Term Paper

on

Radio Frequency Identification (RFID)

Submitted by

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Submitted to

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Perseverance and passion, along with focused work in the proper direction, can lead to success. However, the harsh fact that the road to success is paved with a plethora of tempting, obstructions and traps can be discouraging. In such a case, it is the able advice of a knowledgeable person that guides one through the challenges and assists him in achieving success.

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Radio Frequency Identification (RFID) chip

ABSTRACT

The rising execution of radio-recurrence recognizable proof (RFID) innovation, explicitly in the medical services area, exhibits RFID innovation as a great resource for medical care associations. RFID can possibly set aside associations time and cash by giving constant detectability, recognizable proof, correspondence, temperature, and area information for individuals and assets. The motivation behind this paper is to investigate the advantages and obstructions of executing RFID innovation in the medical services area and to give proposals to defeat possible boundaries. Promising advantages connected with the execution of RFID in medical care showed restraint security, patient and resource following, efficiencies in understanding consideration, and supplier fulfillment. Normal boundaries included monetary, specialized, authoritative, protection, and security challenges.

INTRODUCTION

RFID represents implies Radio Frequency Identification. This innovation deals with label framework. An exceptional tag is appended on a thing and radio waves track that tag. RFID can be isolated into three sections - Reader, Antenna and Transponder.

The recieving wire conveys a radio-recurrence signal outfitting a way for correspondence with the RFID tag. Whenever the RFID tag goes through the recurrence field of the examining radio wire, it distinguishes the enactment transmission and stores the information that is gotten by the recieving wire. Some contain a stored power source or batteries, even if they don't always emit electricity. The scanners that are used to read these devices can also offer enough power to read the microchip. The technology has a variety of applications, but it is most typically used to track objects, animals, and cash.

Depending on the powering technique, RFID tags can be passive or active. When passive tags are in an electromagnetic field, they can only communicate with the reader. Because they do not have battery power, the reader; while active RFID tags can both power and broadcast integrated circuits. The reader receives a return signal.

APPLICATIONS

i) **Medical Mistakes**

Medical errors have overtaken AIDS and aeroplane crashes as the main cause of death, killing more people each year. "Tens of thousands" of people, according to the IOM. Medical malpractice results in thousands of fatalities and injuries each year. Every year, the Food and Drug Administration makes mistakes," according to the FDA.

The Food and Drug Administration (FDA) estimated that number to be over 500,000 .

However, the FDA estimates that half of all drug failures are due to human error are avoidable if the right information is used. Patient error can result in medical misconduct. Misidentification is a severe risk that has been identified.
patient safety, bad drug reactions, and lost or abducted infants
mismatches, and mishaps such as surgical equipment stitched up within
the patient's body following surgery are some of the examples of vulnerable mistakes caused during the operation of rfid chips.

