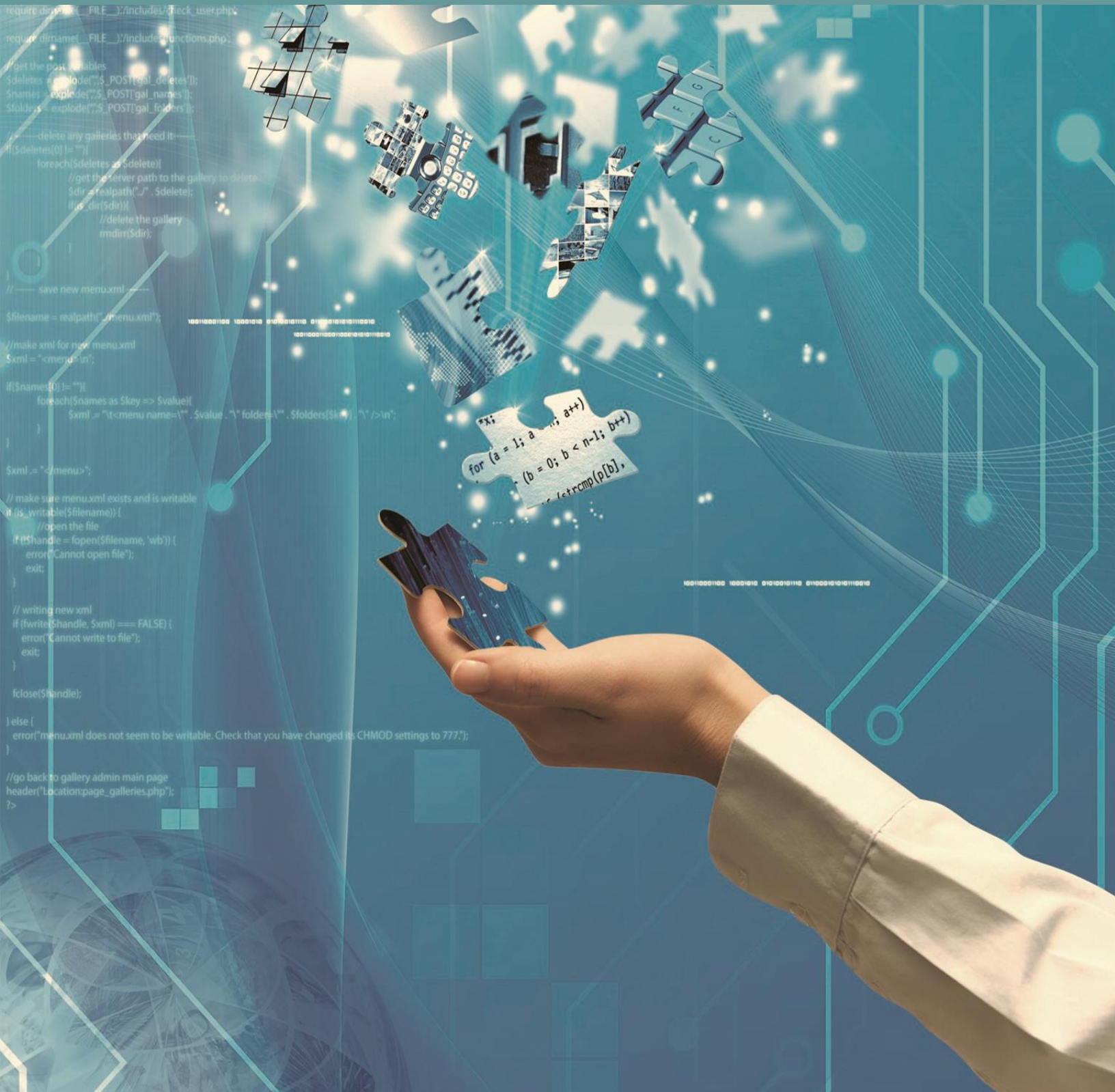# Wearable Technology

Prepared for:
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Prepared by:
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April 14, 2020

