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LIFI DATA TRANSFER IN MOBILE COMMUNICATION

Sabitha.R
Electronics and Communication Engineeering
Cyber Forensics Applied Lab Student
Francis Xavier EngineeringCollege, Tirunelveli
sabithar.ug.21.ec@francisxavier.ac.in

Sowndaryaa.M
Electronics and Communication Engineering
Cyber Forensics Applied Lab Student
Francis Xavier EngineeringCollege
Tirunelveli
sowndaryaam.ug.21.ec@francisxavier.ac.in

Sobana Devi.T.S
Electronics and Communication Engineering
Cyber Forensics Applied Lab Student
FrancisXavier Engineering College
Tirunelveli
sobanadevits.ug.21.ec@francisxavier.ac.in

Dr. R. Ravi
Prof/Director of Computer Science and Engineering
Cyber Forensics Applied Lab In Charge
Francis Xavier EngineeringCollege
Tirunelveli
fxhodcse@gmail.com

Abstract:
This abstract addresses about way to transfer data titled LiFi (Light Fidelity) which uses light waves to transmit data wirelessly. LiFi communicates data using visible light instead of radio waves like regular wireless communication systems do. By providing high-speed data transfer and being more safe and reliable than current wireless communication technologies, this technology has the potential to revolutionize wireless communication. The modification of light waves to convey data is the fundamental premise of the LiFi data transfer principle. An LED (Light Emitting Diode) light source is used to convey the encoded data, which may then be detected by a light detector at the receiving end. It is possible to create a low-cost wireless communication system for displaying text messages using LiFi technology and an Arduino board. The text message is modulated onto the light waves emitted by the LED light source, which are then detected by the photo detector which is in LDR connected to the Arduino board. To display the text message on an LCD screen, a custom programme built in the Arduino programming language is used to process the received data. This technology has the potential to improve wireless communication in a broad range of applications including data transfer in hospitals and other places where radio waves are prohibited, as well as indoor communication systems.

Keywords: LDR Module (Light Dependent Resistor),Indoor positioning, Radio waves, light waves,Revolutionize wireless communication.

Introduction:

Light-Fidelity is typically referred as Li-Fi. Over time, the importance of relying on Wireless Fidelity (Wi-Fi) for data transfer made it necessary to find an other, more trustworthy form of communication, which led to the development of LightFidelity (Li-Fi). A. Shakeela Joy and R. Ravi (2021) proposed using metrics like detection rate, latency, and throughput for varied numbers of rounds to analyse ECC-based authentication schemes [1].The innovation is extremely recent, and the German physicist Harald Haas made the proposal in 2011.Li-Fi uses an LED light bulb whose intensity changes faster than the human eye can keep up to transmit data through illumination. We shall go into great detail about the technology in this paper, as well as how Li-Fi can take the role of Wi-Fi. U. Muthuraman, J. Monica Esther, R. Ravi, R. Kabilan, G. Prince Devaraj, and J. Zahariya Gabriel (2022) future data analysis will be based on statistics gathered with the aid of sensors and will be implemented as a webapp [2].While Li-Fi is suitable for high density wireless data coverage in restricted spaces without barriers, Wi-Fi is useful for general wireless coverage within buildings. Light emitting diodes (LEDs) are used in the wireless optical networking technology known as Li-Fi to transmit data..M. Masthan and R. Ravi (2015) the framework also uses worm and virus detection to assess malware from the data. The system also assigns scores to the vulnerabilities, and then, using the Topological Vulnerability Analysis (TVA) tool, it conducts security analysis [3].Visible light communication (VLC) technology, which uses a medium to enable high-speed communication similarly to Wi-Fi, is referred to as Li-Fi.

Shakeela Joy and R. Ravi (2017) an enhanced endorsement method using elliptic curve cryptography offers higher security, confidentiality, and privacy. The technique is vulnerable to offline password guessing attacks including spidering, stolen-verifier, and keystroke dynamics [4]. Compared to Wi-Fi, Li-Fi offers greater bandwidth, efficiency, availability, and security, and it has already reached rapid rates in the lab.D. Priyadharshini, R. Malliga@pandeeswari, S. shargunam, and R. Ravi (2020) describes the growth of IOT in various fields. Their survey also discusses risk factors, security concerns, and difficulties in IoT [5]. Using electronic components that were readily available, this project put the Li-Fi system into use .The Li-Fi technologies have drawn the interest of the research community. The requirement to support technology is an outcome of modernity.

