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High Speed Data Communication using LiFi providing Security

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ABSTRACT

Data communication or transmission has become the most demanding need for the most of the computer users. Security is another more important concern when it comes to establishing communication between systems through the network. LiFi technology is focused on fulfilling these demands.LiFi basically uses Visible Light Communication(VLC) to establish connection and transmit data. The transmission rate of visible light is faster than all other available today transmission medias such s WiFi, ethernet, infrared etc. Visible Light Communication has many features such as High speed, no radiation, easy to use, easy installation and management etc. However exiting LiFi misses out some things such as two way communication, security. So in order to achieve the high speed of LiFi technology and provide transmission security, the proposed system provides the necessary information.

General Terms

Visible Light Communication(VLC), High Speed Data Transmission

Keywords

Arduino Microcontroller, Light Emitting Diode(LED), Photo diode, Wireless communication

1. INTRODUCTION

Data communication or the transmission among various systems is the most commonly used feature of the computer systems. There are various data transmission methods such as wired communication, wireless communication. Ethernet, WiFi, Bluetooth are the widely used data transmission protocols. With the increasing number of computer users, the data storage capacities and data requirements are increasing tremendously. The existing systems are facing various issues such as traffic overloading , data bottleneck, bandwidth overloading, etc. To overcome these issues, we require even the higher bandwidth than existing systems. LiFi has the capability to fulfil this demand so, bringing the LiFi technology in use can solve many issues. Additionally, security needs to be maintained for data integrity and reliability. The basic idea of the project is to reduce bandwidth overloading, network traffic, communication restrictions in sensitive areas, etc. and provide secure, reliable and easy to use system for users.

2. EXISTING SYSTEM

The communication among various devices nowadays is done through various wired and wireless communication protocols. The LiFi system is currently least used due to some of its limitations, existing LiFi system is limited to one way communication. It does not provide any kind of security at the moment. The basic idea behind this project is to eliminate limitations of the existing LiFi System.

3. PROPOSED SYSTEM

The proposed system uses Arduino Uno R3-328 and MSP 430 G2 micro controllers. These micro controllers are capable of connecting to personal computers and can be programmed through programming languages. The primary goal of the system is to provide high data transmission rate and should also provide the data security. With the increased data traffic, the speed expectations also increase. LiFi has the ability to fulfil this expectation through its high bandwidth capacity. Adding security to this feature involves bringing forward the encryption method. A data encryption method is used to provide the proper data security. This makes sure that the data transmission in progress is not eavesdropped, stolen or tampered. Along with this users are provided with uninterrupted high bandwidth data transmission which is not limited to one way communication. Providing two way communication with proper synchronisation is the primary focus of this system.

4. ARDUINO MICROCONTROLLER

Arduino is a microcontroller which is open-source electronics platform. It is based on easy-to-use hardware and software. Arduino is capable of reading input and turning it to some output. It is very much useful in most of the practical applications which require input through some sensing devices or manual user input. Arduino used in our system will be attached to LED devices and Photo diodes for performing data transmission. It can easily be programmed through the programming languages. The languages supported by Arduino are Object Oriented hence are easy to understand and program.

Fig. 1. Arduino Uno R3-328