

DIGITAL JEWELLERY-MADE POSSIBLE USING WIRELESS COMMUNICATION

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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, jewelery adoms the body, and has very little practical pupose. 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, wwearable computers that allow you to communicate by ways of e-mail, voicemail, and voice communication. This paper enlightens on how various computerized jewellery (like ear-rings,necklace, ring, bracelet etc.,) will work with mobile embedded intelligence. It seems that everthing 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 paper discusses about a new Java-based, computerized ring that will automatically unlock doors and log on to computers.

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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 place millions of transistors on a microchip, which can be used to make small devices that store tons of digital data. 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 in market is to stay fashionable at the same time.



By the end of the decade, we could be wearing our computers instead of sitting in front of them.

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.

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.

The various components that are inside a cell phone:

Microphone, Receiver, Touch pad, Display, Circuit board, Antenna, and Battery.

IBM has developed a prototype of a cell phone that consists of several pieces of digital jewelry that will work together wirelessly, possibly with Blue tooth wireless technology, to perform the function of the above components.



Cell phones may one day be comprised of digital accessories that Work together through wireless connections.

Here are the pieces of computerized-jewelry phone and their functions:

- **Earrings** –Speakers embedded into these earrings will be the phone’s receiver.
- **Necklace** – Users will talk into the necklace’s embedded microphone.
- **Ring** – Perhaps the most interesting piece of the phone, this “magic decoder ring” is equipped with light-emitting diodes (LEDs) that flash to indicate an incoming call. It can

also be programmed to flash different colors to identify a particular caller or indicate the importance of a call.

- **Bracelet-** Equipped with a video graphics array (VGA) display, this wrist display could also be used as a caller identifier that flashes the name and phone number of the caller.

With a jewelry phone, the keypad and dialing function could be integrated into the bracelet, or else dumped altogether—it's likely that voice-recognition software will be used to make calls, a capability that is already commonplace in many of today's cell phones. Simply say the name of the person you want to call and the phone will dial that person. IBM is also working on a miniature rechargeable battery to power these components.



IBM's magic decoder rings will flash when you get a call.

The same ring that flashes for phone calls could also inform you that e-mail is piling up in your inbox.

This flashing alert could also indicate the urgency of the e-mail.



FIGURE 3

the eyepiece above displays images and data received wirelessly from the Communicator's belt module.

The mouse-ring that IBM is developing will use the company's Track Point technology to wirelessly move the cursor on a computer-monitor display. (Track Point is the little button embedded in the keyboard of some laptops.) IBM Researchers have transferred Track Point technology to a ring, which looks something like a black- pearl ring. On top of the ring is a little black ball that users will swivel to move the cursor, in the same way that the Track Point button on a laptop is used.

This Track Point ring will be very valuable when monitors shrink to the size of watch face. In the coming age of ubiquitous computing, displays will no longer be tied to desktops or wall screens.

Instead, you'll wear the display like a pair of sunglasses or a bracelet. Researchers are overcoming several obstacles facing these new wearable displays, the most important of which is the readability of information displayed on these tiny devices.



Prototype bracelet display developed by IBM

Charmed Technology is already marketing its digital jewelry, including a futuristic-looking eyepiece display. The eyepiece is the display component of the company's Charmed Communicator, a wearable, wireless, broadband-internet device that can be controlled by voice, pen or handheld keypad. The Communicator can be used as an MP3 player, video player and cell phone. The Communicator runs on the company's Linux-based Nanix operating system.

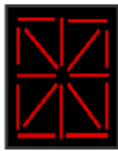
TECHNICAL SPECIFICATIONS OF DIGITAL JEWELLERY:

Digital jewellery 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 audiovisual 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 micro controller 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.

DISPLAY TECHNOLOGIES:

The digital jewelry display, for instance, every alphabet and number system has found representation within the electronics realm and 'dot-matrix' (a matrix of single LEDs) is used to display Chinese and Japanese and other character sets, as can the alternative display for LCDs (liquid crystal displays) also be used, as often found in watches.