Techniques:
LED (lightemitting diode) lights at extremely fast speeds to send information, which is then detected by a photodet ector and converted into digital data.The modulated light signal can contain information since it can be quicky turned on and off and is imperceptible to the human eye.

Data encoding: Before being transmitted into an LED's light output, the data to be displayed is first transformed into a binary format made up of 0s and 1s.

Transmission of light: A receiver, such as another LED or a photodetector, receives the modulated light signal after being delivered over the air.

Photodetection: A photodetector, often a photodiode, detects fluctuations in light intensity at the receiving end
and transforms them back into digital data.

Decoding: To allow the user to access the information transmitted, the received digital data is then decoded back into its original form.
Diffuse transmission and line-of-sight communication are both possible with Li-Fi. Line-of-sight transmission allows for a more dependable and quicker connection because the LED transmitter and photodetector receiver are in close contact to one another. In diffuse transmission, the light signal is scattered by reflection or diffraction such that it can bounce off objects and travel to the receiver even when it is not in line of sight with the transmitter. In our project we have used line of sight communication because LDR, transmitter and receiver are close contact to each other.

Flow Chart:

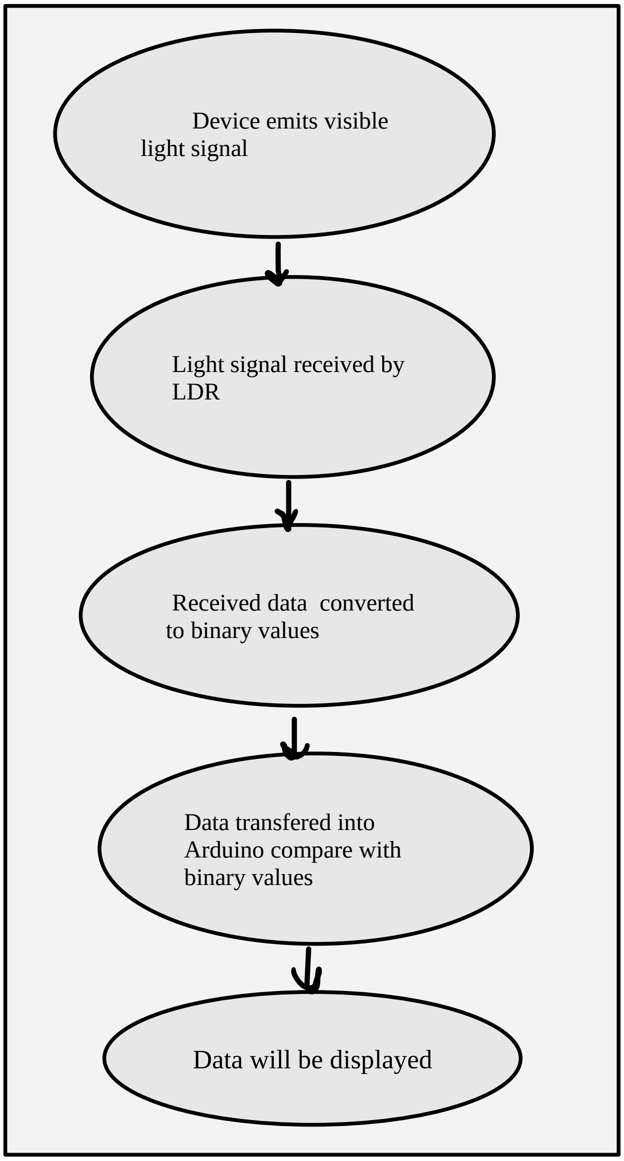

Device emits visible light signal
Light signal received by LDR
Received data converted to binary values
Data transfered into Arduino compare with binary values
Data will be displayed

Figure:1 Flow diagram of transmission of data using LiFi.

Design of the Hardware:
The gadget will generate a light signal along with the message we have supplied via the LiFi app, and the light signal will then be picked up by an LDR module, where a photodiode will detect the light and convert the data into binary numbers before being transferred to the Arduino. After comparing the binary values, the outcome will be shown on the LCD. The data has already been encrypted in the LiFi app we used, and it will be decrypted depending on when the lights come on and go off.

Design of system:
These three components—cryptography, LIFI, and data

transport—would need to be integrated into the LiFi data transfer system in a way that is effective, dependable, and secure. This may include developing specialized hardware designed specifically for LiFi data transfer or altering already existing components. The system would also need to be tested and certified to ensure that it conforms with the relevant performance requirements and security standards. Data that is presented on the LCD display is transferred utilizing mobile communication.

