CS-684-2016 Final Report

Smart IOT Memory Drives

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## 1. Introduction

With the advancement in technology day by day, IoT is one of such which is catching most of the eyes. The internet of things (IoT) is the [internetworking](https://en.wikipedia.org/wiki/Internetworking) of physical media which can be vehicles, buildings and other item, or embedded components like  [sensors](https://en.wikipedia.org/wiki/Sensor), actuators, that enable objects to collect and exchange data. Using IoT technology, we propose a new kind of memory drives called smart IoT Memory drives. Days are gone when someone needs pc to exchange data with the pendrive. But with this smart drive we won’t need PC for exchanging the data. Not only this, it will also allow to transfer data over local area network as well as over the internet too.

## 2. Problem Statement

1. Can data be transferred between memory drives without using any physical medium like PC.
2. Can we transfer data between memory drives which are remotely placed.

## 3. Requirements

This section contains numbered list of expected hardware materials required to implement the proposed project idea.

Component Quantity

1) TI TM4C123GXL 2

2) Wifi Booster Pack(CC3100) 2

3) LCD 2

4) SD card connector 2

5) SD/MMC card 2

6) Router(for testing) 2

This section contains numbered list of expected softwares required to implement the proposed project idea.

1) Eclipse based CCS IDE.

2) TM4C SDK

3) CC3100 SDK

## 4. System Design

Our final product will look like ::



With the help of LCD and few buttons on the module, we can select the data and can appropriately transfer that to another drive based on the mode selected for the drive.

We have used CC3100BOOST wifi module, SD Card Connector, UART, LCD and few buttons.

CC3100BOOST wifi module, SD Card and UART are using “SPI\_0” communication which is connected to PORT A. While LCD is using PORT C. Also PORT F is used for LED Indicator to indicate whether SD/MMC Card is initialised or not. We have also taken cards of 8 GB for demonstration purpose.

## 5. Working of the System and State Chart

We have planned our system to work in 3 Modes ::

1. **Mode 1 :** In this mode drive can transfer data to another drive without need of any 3rd party device.
2. **Mode 2 :** In this mode drive can transfer data to another drive using local wifi network.
3. **Mode 3 :** In this mode drive can transfer data to another drive using Internet.

For the **Mode 1**, first **“TCP Socket”** is created between two drives and then data transfer is allowed. It is like client server architecture.

For the **Mode 2**, Sender first connects to wifi network, then connects to receiver using IP and Port number of the receiver.

For the **Mode 3**, Sender can only send data to the receiver only if receiver is having static IP. If it is not having static ip assigned to it like it is connected to some wifi network then resolving path for the receiver becomes difficult and this part of the Mode 3 is yet to be implemented.

While initialisation, Blue LED indicates that SD/MMC card initialised successfully or Red LED indicates that card is not initialised properly.

We have implemented this application using FATFS module. Because of it, there is maximum boundation of card memory we can access. So maximum card memory that can be interface is 32 GB.

For transfering the file, first it need to be selected with the help of LCD before selecting the approprite mode to transfer.

Below is the state chart describing the system in brief.

fc_1.png

## 6. Discussion of System and Test results

All the components of the system that we introduces worked as per plan. Before integrating all the components, we tested it individually. Below are the testing plans and results :

**Test 1::** While interfacing the modules, each component we are going to use will be checked according to the function it’s going to perform like for example, are we able to Read/Write with SD Card, wireless functions of CC3100.

Result :: Every module used for this product is tested and satisfies our requirement.

**Test 2::** Speed of data transfer between 2 SD Cards through wireless link and its maximum capability of handling the data transfer according to its Class.

Result :: Speed of data transfer here depends on many factors here like SD card class, bandwidth offered by CC3100, mode of accessing the SD card, file type etc. As per analysis it can offer average speed of 10Mb/s.

**Test 3::** File transfer or block transfer.

Result :: First data is transferred in blocks from SD card to the other module and is received perfectly. But for the file transfer, integration of FATFS module is required and implemented successfully.

After all the testing, we integrated the components and resolved all the errors associated with the project. There is not any change in the plan from SRS.

## 7. Future Work

Currently one need to send and receive files manually. Like for sending the file, one need to select it and then transfer it. But this drive will become more smarter if it acts like temporary cloud and one can view the contents of his/her pendrive anywhere anytime.

## 8. Conclusions

Smart IOT Memory Drive has been implemented successfully. Currently we need to hardcode everything like the ip address and file selection etc. But we can make it more fliexible with the help of LCD and switches. All the three modes of this product is well explained and code that we submitted is well commented and easy to understand.

## 9. References

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