazy, awesome, sick, angry, proud, hungry, and cool etc. Mode Detection Application will observe the mode through camera and invoke corresponding method to respond in the event that the mode is glad, it can demonstrate a smiley and play a main tune and the other way around. The mode discovery interface should dynamic and utilize solid sensors to recognize the modes and committed business rationale. Human voices also have the feelings to interact to show human emotional behavior. Verbal input can also be processed by application. Human emotions are reaction in environmental changes and human behaviors. Human interactions change the mode. Cell phones are getting improved by timely. Now days we have build many applications that can be used in showing emotional behavior of cell phones. We have used emotional symbols in our text massaging that show the feeling. We can upgrade and record diverse modes by perceiving mouth position and some outward appearances. The broad field is waiting of researcher to create emotional applications. These applications can fix human feelings and fulfill them in any capacity. It can play and tune, an inspirational discourse, entertaining clasps and exchange like human that an individual can't converse with other individuals. In sad modes it can share its reason with other to get sympathy and benefits. In happy mode the application can strengthen the happiness power and can laugh and make other people happy sowing its behavior. In alone mode it can talk with the application and feel like someone is with him/her. Such applications are helpful to sustain humans

and heel their wounds expressed as modes. The role cell phone as wearable computers is very much ideal because cell phones are available everywhere we can carry them everywhere and as we know cellophane use batteries power that means there is no need any wire or electricity connect to operate these devices by making such type of application is awesome in pervasive computing. We can create emotions using application and cell phone hardware. Being everywhere cell phones are remarkable computers and have variety of applications to work on human emotions and intelligence. Means it can build like true human emotional responses.

**iii. Opticales as Wearable Computer**

Opticales are stylish expansion in human lives. This is wonderful plan to apply wearable computing in glasses. Because due to their unique position in human body they are special to apply wearable computing to make them beneficial for humans. Glasses can be used to clear distance images, to calculate distances and take still and moving images. These can also be used for detecting weather modes simple conditions and blood pressure sensing heart beats near the ear head. Glasses with special cameras can make view delight and attractive that person wearing. We can take picture through this smart glass. EI can be constructed through recording the voices and video scenes in memory and creating procedures that can process the input information and create its response. Emotional intelligence can be made for issuing guidance to different gadgets utilizing the eye light and changes Iris and retina. Eye is trademarks for giving directions are solid enthusiastic identifier. Eyes watch the progressions and make affections for it. We can go data through eyes to any wearable device. This is future technology through which we might be able to convey message through seeing different devices using bio-information technology. The smart glasses can easily attach with computer or laptop to send and receive data we can store picture or video that we make using smart glass in our laptop or pc because in smart glass there is less memory



**iv. Wristwatch as Wearable Computer**

It is like the normal watch but this smart wrist watch have all the functionality of a mobile phone or a mini computer it's have a processor internal and external memory camera for taking picture voice recorder to record the voice OS system which enable all application to run properly it's also provide audio and video song. An expansive number of individuals are cognizant about wearing distinctive style of watches and assortments. It is a great idea to use wearable computing in watch because we can easily carry watch everywhere. We can use smart watch for taking many tasks like take image by using image processing device. Camera is hidden in watch can take snaps. We can use this as a hidden camera for recording and taking picture. This is helpful for security purposes. As we know Images is a solid proof and this can be used as evidence, through this smart watch we can easily get the image and video without next person awareness. We can also use this watch for making videos and recording voices. Watches have sensors about the weather, and this tells us about the weather condition like cool, raining or hot. Wrist watches also be used for temperature and blood pressure checking this device or watch can be used every ware that why is this the good idea for wearable computing applications.