RSSG
(Read Scan Seen Glasses)

&

TL-Watch
(Track Locate Watch)

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Dr. Huda #Lab Project
March 05, 2020

RSSG & TL-Watch systems definition

City of Jeddah

555 Tahlia Street

Jeddah

Kingdom of Saudi Arabia

Attention: Dr. Huda Banuqitah

We have completed our one-month group project on systems of wearable technology. This report mentioned some problems that our systems could solve, description, explanation, how they work and the uses of these inventions. We have also mentioned some of its advantages and disadvantages.

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Executive Summary

The main purpose of this report is to give information about the RSSG, and TLWatch IT projects and explain their objectives, as well as their benefits and how they work and help accomplish a certain task.

RSSG (read scan send glasses), RSSG can scan any written text and save it in a memory temporarily, and then send it to the application then the application converts the text to the computer text types and then share it with others. This technology makes it easier to obtain notes and saves effort.

TLWatch (track `76 locate watch), it looks exactly like a watch and acts as a watch , but the idea behind it is to be able to track certain items with chip associated with the watch, it basically tracks the items with the chips on them and then displays their location in 3d hologram, making it easier not to lose precious items.

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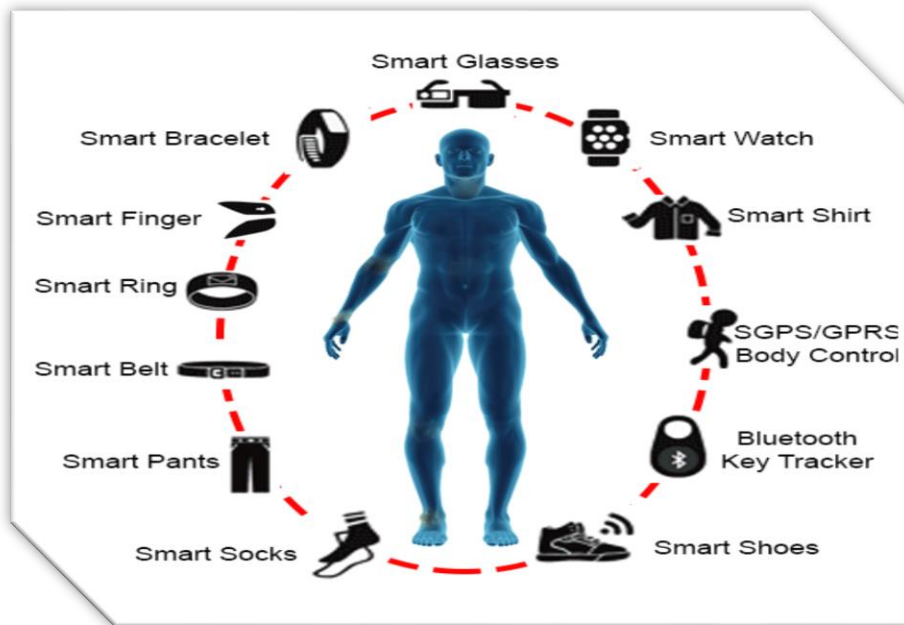
Introduction

In the past few years, technology has evolved massively when it comes to user friendly gadgets. The journey that has started from a room of screens and wires has advanced to a tiny wearable hand device that is beneficial and useful for the coming generations.

One of the most advanced wearable technologies is RSSG glasses. It is an Optical Character Recognition which works through a mobile application. The main objective of these glasses is to develop a user-friendly application which converts any written text on the image to computer text using a phone application. However, this conversion has the key feature to convert any written material into a computer font style with the capability of playing with the text in the application. The RSSG technology take any sort of image as the input, copies text from that image and then converts it into editable text. This application is mainly designed for people who are in need to convert texts into PDF, it is handy for students and teachers. It has some more important features, such as It can zoom any image, edit or crop the written text, along with changing the font style.

