Human Microchip Implantation

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Abstract— Microchip implantation as an authenticating technology, also covers authorization and access control, is gaining more concerns nowadays. Microchip implantation is not new to humans. Applying a heart pacemaker for the prosthesis is now considered a direct process. Microchips are being kept in prostate knees and hips during the restive procedures, which can later help in assisting operative analytics which can help in rehabilitation. While medical innovations using microchips in the past decade, we have begun to see the potential use of microchip transplantation for non-medical devices in humans for control, convenience and care applications. Most of these emerging applications displayed in many cases studies have used passive radio frequency identification (RFID) tags or embedded transponders in the hands of trisés, cell, wrist or implants. The RFID transponder stores a unique identifier that is turned on when the device comes in to the range of reader. In this paper we will see how the RFID technology is implanting in Human body, it's working, advantages and disadvantages and how it is affecting the human life.

***Keywords*- Include at least 4 keywords or phrases**

I. INTRODUCTION

RFID (Radio Frequency Identification) is a tracking technique used to identify and authenticate tags that apply to any product, person or animal. Radio Frequency Identification and Detection is a common term that is used for technologies that use radio waves to identify objects and people.

RFID is similar to barcoding in which the data is read from a tag or label and is stored in a database. RFID, however, has several advantages over systems that use barcode asset tracking software. The most notable is that RFID tag data can be read out of line-of-view, while the barcode should be aligned with an optical scanner.

RFID is a technology used to transmit data using the radio waves. In this technology a computer microchip called RFID chip (or tag) (Radio Frequency Identification) which stores a unique identification number and a receiver which continuously transmits the radio waves are used to complete the communication between RFID chip and receiver.

A human microchip implant is typically an identifying integrated circuit device or RFID transponder encased in silicate glass and implanted in the human body. This type of subdermal implant usually contains a unique ID number that can be linked to information contained in an external database, such as personal identification, law enforcement, medical history, medications, allergies, and contact information.

The chips are the size of a grain of rice and are inserted underneath the skin between the thumb and forefinger.

Figure 1.1 Human Microchip Implanted in hand between thumb of fingers.

I.I History

Generally it is said that the roots of Radio Frequency Identification Technology can be traced from the second world war. German, Japanese, American and British were using all the radar, which was discovered in 1935 by the Scottish physicist, Sir Robert Alexander Watson-Wat-Two, with aircraft, while he was still miles away. The problem was that there was no way to find out which aircraft was of the enemy and who is returning from a mission.

The Germans discovered that if the pilots rotate their planes as soon as they return to the base, then it will change the radio signal back. This rare method warned the radar crew on the ground that they were German aircraft and was not allied aircraft (this is essentially the first inactive RFID system).

The British developed the first active identity friend or enemy (IFF) system. They put a transmitter on each British plane. When it was indicated by radar stations on the ground, it started broadcasting back a signal which identified the aircraft as friend. RFID works on the same basic concept. An indication is sent to the transponder, which arises and either shows a signal (passive system) or transmits the signal (active system).

The first experiment with RFID transplantation was done by the British scientist Kevin Warwick in 1998. Their implants were used to open the doors, turn the lights inside, and produce oral within a building.

II. Working Principal of RFID

RFID Technology has mainly two components which are used to complete the process of identifying objects uniquely or to authenticating someone. First component of RFID technology is RFID transponder (or tag or chip) and second is RFID reader.

RFID Transponder:-

A RFID Transponder (or tag) is device which is tagged with objects to identifying them. A Transponder store the unique identification number and sends this data to RFID reader whenever is comes under the range of RFID reader. There are two types of RFID Transponder:-

(i). Active Tag
(ii). Passive Tag

(i) Active tags are those which contain internally power source (like lithium batteries, etc.) for generating signals and transmitting them. These tags are more powerful then passive tags because they have their own power source therefore they can generate more powerful signals and have more range of courage then the passive tags.

(ii) Passive tags are those which are dose not contain any power source and relay on the coming radio waves from RFID reader for their power. Passive tags have a coil which receives radio frequencies and generate power for operation.

Passive RFID tags are mostly used because they chipper then active tags and quick compact coze they don't have batteries.

An Active RFID tag is consists of mainly two things first one is a computer chip which stores the unique id number and second one is an antenna for receiving and transmitting radio signals. An external source of power (batteries etc.) is attached in the circuit.