**v. Geometry box as Wearable Computer**

Geometry box (G) is brand new idea to apply wearable computing for learning purposes. Geometry box comprises of Protector, Led pencil, Scale, eraser, Compass and sharpener Compass, We can teach students creating EI environment that can enter student's advantage and show him/her to utilize diverse part so as to draw triangles, squares, angles, parallelogram, lines and quadrilaterals etc. it can distinguish between different types of rays, angles, and line. Geometry box wearable computer application will have stored procedures for the implementation by using different geometry box components also provide guide how to use them for making different squares, shapes and angles. It can take learner or the user interest as audio and video or may some time it take user interest as written procedure with diagram. Geometry box wearable computer also have display screen,

sound system by using touch sensing technology like the smart phone. A user can operate Geometry box components with a guide that will also be provided through application or through user manual. The intelligence of the G will be measured by optimizing learner interactions. A user-friendly environment can be used to detect the user interaction and give responses as well. Learner will learn how to draw a ray, square, line, triangle, different types of angles, and how to use Geometry box etc. Use of sharpener and led pencil is a motivational welcome speech that can attract the learner to learn something new.

### CONCLUSION

Wearable computing is applicable to anything under human use. It wound up valuable and coordinative with the Emotional Intelligence. EI can upgrade user communications and making a feeling of execution of the device being utilized. EI proved as constructor for wearable computing. Emotional Intelligence and wearable computing are dependent to each other. We can optimize human watches, optoclasses, modes, geometry box, and pen functionality and create intelligence to implement them behaving like we aspect or desire. We can pass data however visionary organs that established frameworks for the issuing of directions to different gadgets through eyes. This can create quicker method for order handling. In Human body human sensing organs detect the human emotions and create a working scene for human likewise wearable computers can also behave like human and may work like man himself. We wish this technology grow faster in future and it's included more benefits

### REFERENCES

- [1] Amy Y.C. , Joseph V. Ciarrochi, Chan, P. Caputi, "A critical evaluation of the emotional intelligence construct", University of Wollongong, Australia, 1999.
- [2] C. Schiele, C. Pentland and T. Starner "Visual Contextual Awareness in Wearable Computing", Cambridge, MA 02139.
- [3] T. Starner, S. Mann et al, "Augmented Reality through wearable computing", The Media Laboratory, Cambridge MA 2139
- [4] A. Dey, R. Orr , Gregory D. Abowd, and J. Brotherton, "Context in wearable and ubiquitous computing", GVU Center, Georgia Institute of Technology, Atlanta.
- [5] D. Salber, Gregory Abowd and D. A. S. Dey, "Combining Context-Awareness with Wearable Computing", GVU Center, College of Computing, Georgia, Atlanta
- [6] W. Picard, J. Healey ,E. Vyzas and Rosalind, "Towards machine emotional intelligence: Analysis of affective physiological state", M.I.T Media Laboratory, Cambridge, MA 01239
- [7] Sheikh IQBAL Ahmed and MUNIRUL HAQUE " Security in pervasive computing

- [8] Starner Thad E., "Wearable Computing", Georgia Institute of Technology, thad@cc.gatech.edu
- [9] A book on "Wearable Computing and Contextual Awareness" written by S.B. Massachusetts and Thad Eugene Starner Institute of Technology, 1999
- [10] B. Wellman and S. Mann, J. Nolan, "Sousveillance: Inventing and Using Wearable Computing Devices for data Collection in Surveillance Environment", Surveillance & Society, <http://www.surveillance-and-society.org>
- [11] A HAJJAR, The ISMAIL, A.E.S. and LSMAIL the Network security and attacks MA 021136.
- [12] A. Pentland ,B. Clarkson, and N. Sawhney, "Auditory Context Awareness via Wearable Computing", MIT Media Laboratory, Cambridge, MA 02139, {clarkson, nitin, sandy}@media.mit.edu
- [13] D. Raskovic, E. Jovanov and, T. Martin E. Jovanov "Issues in wearable computing for medical monitoring applications: A case study of a wearable ECG monitoring device", Department of Electrical and Computer Engineering, Huntsville, AL 35899.

IEEE SEM