



A Study on Digital Jewelry: Components and Methodology

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ABSTRACT: Wireless networking technology has been a very significant breakthrough in this rapidly advancing world which frees us from the use of wires and has made the process of communication more comfortable and convenient. In the present epoch of computer networking, mobile computing has advanced to an unimaginable extent and yet at times it becomes unwieldy to carry it. This gives way for breaking ground the next era of computing, i.e. Wearable computing, often referred to, as Digital Jewelry. This paper specifies the concepts, features, components (internal & external), features, methodology and examples of the various advancements in this field till date.

KEYWORDS: Digital Jewelry, Portable Devices, Miniature, WearableComputer, Java Ring

I. INTRODUCTION

Many miniature devices have been invented and are rapidly developing in today's era of computer technology, which have simplified many of the day to day tasks and activities. The rapid use of this portable technology and its multiple functionalities in assisting people to engage with other useful activities have made Digital Jewelry a versatile tool for learning and leisure purposes (Sedek et al. 2012 et al., 2012). According to Lee, et al. (2013) various studies have scrutinized the potential of miniature devices for ubiquitous learning systems, leisure and confirming their effectiveness and how they have an impact on lives and other areas of human endeavor.

The dynamism of technology has brought about numerous portable devices ranging from Micro, Super-Micro, Lap, Pad, Tab to skin and there seem to be no perfect technology for students, workers, and people at large and thus keeps rapidly advancing.

II. LITERATURE REVIEW

Digital Jewelry is one of the upcoming and emerging areas of the wearable computer. Digital Jewelry is nothing but the re-packaging of some of the components present in the cell phone. The components that form each piece of Digital Jewelry, include Microphone, Receiver, Touch Pad, Display, Circuit Board, Antenna, and Battery and they have the functionalities similar to that of a cell phone.

A. What is a Wearable Computer (Wear Comp):

A wearable computer is a miniature electronic device that is worn by the user under or on top of clothing (Wikipedia, 2011). It is a ubiquitous device that is always with the user which allows the user to enter commands and to do other activities without hindrance (Mann, 1998). It is a device which is small and light enough to be worn on the human body with ease and comfort while parallel providing all its functionalities. It is a device that is incorporated into a person's apparel or personal accessories and is capable of storing and processing data.

B. What is a Digital jewelry:

Digital Jewelry is small electronic devices that are designed as fashion jewelry and are embedded with intelligence. These facilitate in storing important personal information such as identification number, passwords, account information, etc. Today, each individual has numerous passwords to remember. This issue can be solved by the use of Digital Jewelry. It has the capability to be an all-in-one replacement for documents and information such as credit cards, business cards, driver's license, corporate security badges, etc.



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C. Features of Digital jewelry:

There are many significant and unique features of Digital Jewelry, some of which are listed below:

- Portability: The ability to use wearable computer while walking or moving around because of its small size is one of its most paramount
- Sensors: Wearable computers must have sensors for its physical environment in addition to the user inputs. Such sensors may include cameras, microphones or wireless communication.
- User Attention-Free: Other matters can be attended to while using this device and it does not require attention or interaction from the user constantly. It is unrestrictive and unobtrusive to the user. The user will be able to perform daily chores, walk around or ride a crowded bus.
- Communication: These devices can communicate to other systems and the external world. They can communicate with the user within reasonable limits of time.

D. Advanatages of Wearable Computer:

- .A wearable computer is a wireless device and hence gives freedom from desk.
- Always connected to the Internet and/or reference materials.
- It is available immediately and there it is not required to remove it from the bag and to turn it on.

III.METHODOLOGY

Worldwide, various individuals, manufacturers and companies have designed and developed various digital jewelry that range from bracelets to rings and necklaces.

A. Components of Digital Jewelry:

According to Sayeesa (2013), the main idea of digital jewelry is to divide the different components inside a cell phone such as Battery, Circuit Board, Antenna, Display, Microphone, Camera, Reciever, etc. and repackage them in such a way so as to form a fashion jewelry that the user can wear it and it also performs its functionalities effectively and efficiently.

The components include:

- Earrings - Its design is such that, the speakers will be embedded into the earrings and will serve as the phone's receiver. Various companies worldwide are developing technologies such as pendants and earrings that serve the functionality of Bluetooth devices which the user can wear as jewelry and at the same time help enhance their devices.
- Necklace – Microphones are embedded into necklaces which the users will talk into using the assistance of voice recognition software that is embedded into it.



FIG 1. Necklace

- Ring – The rings have light-emitting diodes (LEDs) embedded into them that flash to indicate an incoming call. Different flash colours to identify different callers or indicate an important caller can also be programmed.

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- Bracelet – This device can be used as a wrist display and can also be used as a caller. It has a video graphics array (VGA) equipped into it for display.

B. How Digital Jewelry Works and Its Internal Components:

The keypad and dialing functionalities are integrated into the digital bracelet. To make any calls, the voice-recognition software will be used. If you say aloud the name of the contact you would like to call, the cell phone will auto dial that number. Users can then talk into the microphone that is embedded in the digital necklace. The information transfer is done in the form of signals, the sensors embedded in these devices help in the information transmission through a wireless technology. If the user receives a phone call, he/she can identify it when the digital ring flashes. A user is also notified when he/she receives an email. The ring, bracelet are all inbuilt with a rechargeable battery and they can be also set to vibrate to indicate an incoming call.

International Business Machines Corporation, an American company has developed a working prototype of a cell phone. It consists of various components of digital jewelry that will work together in coordination with the help of wireless Bluetooth technology. To power these components, IBM also develops small rechargeable batteries.

C. Java Ring:



Fig 2. Java Ring

The Java ring which is programmed with Java applets will communicate with host applications on networked systems (Bonsor, 2015). The applet is a small program that is written in Java or any other programming language and is built in the Java ring.

The Blue Dot Receptor is a device that facilitates the host system to communicate with the ring and store into it the captured information. The material which is used to manufacture the ring is stainless steel and its dimensions include: diameter of 16 millimeter and it also has anButton which is a transistor processor. The memory and system specifications of a Java Ring are: Java Virtual Machine software, 134KB of RAM and 32KB of ROM.



Fig. 3 Blue Dot Receptor



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The Java Ring was first launched at the Celebration School. The Ring has been designed and programmed so as to store different information such as a student's medical records, attendance, and money for various expenditures such as lunches. When a student presses the signet of his/her ring, all this information is stored.

D. IBM Ring:



Fig 4. IBM Ring

The American company International Business Machines Corporation (IBM) is developing a device named IBM Magic Decoder Ring, which is a mouse ring that will use the company's IBM Track Point technology. The Track Point Technology is the one used to track the position of a cursor on the laptop keyboard.

This technology is built into the ring and appears as a black pearl ring. To rotate and turn around the cursor, the ring has a black ball on its top.

IV. CONCLUSION

The main concept of the digital jewelry is to have wireless miniature devices that can be used as daily fashion apparel and provide its functionality while remaining attractive.

Whilst wearable computers provide various paramount features of which digital jewelry is no exception, a major setback of these devices are its various limitations.

Today, as we are constantly approaching towards the fifth generation of computers which are small and portable devices and can be used as a part of everyone's daily apparel. But along with the advantages also come the limitations of limited capabilities of interactions due to their lack of display, or its small size as compared to a laptop or a mobile phone.

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