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DIGITAL JEWELRY: AN APPROACH TO PROTECT JEWELRY

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Abstract

Mobile computing is beginning to break the chains that tie us to our desks, but many of today's mobile devices can still be a bit awkward to carry around. In the next age of computing, there will be an explosion of computer parts across our bodies, rather than across our desktops. Basically, jewelry adorns the body, and has very little practical purpose. However, researchers are looking to change the way we think about the beads and bobbles we wear. The combination of microcomputer devices and increasing computer power has allowed several companies to begin producing fashion jewelry with embedded intelligence i.e., Digital jewelry. Digital jewelry can best be defined as wireless, wearable computers that allow you to communicate by ways of e-mail, voicemail, and voice communication. It seems that everything we access today is under lock and key. Even the devices we use are protected by passwords. It can be frustrating trying to keep with all of the passwords and keys needed to access any door or computer program. This seminar discusses about a new Java-based, computerized ring that will automatically unlock doors and log on to computers.

1. INTRODUCTION

The latest computer craze has been to be able to wear wireless computers. The Computer Fashion Wave, "Digital Jewelry" looks to be the next sizzling fashion trend of the technological wave.

The combination of shrinking computer devices and increasing computer power has allowed several companies to begin producing fashion jewelry with embedded intelligence. Today, manufacturers can place millions of transistors on a microchip, which can be used to make small devices that store tons of digital data. Digital Jewelry appears to be one of the biggest growing promotions of its time. Imagine being able to e-mail your boss just by talking into your necklace, or by picking up messages through your watch.

The whole concept behind this is to be able to communicate to others by means of wireless appliances. The other key factor of this concept is to stay fashionable at the same time. Cellular phones are often said to be attached to our ears in this day and age. Yet they can tend to be an eye sore.

2. Background

2.1 What is Digital Jewelry?

Digital jewelry is the fashion jewelry with embedded intelligence. "Digital jewelry" can help you solve problems like forgotten passwords and security badges. "Digital jewelry" is a nascent catchphrase for wearable ID devices that contain personal information like passwords, identification, and account information. They have the potential to be all-in-one replacements for your driver's license, key chain, business cards, credit cards, health insurance card, corporate security badge, and loose cash. They can also solve a common dilemma of today's wired world the forgotten password.

Figure 1: Digital jewelry and its components

Soon, cell phones will take a totally new form, appearing to have no form at all. Instead of one single device, cell phones will be broken up into their basic components and packaged as various pieces of digital jewelry. Each piece of jewelry will contain a fraction of the components found in a conventional mobile phone. Together, the digital-jewelry cell phone should work just like a conventional cell phone.

3. Architecture

3.1 Technical specifications of digital jewelry

Digital jewelry devices consist of a screen or display for information, most likely consisting of 7-16-segment, or dot matrix LEDs, LCDs, or other technologies such as electroluminescent material (EL) or others, which could become an optional display. So too, an audio visual or other 'display' could consist of a speaker, a single flashing light, a sensor of some kind (such as a temperature driven EL display), or other informational aesthetic. The display layer sits on a face of the device, which is enclosed in some material such as plastic, metal, crystal, or other material. It has external switches and

buttons on its side and a data-port for accessing the programmable electronic circuit inside. A microcontroller that is a surface mounted device (SMD) on a printed circuit board (PCB) with resistors (R) and capacitors (C) are the internal 'guts' of the jewelry.
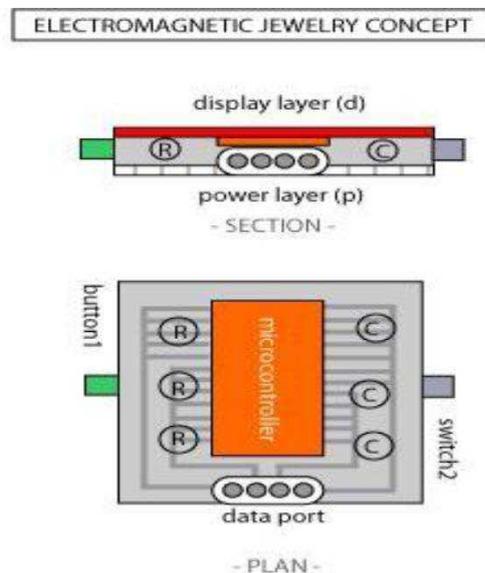

Figure 2: Specification of digital jewelry.