ii)   **Prevention of drug counterfeiting**
The threat of tainted or changed items entering the healthcare supply chain is increasing.
According to the FDA, up to 40% of drugs are recalled.
It's possible that goods imported from Colombia and Mexico will be contaminated.
counterfeit, which has posed a serious threat to people's health
as well as society. According to the pharmaceutical business,
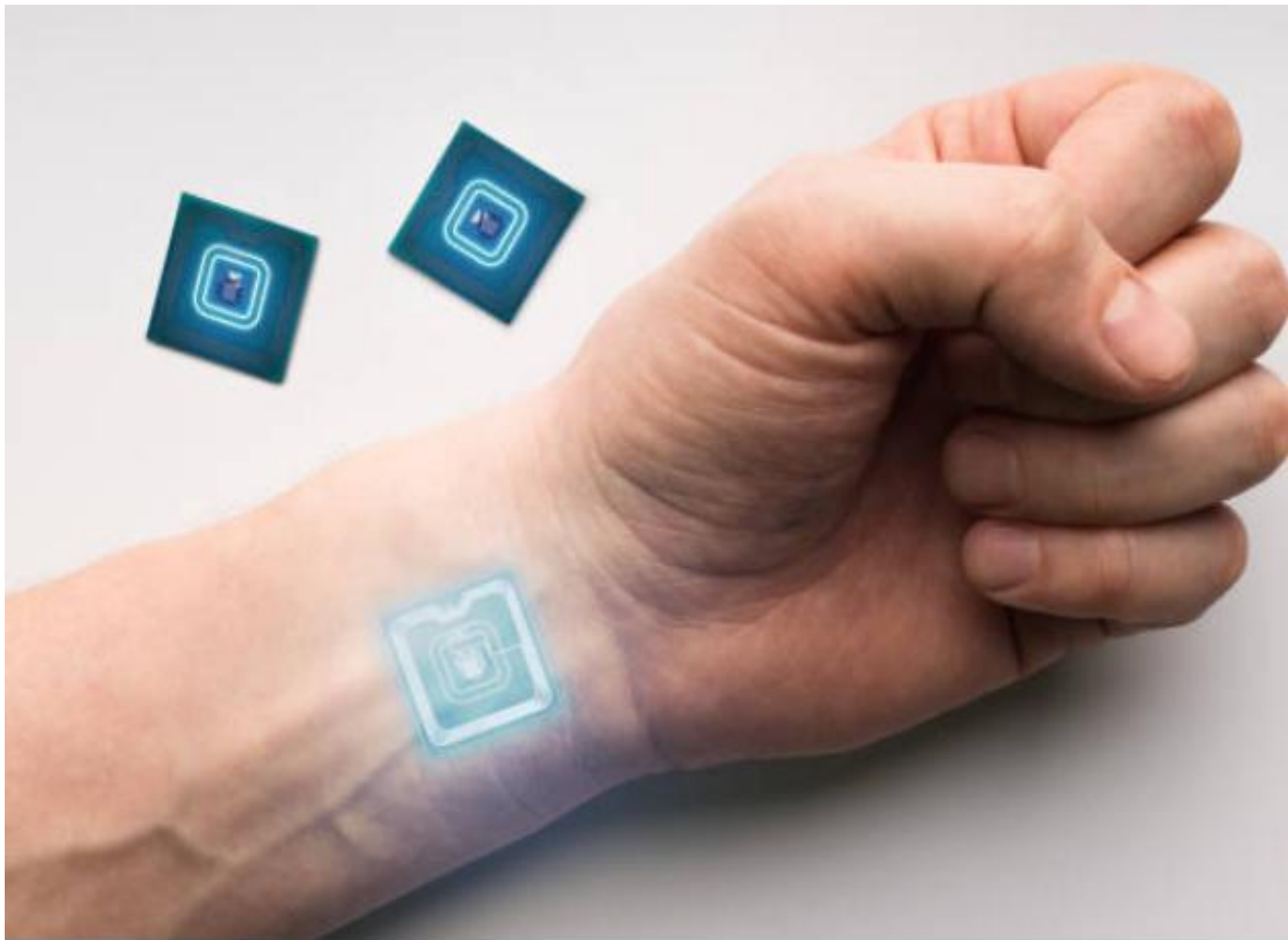It loses $2 billion a year due to medicine counterfeiting.
Consumers and manufacturers alike are seeking for methods to save money and keep narcotics out of the wrong hands. RFID tagging at the item level is thought to be beneficial, the most effective anti-counterfeiting strategy.

Rfid chips with injecting syringe

Hand with RFID Chip Implant

iii)   Micro chipping uses in pet care

The microchipping of pets, often known as pet chips, is one of the most prevalent uses of RFID technology. Veterinarians implant these microchips, which include information about the pet, such as their name, medical records, and contact information for their owners. When a pet goes missing and is surrendered to a shelter or rescue, the worker scans the animal for a microchip. If the pet has a microchip, the shelter worker will be able to contact the pet's owners with just a phone call or an internet search. Collars, which can fall off or be removed, are regarded to be less dependable than pet chips.

iv)   Tracking of medicines and pharmaceutical assets

Asset tracking and management software when merged with RFID can manage the medicines department of a hospital. The system keeps track of pharmaceutical expiration dates and supply levels. Overall, the app makes it simple to keep track of your present medicine collection.

Pharmaceuticals and medicines are the most commonly used and necessary commodities in hospitals, thus each one must maintain a steady supply of them. Vaccines and other biodegradable goods used in surgeries, such as masks, syringes, and gloves, should also be included.

Medicines and surgical instruments are also costly items. As a result, it is critical for healthcare facilities to keep inventory and track of these things. The investment is significant, and it can't be safeguarded without tracking.

Monitoring blood banks, monitoring medication routes from medicine cabinet to patient n hospitals, drug recall (product pedigree), identifying counterfeit or falsely labeled medications are some of the other.

Medical RFID offers a lot of possibilities. administration of equipment Instrument tags and the sterilising chambers and storage readers. Cabinets can verify appropriate cleaning and assist in rapidly locate and identify required instruments are suitable for use.

v)   Helps in patient tracking and safety

The main purpose of RFID technology in healthcare is to increase patient safety. First and foremost, RFID is a useful tool for swiftly accessing and monitoring patient data location in hospitals in order to increase patient accuracy identity as well as any medications the patient is currently taking regarding the diagnosis.