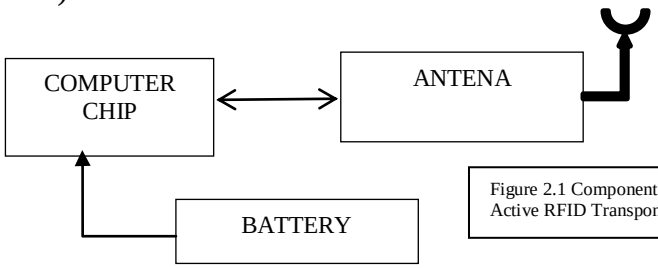

Figure 2.1 Components of An Active RFID Transponder..

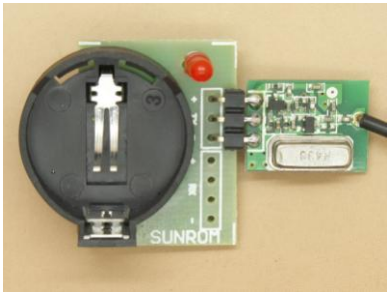

Figure .2.Active RFID Transponder

A Passive RFID tag is consists of three things: - a computer chip, an antenna and a coil which generates power from the magnetic field created by RFID Reader and stores it into capacitor for operational purpose.

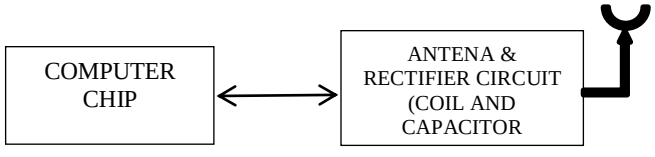

Figure 2.3 Components of A Passive RFID Transponder..

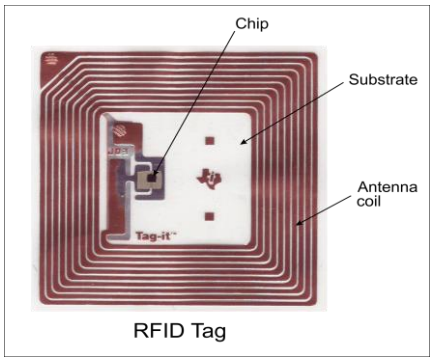

Figure 2.4 Passive RFID Transponder

RFID READER:-

RFID reader is device which contains a coil to generate electromagnetic field and radio frequency (RF), a radio frequency (RF) receiver and a microcontroller.

RFID reader generates an electromagnetic field and transmits RF signals to few meter of range (Range Is Depends upon the Frequency Band of Radio Waves. Check table 1.1 Frequencies Of operation). RF signal receiver receives signals coming from RFID tag and transfers to the microcontroller for converting signals into data.

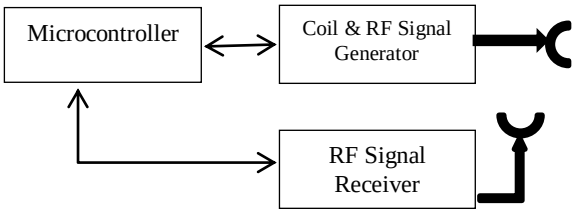

Figure 2.5 Components Of RFID Reader.

TABLE 2.1 Frequencies Of operation.

Frequency	**Band**	**Range**
Low Frequency	125 kHz-134 kHz	Up to 10 cm.
High Frequency	13.56 MHz	Up to 1 m.
Ultra-High Frequency	860-960 MHz	10 to 15 m.

How RFID Works:-

A RFID Reader creates an electromagnetic field and continuously transmitting RF signals. Whenever the RFID Tag (or transponder or chip) came into the range of RFID reader, the RF signals of Reader activates the RFID tag. Antenna & coil receives the signals generates operational power from it and stores it in a capacitor and powered the computer chip. The Computer chip then transmits the stored data back to the receiver through antenna.

The RFID Reader receives the reflected signals through RF signal receiver.

The reader also comprises of the software and components. Using these components the reader decodes the received code and display the result in an LCD display. The reader can include a RS-232 port to attach a computer.