According to the on-off time, lights are transformed into binary values and sent to the Arduino. Then, using code, we compare the binary values and publish the results on an LCD phone. The flash will be sent to the LDR.

The LDR will receive the flash created by the mobile phone app and will process it to text message.

Circuit Diagram:

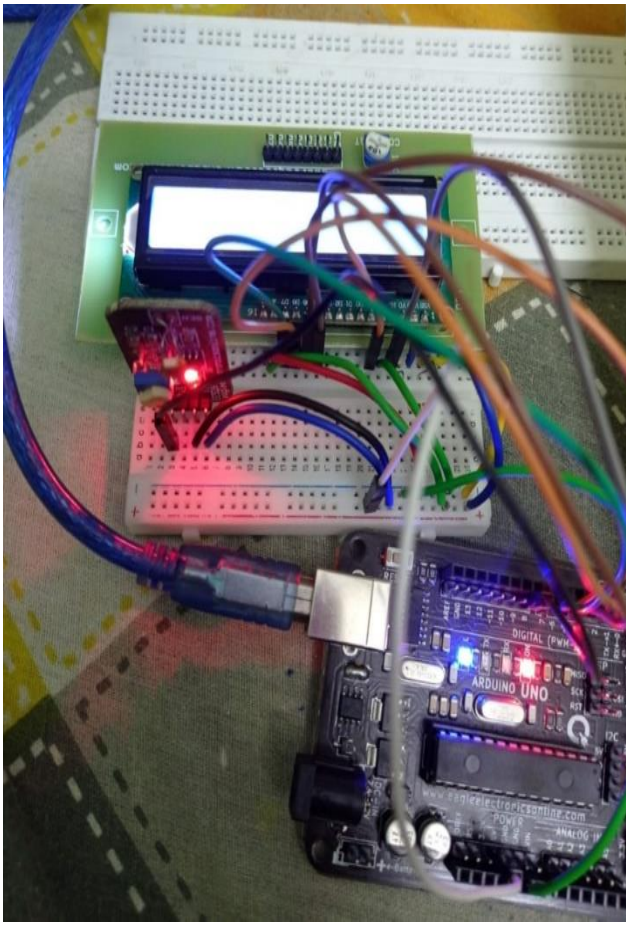
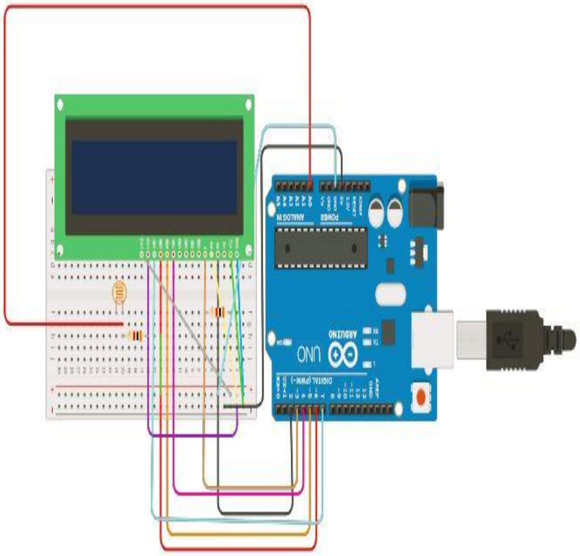
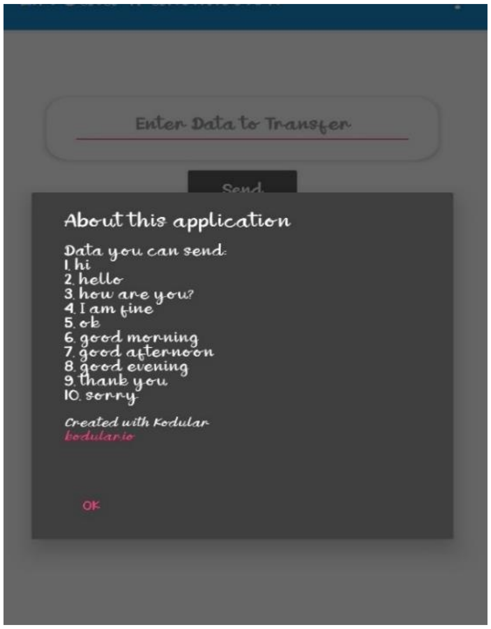


Figure 2: Arduino connection with LED display

Schematic diagram:



Pre-encoded messages:



About this application

Data you can send:
1. hi
2. hello
3. how are you?
4. I am fine
5. ok
6. good morning
7. good afternoon
8. good evening
9. thank you
10. sorry

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Figure 3:The pre encoded messages of Li-Fi app have used is displayed here.