Secondly, finding the necessary equipment as soon as possible can save a patient's life in extreme cases as each seconds count in case of emergency.

Thirdly, integrating RFID with an existing HIS can help to increase performance of decision-making based on real-time access to patient data accurately. Furthermore, an RFID-based tracking system can boost efficiency. Better access control improves personal safety and security.

Hospitals and emergency medical services (EMS) face numerous obstacles on a regular basis, particularly when dealing with emergencies. If a patient isn't present, from a hospital bed or an emergency room, or incorrect therapy as a result of incorrect identification. The healthcare organisation has the accountability regarding it. RFID wristbands allow for easy tracking and identification of the patients in this case. Making patients' lives easier IMEC-Nederland (IMEC-NL) is a non-profit organisation based in the Netherlands, working to use active monitoring to keep track on epilepsy patients using RFID tags with built-in sensors.

vi)   **Inventory tracking and management through RFID**
In hospitals, single-use inventory goods such as gauze, disposable exam paper, boxes of gloves, and plastic vials must all be kept on hand. Using high-cost RFID tags to track them isn't possible because they're single-use and low-cost. For these single-use goods, RFID inlays can provide a cost-effective inventory solution that can be stored in inventory rooms, shelving units, or RFID vending machines. In most cases, large amounts of inventory can be found in hospital operating rooms. Due to a lack of visibility in the supply chain, as well as illegitimate purchases,

The proliferation of specific items is typically the outcome of the proliferation of particular items.

Inventory that is "unofficial" and could be lowered by managing the material ordering process properly RFID technology can provide a precise account of a person's whereabouts, inventory levels, both official and unofficial.

When tracking single-use items, some hospitals want to maintain track of the staff member who used the item in order to guarantee that the inventory is correctly used and to prevent waste or theft. This is an example of how RFID tags on badges can be used to track workers in conjunction with inventory tracking.

vii)   **Alerts and triggers regarding safety during medical operations**
Alerts and triggers are used in applications to safeguard patients from risky events or emergencies like surgery, blood transfusion, or medicine administration, hand hygiene etc. In the surgical setting, it is estimated that 1,500 objects are left inside patient bodies following surgery in the United States each year, with sponges accounting for two-thirds of them [55]. To address this,
A handheld wand scanning device was proposed to solve the problem of identifying sponges inside the patient's body a similar method was used to detect sponges inside the patient's body.

The experiment was carried out with a 100% detection accuracy when the passive RFID tags inserted in gauze sponges was put to the test on an animal and found to be effective. In surgery, applications of RFID are investigated and are thought to make a difference in the domain of patient care.

DISADVANTAGES OF RFID USAGE

1) **Privacy Issues**

Many people are opposed to RFID technology. Privacy advocates warn that the unparalleled ability to follow the travels of serialised things could jeopardise individual privacy.

be flipped around and used to track persons who are transporting

those things. Some privacy advocates have expressed their reservations.

about patient tagging and tagging of visitors. Personal information, on the other hand, is saved in an RFID-fed device. A server protected by a firewall is more secure than an open network as in the case of RFID.

2) **Cost**

Initial hardware and software costs, as well as training and the ongoing high costs of RFID infrastructure maintenance and update, are all included in RFID prices. This not only does infrastructure necessitate tags and readers, but it also necessitates

Servers, databases, middleware, and applications that are not currently in use.

Each passive RFID tag costs about ten cents to produce.

A live one costs several dollars compared to 3 cents per minute for a passive one.

The total cost difference can be significant.

If all equipment and patients are labelled, the savings can be significant. In

RFID connectivity with back-end systems and data is also a plus.

To make RFID feasible, synchronisation networks are required. The

The entire expense can be enormous.

3) **Health Risk**

Hospitals contain a variety of radiation emitting devices like X-ray machines, MRI units microwave sterilizers and pacemakers etc which may create interference. The risk in embedded rfid chips is now reduced after the approval of the Food and Drug Administration in the US.

4) **Legal Aspects**

There are no clear norms or rules addressing data gathering, data security, or tag reuse from the government, industry, or stakeholders as well as information, destruction of information, as well as tag killing devices, data monitoring and authentication standard, and so on.

CONCLUSION

Healthcare industry will change dramatically over next few years with increasing demands for quality and service, which will bring changes in the current healthcare support systems through RFID. But this change may invite new problems in the privacy and security regimes of healthcare information.

A standard should be created so that RFID can be used with its increased capabilities, be deployed globally to be used in a variety of fields

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