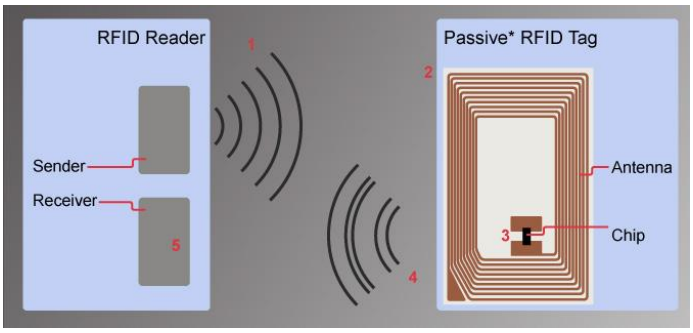

Figure 2.6 Communication Between RFID Tag & Reader.

III. HUMAN MICROCHIP MODEL

The reader also comprises of the software and components. Using these components the reader decodes the received code and display the result in an LCD display. The reader can include a RS-232 port to attach a computer.

Human microchip is a type of Radio Frequency Identification (RFID) tag wrapped in silicate glass with a size of a grain of rice and injected into human body.

The Human Microchip implant system comprises two components: a transponder and a reader. The transponder is the actual Human Microchip implant. The Human Microchip system is RFID system, which uses low-frequency radio signals to communicate between the Human Microchip and Reader. The range of activating the microchip and

reading data from it is quite small. Normally it is between 2 to 12 inches.

Transponder:-

It is the main component of Human Microchip Implant System. The transponder is the actual Human Microchip. It is a passive transponder, means it not contains any battery or any other external source of power. Because there is no battery in the passive transponder, or nothing to wear, it has a long life of 99 years, and there is no maintenance. Due to being passive, it remains passive until it is activated by the reader sending it in a low-power electrical charge. The reader reads or scans the implanted microchip and receives data from the microchip (an identification number in this case). Communication between Human Microchip and Reader is through low-frequency radio waves. Since the communication occurs through very low frequency radio waves, it is not harmful for the human body at all.

The Human Microchip-transponder comprises of four parts; computer microchip, antenna coil, capacitor and the glass capsule.

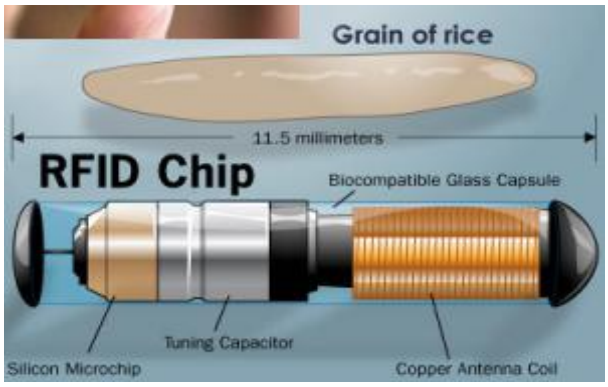

Figure 2.7 Structure Of Human Microchip

Microchip: - The Computer microchip stores a unique identification number of 10-15 digits which is used to identify human as unique. Chip contains the read only memory so if once the code has written cannot be changed after that.

Antenna Coil: -The simple coil of copper wire is used to receive electrical charge wirelessly from the magnetic field created by reader. It is also used to receive and transmit the RFID signals from or to reader.

Tunning Capacitor: - The capacitor stores the small electrical charge sent by the reader, which activates the transponder. The "activation" allows the transponder to send back the ID number stored in the computer microchip. Because "radio waves" are used to communicate between the transponder and reader, the capacitor is tuned to the same frequency as the reader.

Glass Capsule: - The glass capsule holds the microchip, antenna coil and capacitor. It is a small capsule, the smallest measuring 11 mm in length and 2 mm in diameter, it is about the size of a grain of rice. This capsule is made of biocompatible material such as soda lime glass.

After assembly, the capsule is air-tight sealed, so no body liquids can touch the electronics inside the capsule. The glass is very smooth and subjected to movement; a material such as a polypropylene polymer case which covers the one end of the capsule. This case provides a consistent surface which the body tissue fibres bond or interconnect, and this result the permanent implantation of microchip.

The Human Microchip is inserted into the subject with a hypodermic syringe. Injection is safe and simple, comparable to common vaccines. Anaesthesia is not required nor recommended. In dogs and cats, the microchip is usually injected in hand between the thumb and fingers.

