LI-FI TECHNOLOGY FOR ILLUMINATING EXHIBITS IN MUSEUM

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ABSTRACT

Li-Fi is the use of visible light communication system to transmit information at a very high speed. Li-Fi does not have any interference issue and almost no limitations on capacity. The visible light spectrum is 10000 times longer than entire radio frequency spectrum. In this project we are going to illuminate the exhibits in the museum which will display information about the article by sensing the presence of human. Light emitting diode is used to send data through light spectrum that eliminate the need of complex wireless network and protocol. It is been performed using transmitter circuit which sense the human presence using IR sensor and give the respective ID of exhibits and the information is received at the receiver circuit in portable device.

INTRODUCTION

Li-Fi stands for Light-Fidelity. Li-Fi is transmission of data using visible light by sending data through an LED light bulb that varies in intensity faster than the human eye can follow.The term Li-Fi was coined by university of Edinburgh professor Harald Haas during a TED Talk in 2011.Hass envisioned light bulbs that could act as wireless routers. Li-Fi uses common household LED lightbulbs to enable data transfer, boasting speeds of up to 224 gigabits per second.

Li-Fi is more useful than Wi-Fi because of its advanced features such as absences of interferences issues, faster transfer speed, data protection and security and free to be used.

Li-FI are used in Military, GPS, Parenting, car-to-car communication, traffic lights, underwater communication, Augmented reality,security and other applications.

SYSTEM DESCRIPTION

The transmitter system depicted in Figure 2.the li-fi transmitter circuit consists of three transistors and few passive components paired with one watt LED. But changes in brightness of LED is due to the current consumed by the microcontroller ,if the current consumed is less than 0.9 ampere then the LED will be

glowing dimly and the information will not be transmitted properly. The transmitter circuit consists of microcontroller, bridge rectifier, paired IR sensor along with the power supply that are described in next section.


Li-Fi module

The receiver system under consideration is depicted in Figure 1. The li-fi receiver

consist of a photo detector which is paired with an amplifier. The li-fi receiver is connected with an UART which acts as a medium between li-fi receiver and the display for serial communication. We can connect any portable device to the UART that will display information about the exhibits in the museum.
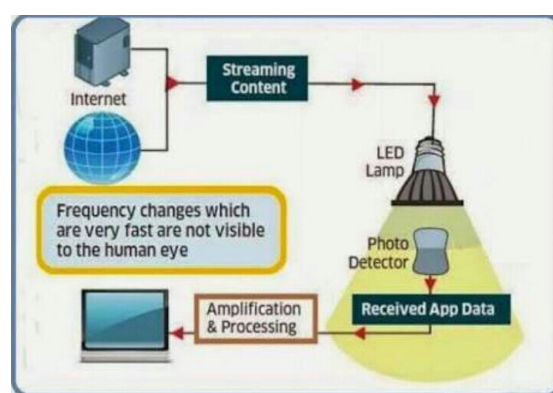

BLOCK DIAGRAM
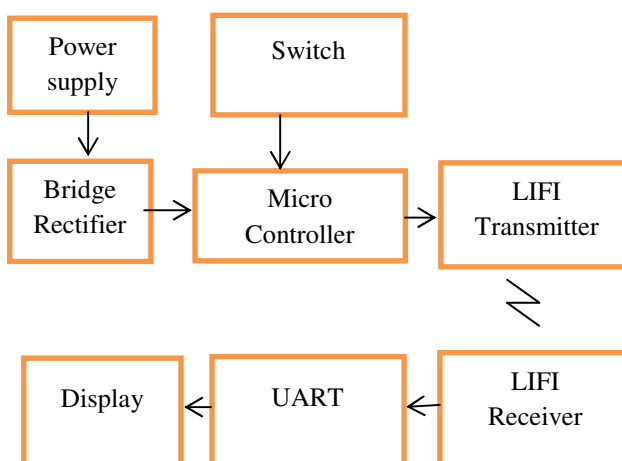
HARDWARE REQUIREMENT

The arduino UNO microcontroller is a microcontroller board based on the ATmega328. It has 14 digital input/output pins, 6 analog inputs, a 16M Hz crystal

oscillator, USB connection a power jacket, an ICSP header and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with the USB cable or power it with a AC to DC adapter or battery to get started.
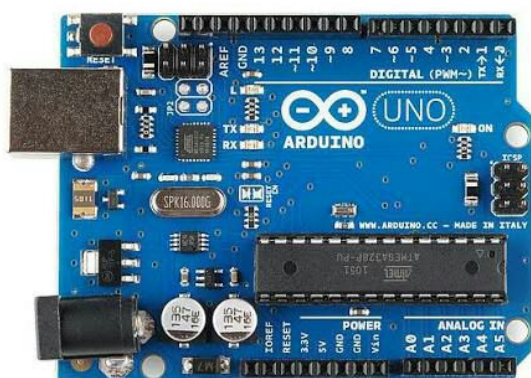
The IR obstacles sensor sense the presence of any obstacles that has built in IR transmitter and IR receiver (photo-coupler) that sends out IR energy and looks for reflected IR energy to detect the presence of any obstacle in front of the sensor module. The module has on board potentiometer that lets user adjust detection range. The sensor has very good and stable response even in ambient light or in complete darkness.
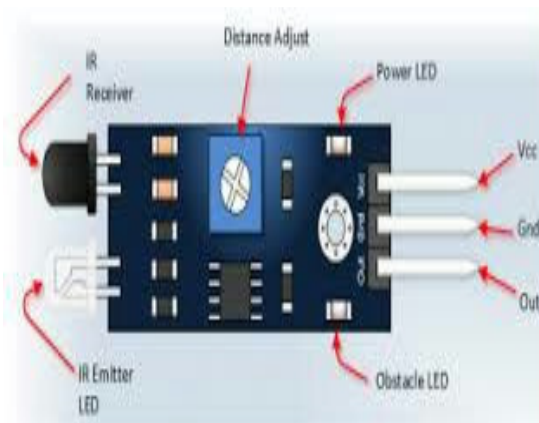
SOFTWARE REQUIREMENT

The Energia IDE (integrated development environment) is used as flasher tool. It is an open-source electronics prototyping platform. Energia includes an integrated development environment that is based on processing. Energia is a portable framework/abstraction layer that can be used in other popular IDE's.

RESULT ANALYSIS

Bysensing the presence of human the Li-Fi module automatically illuminate article information. The data dumped in the microcontroller about the exhibits will be transmitted from Li-Fi transmitter in the form of electrical signal and the Li-Fi receiver coverts the signal to data and is displayed in portable device.

FUTURE SCOPE

1. Develop Li-Fi portable device.

2. Overcome line of sight.

3. Achieve seamless interoperability with other network in a way such that it can be operated in the outdoor environment.

4. Driving illumination grade LED's at high speed.

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