3.2 The java ring

A Java Ring is a finger ring that contains a small microprocessor with built-in capabilities for the user, a sort of smart card that is wearable on a finger. Sun Microsystems Java Ring was introduced at their JavaOne Conference in 1998 and, instead of a

gemstone, contained an inexpensive microprocessor in a stainless-steel iButton running a Java virtual machine and preloaded with applets (little application programs).

The Java Ring is an extremely secure Java-powered electronic token with a continuously running, unalterable real-time clock and rugged packaging, suitable for many applications. The jewel of the Java Ring is the Java iButton a one million transistor, single chip trusted microcomputer with a powerful Java Virtual Machine (JVM) housed in a rugged and secure stainless-steel case The Java Ring is a stainless-steel ring, 16-millimeters (0.6 inches) in diameter, which houses a 1-million-transistor processor, called an iButton. The ring has 134 KB of RAM, 32 KB of ROM, a real-time clock and a Java virtual machine, which is a piece of software that recognizes the Java language and translates it for the user's computer system. Digital jewelry, (designed to supplement the personal computer,) will be the evolution in digital technology that makes computer elements entirely compatible with the human form.
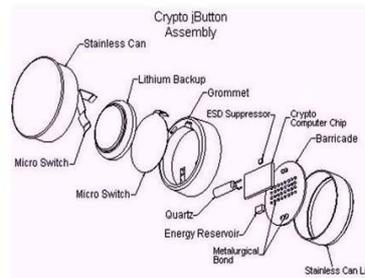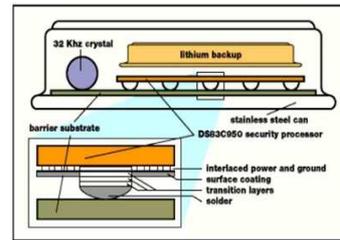

Figure 3: Java ring

In the future, the Java Ring may start your car. Mobile computing is beginning to break the chains that tie us to our desks, but many of today's mobile devices can still be a bit awkward to carry around. In the next age of computing, we will see an explosion of computer parts across our bodies, rather than across our desktops

Figure 4: Internal construction of the I Button & Components of the DS1954B Crypto iButton

3.3 I Button

The jewel of the java ring is the java iButton .It contains one million transistor processor single chip trusted microprocessor with powerful Java Virtual Machine(JVM) housed in rugged and secure stainless steel case. It is originally called touch memory devices they were later renamed as "ibuttons packaged" like batteries. I Button have only a single active electrical contact on the top surface and with the stainless steel shell serving as ground Every IButton product is manufactured with unique 8 byte serial number and carries a guaranty that no two IButtons have same number. Among the simplest I button are memory devices which can hold files and directories that can be read and written like small floppy disks

3.4 Blue dot receptor

- The Java Ring is snapped into a reader, called a <u>Blue Dot receptor</u>, to allow communication between a host system and the Java Ring

- Read write operation can be done by this blue dot receptor

- Receptor cable connected to the USB port of pc or any embedded system

- The information is transferred between the ibutton and pc with momentary touching java ring

Figure 5: Blue dot receptor

3.5 Inside java ring

The world today is in hunt for the new technology, and has contributed miracles to the field of science, the ever ending stream. The one such contribution is the JAVA RING, a finger ring that contains a small microprocessor with built-in capabilities for the user, a sort of smart card that is wearable on a finger. Well it's something new to the world. Since it has not been very popular these days, it's really a new opening for sure introducing more of it, we can say that, it contains an inexpensive microprocessor in a stainless steel iButton, this particular ring is running on a Java Virtual Machine and it is preloaded with applets.