Figure 2.8 Microchip Implant Done Through A Syringe.

Reader: -The Reader reads the microchip's data by activating it through RF signals. After receiving signals from reader microchip send back the stored unique id number to reader using same frequency.

The reader receives signals from microchip and decode it into human readable form and use this information for security authentication, displaying medical history of the person, it other details etc.

IV. Area Of Use

In 1998, after the use of Professor Kevin Warwick's Cyborg 1.0 in the UK, in 2004, the first commercial human microchip was developed by American company Veriship Corporation in 2004. The idea to identify the tag for humans came after the September 11, 2001 attacks on the World Trade Center and the Pentagon.

When the Varichip launched its product range for the first time, they had four corn stone app references: (1) VeriPe, (2) Verimed, (3) Veriard, and (4) Correction.

The VeriPay system allowed end-users the ability to perform cash and credit transactions with the embedded implant.

VeriMed was a user-operated healthcare information portal, under which consumers (i.e., patients) could have their own personal health record (PHR) online. Employees of the hospital and personnel of emergency service can access that information for allergic reactions to patient's history, as well as medicines and other things.

The VeriGuard application was considered to be a versatile safe access technique, which allowed the authorized individuals to go and unleash unauthorized people out.

Finally, VeriChip's 'Corrections' product had to done with chipping the individual who had committed a crime, were on parole or probation, or were awaiting trial.

Medical & Health Care: - The technology used by VeriChip allows a hospital with a special scanner to read a unique medical identification code in the microchip. Medical personnel can then input that code into a computer database and quickly locate medical records for a patient. This could save precious time during an emergency or reduce risks when treating a patient with dementia.

Security Authentication: - This technique is also being used for better security and safety. Some organizations have already started using implanted microchips as an electronic key to provide access to highly sensitive areas.

Location Tracking: - This technology could be used in future to track the location of lost people, Alzheimer patients, and could help police system to track the location of criminal. Using this technology police can track all the details of criminal at the crime spot by checking the surveillance and human microchip reader present at that spot. A GPS-enabled chip could make it possible for people to physically be located by latitude, longitude, height and velocity. This kind of implantable GPS device is not technically possible at this time. However, if deployed widely at some point in the future, then Implantable GPS devices may allow the detection of missing persons and fugitives and people fleeing a crime scene.

Payment Transaction: - Because modern payment methods rely on RFID / NFC, it is believed that implantable microchips, if they become popular in use, will become part of the cashless society. Verichip transplantation has already been used in such nightclubs like Baja Club for such purpose, so that patrons can purchase drinks with their alleged microchip.

V. Problem With Human Microchip Implantation

There are both potential problems and benefits associated with human microchip. One problem is that privacy of a person can be seriously affected. This can happen because the person's movements can be tracked physically and financially. Personal data about a person can be sold or hacked. A third potential problem can be that who has the reach to the information and who will the store information. There are potential health problems as well. For example, non-ionizing radiation from the microwave radio frequency and magnetic field can cause various health issues. A potential benefit may

include the complete medical history of a person, or involving bare minimum medicines which they are taking or who are allergic.

If cash no longer existed and if the world's economy was totally chip oriented; -there would be a huge "black-market" for chips! Since there is no cash criminals would cut off hands and heads, stealing "rich-folks" chips.

This is very dangerous because once the kidnappers know about these chips; they can take them to the skins to find them.

This technology's best benefits are seeing in medical area where doctors can serve with all the medical history of patient so quickly without any delay. This chip is a computer chip and there are many chances that it can be affected by computer virus. A virus affected Microchip can affects other medical or no-medical system to and this could be lead to a very dangerous damaged in human life.

VI. Conclusions

This paper presented the timeline for RFID advancements. This paper presented how the RFID actual works and how it is deploying in human beings. It also discussed how RFID can be used within the health care industry. This technology has many advantages to human life like- it is providing a more secure and trusted way of security authentication, it is providing whole medical history at the time of treatment, it gives the very convenient way of carrying credit card details, id cards, etc. But this technology has some disadvantages also like – it is threatening to the right of privacy of humans, data of someone's will stored on some governmental database server or other organizational database server then there are chances of hacking and data breaching, a microchip could be affect by a virus, etc. This paper also presents the potential problem associated with human microchip implantation.

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