Decoded messages:

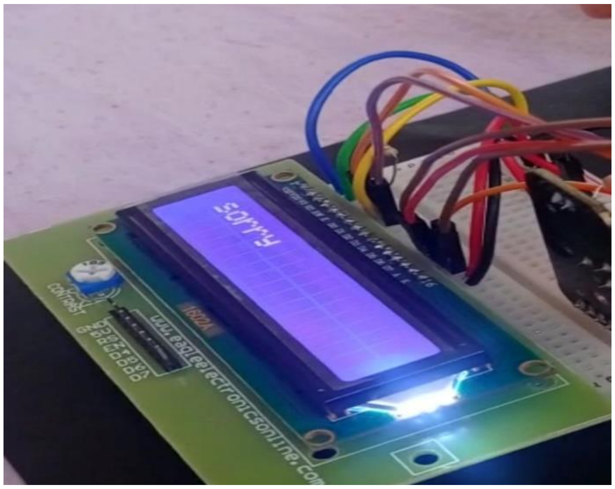

Figure 4:"**Sorry**" is the decoded message.

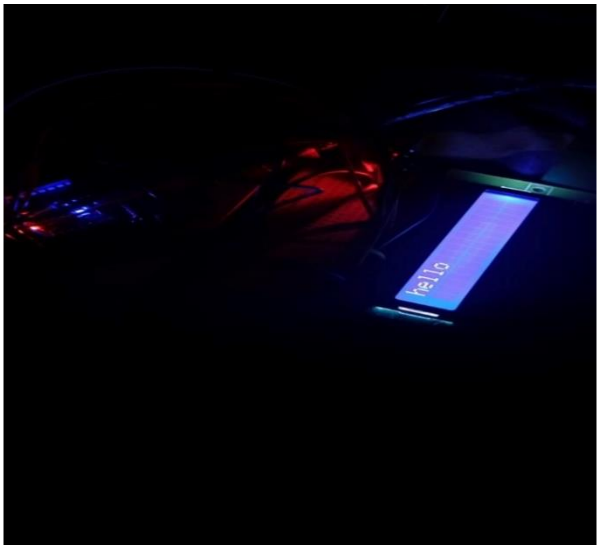

Figure 5: "**Hello**" is the decoded message.

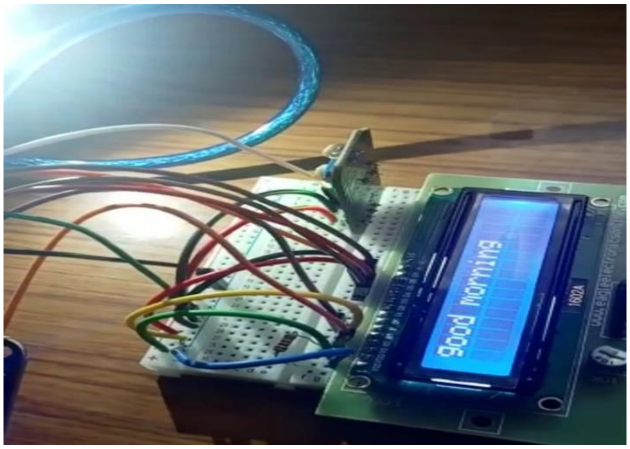

Figure 6: "Good Morning" is the decoded message.

The figure 3,4,5 represent the decoded message of the words we have used in Li-Fi app.

Final summary:

The goal of our project is to use cryptography to send data across wireless networks in a way that is more safe and dependable. Typically, the communication between two devices connected by Lifi can be encrypted. They will help protect critical information in financial transactions. It is used in the health monitoring industry to safeguard patient health information. Information distribution to the appropriate soldiers will be more secure in military applications.

In conclusion, LiFi data transfer **using** cryptography is a crucial component of mobile communication that can help to safeguard the confidentiality and security of data being communicated wirelessly. Data transport over LiFi in mobile communication can be secured by employing cryptographic techniques like encryption and secure key exchange protocols like Diffie-Hellman Light-based communication for text messages is another potential application of light-based communication technology. In the future, we may see the development of new technologies that use light to transmit text messages in a variety of settings**.**Light-based communication for text messages could also be used in other settings, such as in outdoor festivals or events where cellular networks may be congested..Overall, the use of light-based communication for text messages has the potential to offer a wide range of benefits in a variety of settings..One potential application of light-based communication for text messages is in areas with limited or no cellular coverage. In these areas, light-based communication could be used to transmit text **.**

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