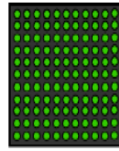
alphanumeric or graphic Display Types



16-segment LED



16-segment LCD



Dot-matrix LED/LCD

FIGURE 5

Digital Jewelry can be made in many different sizes and shapes with a variety of materials ranging from plastic and metal to rubber and glass. They utilize electromagnetic properties and electronics to display information through a screen or display of some kind. This could range from LED 7-segment, 16-segment, dot matrix, and other programmable LEDs devices to LCDs, OLEDs, and other displays, which are all driven by the self contained jewellery devices themselves.

ELECTROMAGNETIC BEADS:

The closest comparison to this model is that of 'beads' which are strung together to make a custom necklace or bracelet, with interchangeable electromagnetic component systems or devices. One bead may be a capacitor on the inside, and a solar panel on the outside. Another bead may have an internal resistor which feeds power into a programmed microcontroller bead which drives an external screen, with other options available in a variety of bead configurations which compose a circuit, including beads with a piezo element, voltage regulator, crystal, or rechargeable battery as part of the modular jewel circuit. The number of data pins on the microcontroller needs to be enough to easily program the display layer plus the switches without overly complex and advanced coding methods.

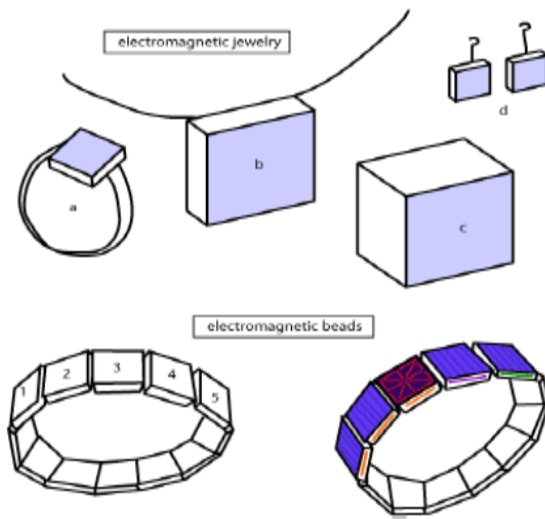


FIGURE 6

The key to the device's ability to work effectively is a balancing of electronic components within the circuit with a light duty processing and limited power consumption required for the display (d) layer.

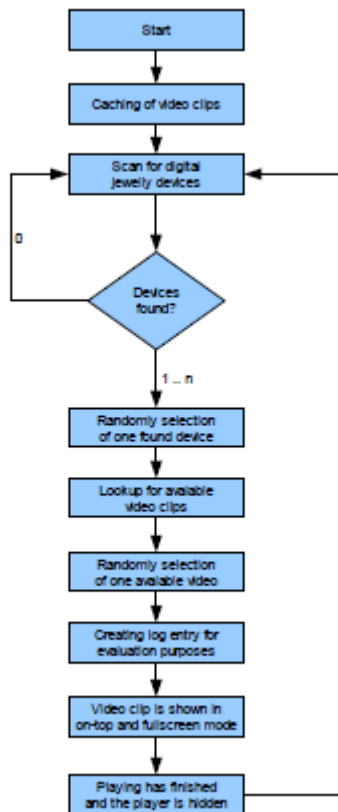
PROTOTYPES OF DIGITAL JEWELRY



Complex HIOX necklace showing all 26 letters of the Roman alphabet Extended in 4-dimensional space time. Metal with leather cord.



Programmable HIOX ring with 16-segment LED display



Technical Part

THE JAVA RING:

It seems that everything 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.



The java ring can be programmed to give you access to every door and device. The java ring is snapped into a reader, called a Blue Dot receptor, to allow communication between a host system and the Java Ring.



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 134KB 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 jewellery, (designed to supplement the personal computer,) will be the evolution in digital technology that makes computer elements entirely compatible with the human form.

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).

CONCLUSION

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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