The JVM is the "processor architecture" on which java byte code is executed. It is mostly implemented in software, and available for a large variety of hardware platforms, ranging from mainframe computers to mobile phones and small embedded devices

4. Operating system of java ring

A special operating system was designed and stored in the ROM of the Crypto iButton to support cryptography and general-purpose financial transactions - such as those required by the Postal Service program. While not a Java virtual machine, the E-Commerce firmware designed for this application had several points of similarity with Java, including an object- oriented design and a byte code interpreter to interpret and execute Dallas Semiconductor's custom-designed E-Commerce Script Language A Compiler was also written to compile the high-level language representation of the Script Language to a byte code form that could be interpreted by the E-Commerce VM. Although the E-Commerce firmware was intended primarily for the USPS application, the firmware supports a variety of general electronic commerce models that are suitable for many different applications. The E-Commerce firmware also sup-ports cryptographic Protocols for secure information exchange such as the Simple Key- Management for Internet Protocol (SKIP) developed by Sun Microsystems Inc.

5. Application of java ring

It seems that everything we access today is under lock and key. Even the devices we use are protected by passwords. It can be frustrating trying to keep with all of the passwords and keys needed to access any door or computer program. Dallas Semiconductor is developing a new Java-based, computerized ring that will automatically unlock doors and log on to computers.

User simply has to press the signet of the java ring against the blue dot receptor and the system connected to the receptor performs the function that the applets instruct it to.java ring has the user profile and the same profile is present in the door embedded system also, when the user press the signet of the java ring against the java ring reader which is embedded at the handle

of the door the data is transferred from the ring to door system. if the profile is authentic means user is authentic to open the door the applets president in the ring instruct the door to open

6. Highlights of java ring

- Runs Java better (plus portions enhance Java Card 2.0)

- Careful attention to physical security (rapid zeroization)

- Durability to stand up to everyday use

- High memory capacity (up to 134K bytes NV SRAM)

- Retail connectivity to 250 million existing computers (less if designed-in before manufacturing)

7. Future progress

Through methods involving cognitive processes of recognition on an individual level identifying elements of personal significance a series of practice based investigations will be undertaken exploring memory and significance.

These investigations are firstly intended to look at the notion of significance, then significance in interactive objects and aim to show that there are possibilities through the use of contemporary jewellery knowledge to enable interactions that are unusual and new.

The IDEO design company has proposed for the design of CELL PHONE RING and TOE JEWELLERY.

7.1 Advantages

a.It provides security. For example: - java ring is used to lock or unlock doors or computers as we use passwords and keys to lock our computers and doors. We can't need to remember all those passwords and carry all those keys. So java ring is designed to provide security.

b. Easy to carry everywhere.

7.2 Disadvantages

c.As this digital jewellery is related to wireless technology there is a great scope of hacking.

d. Charging capability of the elements will be a very vital problem including the cost.

e.There may be some unwanted changes in the parts of human body by the continuous usage of jewellery due to the radiations it emits.

f. There is scope of decline in the quality of the products that are used by the individuals.

g.This technology will be much more useful to ladies rather than gents as jewellery is mostly worn by them.

CONCLUSION

Digital jewelry can best be defined as wireless, wearable computers that allow you to communicate by ways of e-mail, voicemail, and voice communication. The jewelry pieces work as a set. For example, imagine that your set consists of earrings, a necklace, and a watch. You can pick-up your messages and display them on your watch. In order to hear the message, if it's a voice message, you can listen to it in your earrings. If you want to send out a message, you can talk into your necklace and it will allow you send a voice message. The works much like that of a cellular phone. It does almost all the same functions but looks nicer. Each piece has a small button on the backside of the accessory that when pressed activates the piece. You then use each piece accordingly. You may also, once marketed, choose to buy extra pieces for the set. This may include a ring that has a vibrating chip in it. The ring would vibrate to inform you of any incoming messages.

The basic idea behind the digital jewelry concept is to have the convenience of wireless, wearable computers while remaining fashionably sound. It is hoped to be marketable soon, however, several bugs remain. Charging capabilities and cost are just a sample of the problems that lurk.

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