The second advancement in modern technology is the use of 3D Hologram. Through the enormous development of technology, many scientists began to make greater use of TL-Watch. The way TL-Watch operates is by creating the illusion of a three-dimensional image. A light source is projected onto the surface of an object and scattered. A second light illuminates the object to create interference between both sources. Eventually, the two light sources interact with each other and cause diffraction, which appears as a 3D image. This TL-Watch is used as a wristwatch, which comes along 10 microchips.

Each chip is attached to any important thing related to daily use, such as mobile phones, pens, keys, etc. The main function of this technology is to locate the missing objects via TL-Watch. For example, searching for a missing mobile phone which is switched off, the place can be located on the watch through a 3D image showing the exact place of the missing object. A certain application will be installed in the watch which will help us locate our missing objects using the microchips which were attached to the important objects. We can see the importance of 3DHT in many areas, such as marketing and advertising, society, environment, and education.

Document Description

The technology is now considered as an important part of our lives and most people depends on it to solve problems, such as their bank transactions, education methods, communication, healthcare, etc.

So, we developed kinds of wearable technology that have a certain way of working and a specific goal to achieve.

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RSSG System

1.1. IT subject, Description, Explanation and contribution

RSSG is wearable technology glasses designed to converts any handwritten paragraph to text in PDF format on smartphones, iPad or PC and has the ability of sharing.

1.2. The IT Problem

Frequently it is hard to rewrite what's on the board or handwritten message and could be time-consuming. Moreover, the paper we write could be or be damaged whereas, the text in digital form has reliable storage of information. Furthermore, the handwriting paragraph can't be shared over a long-distance.

1.3. Existing solutions (if any)

In our problem, there is a lot of existing solutions such as, programs that convert the handwritten words to digital data. For instance, Stylus Beta for android that lets you handwrite by stylus or fingers to turns it into text. Also, the Notability program that transforms your handwritten notes to digital text.

1.4. The IT solution (your project)

Our RSSG glasses don't require the effort of writing and save time. RSSG glasses can save the date in digital format on the memory, so it will avoid losing or damaging the information which can happen on paper. Any information saved on the memory of the glass can be shared via an internet connection.
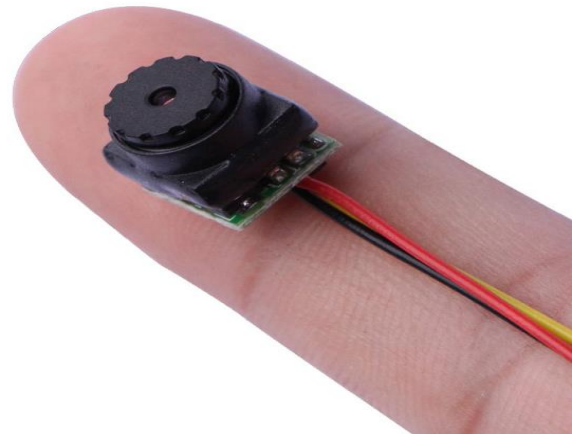
1.5. Project components

Memory card reader:

When it comes to projects, one problem will always occur, which might be the main obstacle is the storage. In Arduino projects, large date storage needed to be used. Therefore, scientists invented the SD or Micro card to store a great Gigabytes of data with less space possible. In the hardware part of the SD and micro card, two components can be found: the voltage regulator & the level shifter.

The regulator works as voltage modifier, the maximum level of the voltage that the SD and the Micro card can handle is 3.3 V, whenever the voltage exceeded that number "any number between 3.3V – 6V", the voltage regulator will lower it down to 3.3V. The logic level shifter has the same function except its concern only about the interface which the voltage might be from 3.3V – 5V and modify it to the standard, which is 3.3 V.

Camera and flash:

This camera functions on two systems, which are NTSC, and PAL. It size is (L x W x H) 9.5mm x 9.5mm x 12mm, having a weight of 1 gram only. The sensor dimension of this camera is 4.75mm (H) x3.55mm (V) with the horizontal resolution of approximately 520TV Lines. The scanning system of this camera consists of Interlace 2.1. Its operating temperature is -10 C ~ +50C, which is less than 90% RH. The power required for this camera is DC 3.3V-6V.

