



Research Article

Software designing of Laser communication and Security system

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Abstract: The Laser communication system is compact, efficient, reliable and inexpensive, which can be associated as one of the form of optical communications system. It can be used for inter and intra-building communication, closed circuit TV's, PC, LAN etc. It is suitable for the study of optical communication specifically laser based communication. It has achieved a high-speed rate communication up to megabits per second and a reasonably low error rates. It enables communication up to several hundred meters and this technology can be extended in future to enable longer distance communication by using parabolic light reflector. It can also be utilized as a security system. The receiver circuit provides an audio-visual indication of the interruption by sounding an alarm. Laser communication has many advantages over traditional radio communication especially in high data rate.

Keyword: Optical Communication, Laser Software, Security System

INTRODUCTION

Renewable energy from sun and wind is an abundant and ubiquitous resource. Although capable of providing plentiful and reliable electricity, these resources are largely untapped. Reliable electricity produced on site has proven capable of delivering high quality electricity for vaccine refrigeration, lighting, communication, medical appliances, clean water supplies, and sanitation. It can also improve management, logistics, and distribution of information, education, and communication. [1]

This paper helps us for the better understanding of optical communication which has become a primary means of communication in the present world and gives us the view about free optics. Sending and receiving messages from one place to another has always been a matter of great importance. The elements involved in such a system namely, an information source, a transmitter , a transmission channel and a receiver and the means to continuously improve their performance are therefore of great importance.[2]

Flow chart of Laser communication

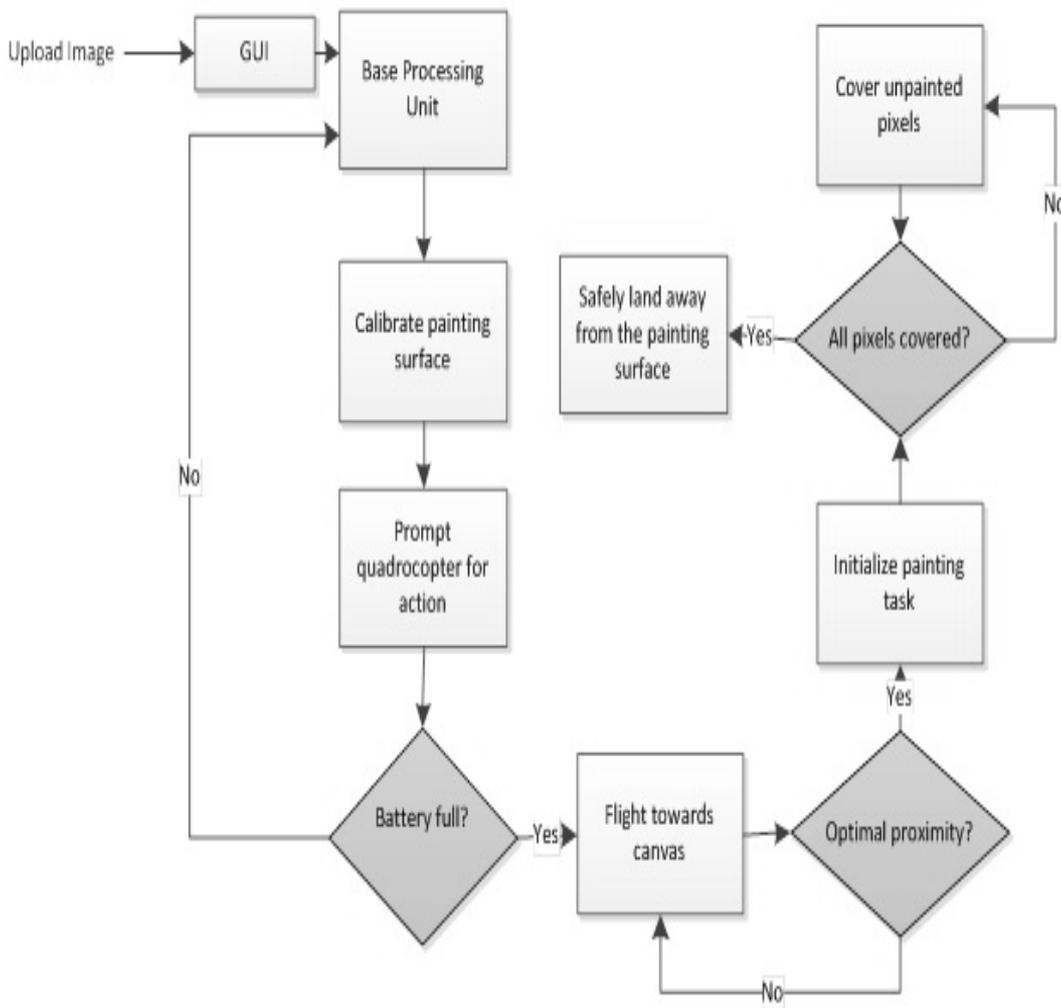


Fig.1: Flow chart of laser communication system

The field of fibre optics communications has exploded over the past two decades.[3] Fibre is an integral part of modern day communication infrastructure and can be found along roads, in buildings, hospitals and machinery. The fibre itself is a strand of silica based glass, its dimensions similar to those of a human hair, surrounded by a transparent cladding. Light can be transmitted along the fibre over great distances at very high data rates providing an ideal medium for the transport of information.