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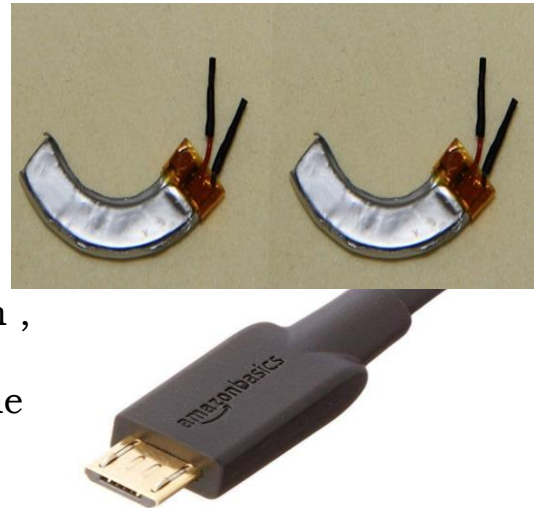Introduction to Information Technology
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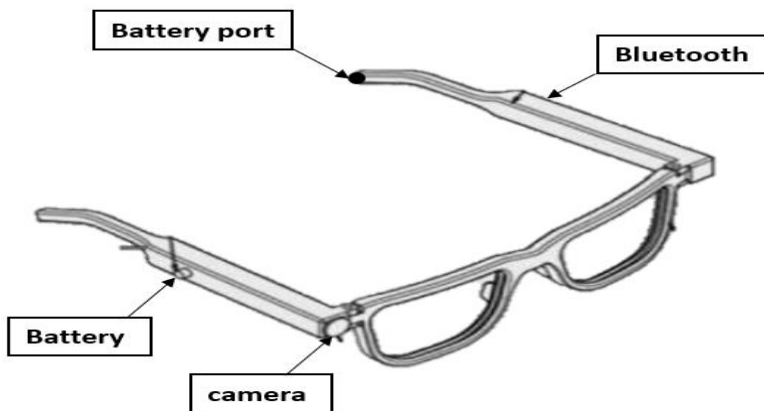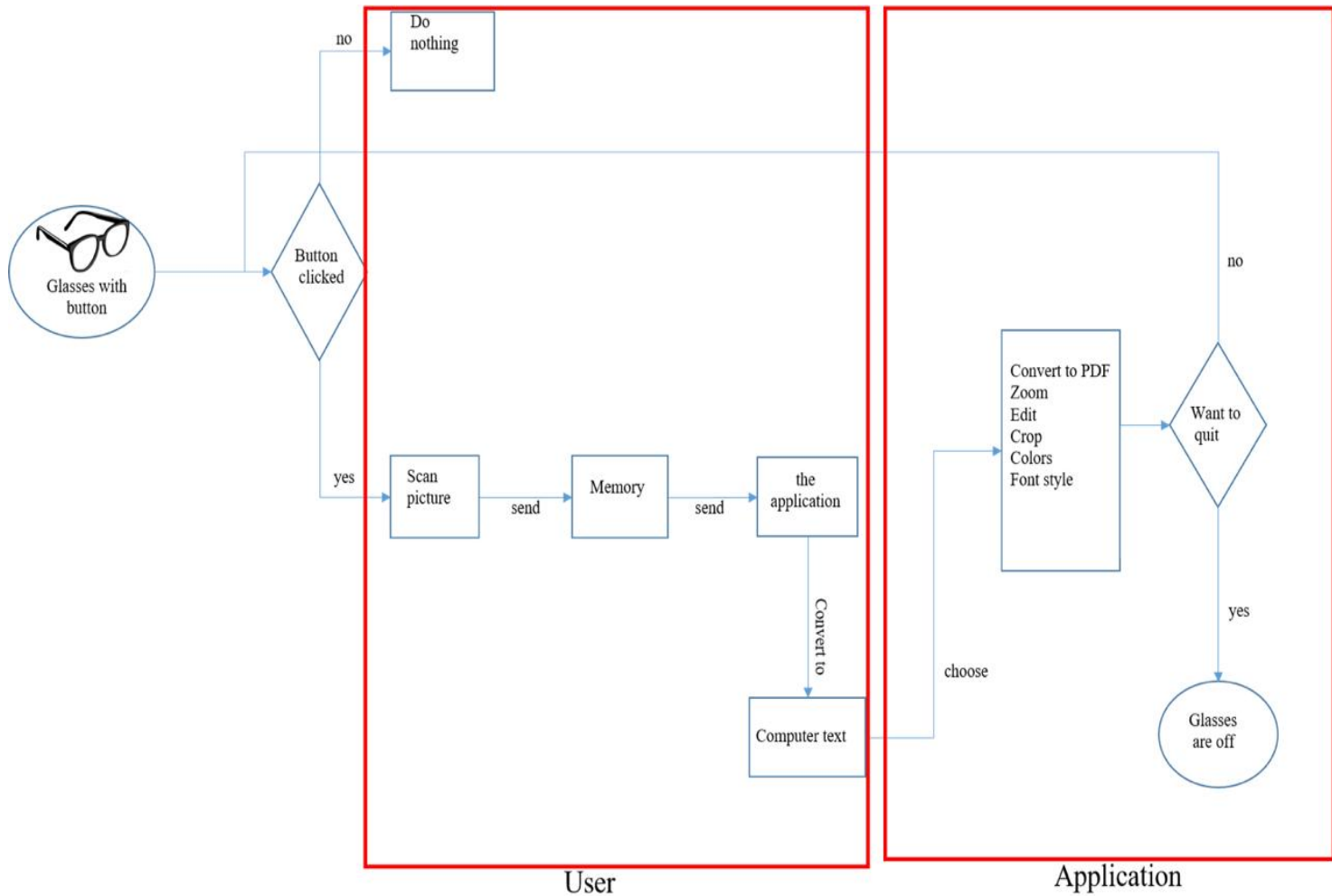
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Micro Bluetooth:

3.5 mm x 3.5 mm x 1.0 mm are the ultra-compact dimensions of the new TDK SESUB-PAN-D14580 module, which is smaller than footprint by more than 60 percent. The module contains an integrated DC-DC converter with a voltage supply of 3.0 V, its current consumption is only 5.0 mA when sending, 5.4 mA when receiving and 0.8 µA in standby mode. the new Bluetooth module is the best for use in battery-powered wearable devices because of its low current consumption and miniature size where features such as small size, lightweight, and low power consumption are primary requirements in wearable devices.

Energy supply and micro USB:

The battery used to power the system is a novel C shaped battery called LiPo , the shape of the battery fits the Shape of the frame of the glasses perfectly , also it will be imbedded in the frame itself which makes it not visible whatsoever ,the Best performance of the battery is 3.7V or 3.8V , and the capacity is 32mAh , as for charging there is a USB micro b at the end of the frame that will be used to repower the system , this specific charging wire was selected because of its small size and availability at the markets.

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1.6. Project Block Diagram

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1.7. Implementation, Analyses and Testing

Implementation:

First, the user wears the glasses when he pushes the bottom the camera takes power from the battery and turns on and then takes a picture while the flash lights up to provide better lighting on the object then the picture is saved in the memory and sent via Bluetooth to an application called "Pen to Print" on the phone , after that the application analyses and types the text in a file.

Analyses:

The system will use the C++ programming language as well as the application which will make them connect and applied the algorithm easily and the frame for the glasses will be custom made in order to add the parts like the camera and battery because they are integrated within the frame.

Testing:

A prototype of the system was use in different classes in different schools and some universities that depend on smart learning. All students downloaded the application "Pen to Print" which uses OCR engine (optical character recognition) then they can see and share the pdf file.

1.8. Advantages and Disadvantages

Advantage:
- Save time and efforts by reduce the time of rewriting the text by hand.
- Save the money by avoid using school utilities.

Disadvantage:
- Sometimes the text can analyze the picture with errors leading to incorrect text.
- The RSSG can be easily damaged.

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TL-Watch System

2.1. IT subject, Description, Explanation and contribution

The TL Watch acts exactly like a regular smartwatch it shows time , day , date ,except it comes with 10 numbered tracking chips that can be placed on any object and then the watch is able to display the locations of the objects with the chips on them using hologram technology ,the hologram will show a map that will display the number of the chip so the object can be identified, this will be a great help in not losing objects or simply locating them.

2.2. The IT Problem

The Problem Many times you could lose your things in a public place and it can be difficult to remember where you put them. Also, they can be stolen from someone, which makes finding them harder.

2.3. Existing solutions (if any)

Wearable communication devices, for example, implemented in a watch, using short-range communication to a lost object, and facilitating natural and intuitive user interface with low-power implementation allow a user to easily access all features of the lost device, all while the lost object is nearby but not visible. Notification is performed with vibration; an LED light and a 3D hologram display of the place appears. It allows communicating hands-free. This allows using the communication device as "remote control" for home devices, etc. via voice and buttons.

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2.4. The IT solution (your project)

With all the technology developments happening around us, people became overwhelmed with their belongings, imagine how many things people carry every day, their keys, glasses, wallets and so on. This invention made our life easier, the invention is a chip that will be inserted or attached to whatever we want to find , so when we forget anything the chip will be programmed with a software in our watch that will alert a 3D model that will show exactly where we lost it and what are the things around it . This will be helpful specially with people with chronic diseases, or senior people, this invention will save time and effort to find our belongings.

2.5. Project components

Smart watch:

The smart watch has a similar look to the apple watch and Fitbit VERSA and it also has some common functions like showing time , date , day through AMOLED display and the frame will be composed of tough steel within it will contain the Holovect and all components that display the hologram.

GPS Tracking chips:

GPS tracking chips are becoming more common. These devices are small and are hardly noticeable when attached to an object, but it is efficient enough for owners to be able to locate their objects in case it gets stolen or misplaced.

Holovect:

The Holovect is a laser-based volumetric show the system that fits inside a watch and has the ability of drawing 3D objects in air with light.

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2.6. Project Block Diagram
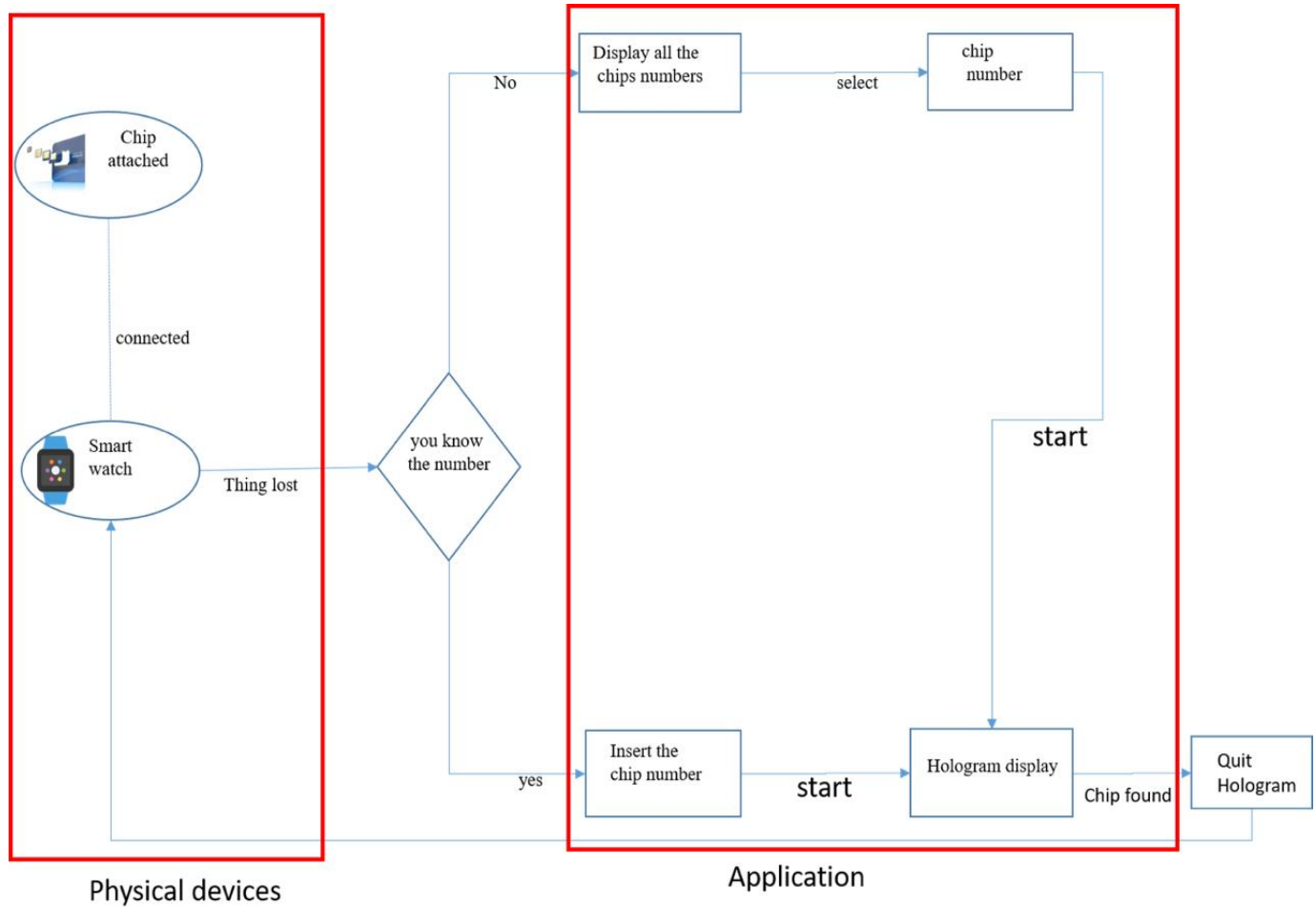
2.7. Implementation, Analyses and Testing

Implementation:
the users will place the chips on the items that they don't want to lose and in case an item was lost the users will select the find icon in the watch which will display a 3D map and the location of the lost item.

Analysis:
The watch will need an updated map which will show new or removed streets, buildings, shops, etc. This map will be acquired from google map.

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Testing:

We took a sample of the population and we asked them to put the chips on the items that they lose often, then we placed the items in different locations and asked them to use the watch to find them.

2.8. Advantages and Disadvantages

Advantages:

- The watch will help the people to find the items they lost.
- By finding the items through the watch they will save money, time and effort.

Disadvantages:

- The battery of the chips must be changed every once in a while.
- There is a limit of the number of chips.
- The watch is expensive.

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Conclusion

To summarize, IT departments are making the community's lives easier and smarter by introducing wearable, user friendly and two most necessary gadgets in every individual's life.

The gadget is explained in a detail manner, their usage, functions, specifications, advantages and disadvantages as well, leaving no room of confusion for anyone. We believe the coming era is the future of microchips and tiny wearable gadgets.

So both of RSSG and TL-Watch can benefit people by their capabilities and functions making their life easier and more beneficial for them to achieve their goals.

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Appendix A

Acronym and explanations

RSSG   Read Scan Seen Glasses.

TL-Watch   Track Locate Watch.

OCR   optical character recognition Spyware that captures screen shots.

LED light   light-emitting diodes.

AMOLED   active-matrix organic light-emitting diode.

Holovect   Holographic Vector Display.

GPS   Global Positioning System.

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Appendix B

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