Flow chart of security system:

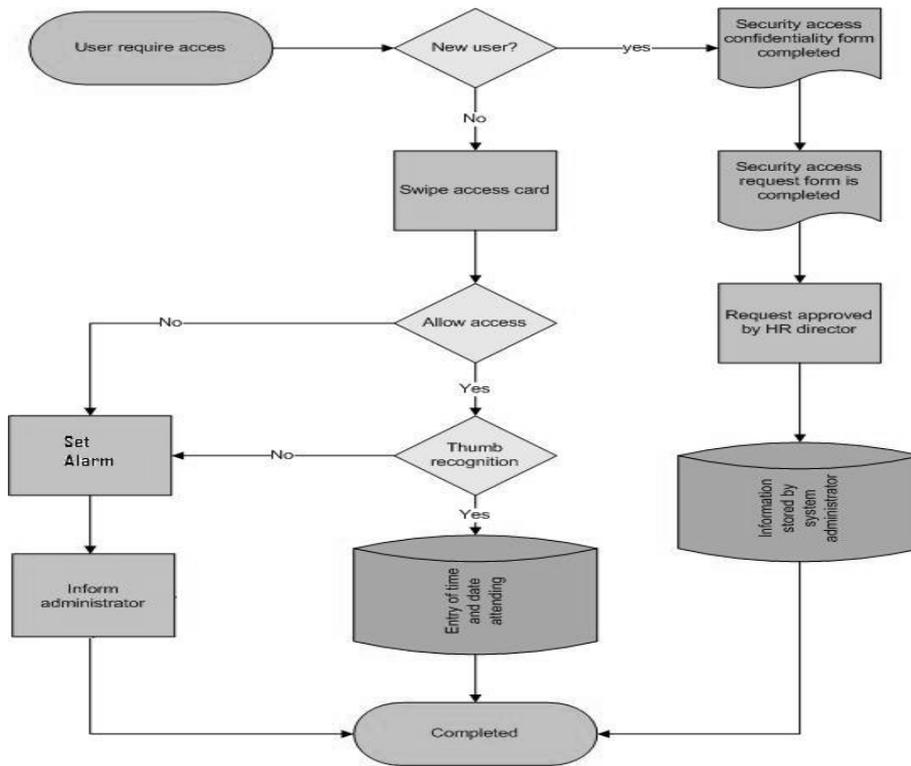


Fig. 2: Flow chart of security system

Detail requirements of laser communication system: The development of optical communication system in recent years as one of the most popular methods of communicating has added a new dimension to the field of communication system. [4] The development of optical sources like LASERs and LEDs and optical detectors like Avalanche and P-I-N photodiodes had helped in quick advances in the field of optical communication. Also the invention of optical fibre cables has led to the secure communication by using this system.

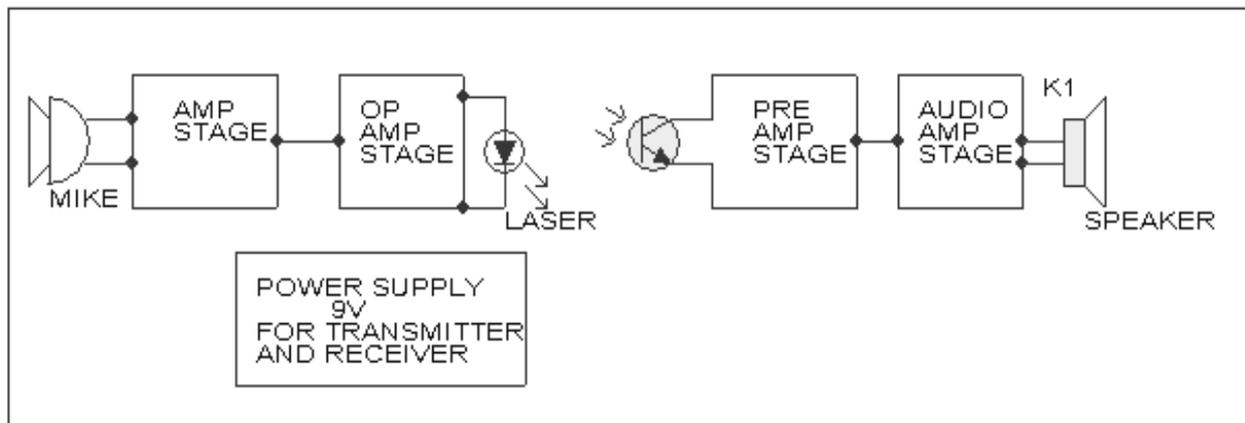


Fig. 3: Block Diagram Of Laser Based Communication System

The system for such application can be built using the following three basic components or transducers:

1. A light emitting element, which could be a laser diode or light emitting diode (LED).

2. Transmission media such as optical fiber or free space.
3. A light receiving element which could employ Avalanche Photodiode, PIN-Photodiode or any light sensor.

Since the communication's performance of the system depends on the overall characteristics of the above elements, the characteristics of the individual elements should match. [5]

Transmitters-:

- LED (single or multiple), a transducer which transforms electrical energy into optical output.

– 1 mW typical. Laser Diodes Convert an Electrical Signal to Light

- Laser (single or multiple)

– 10-20 mW typical, up to 100 mW

- Usually 785 or 850 nm, some 1310 nm
- Eye safety limit: 1.5 mW/cm² at 785 nm
- Multiple transmitters boost power, may also reduce scintillation fades

Detectors-:

- PIN Diodes

43 dBmW typical

- Avalanche Photo Diodes (APD),
(transducer which converts light energy into electrical output)

-53 dBmW typical

(also greater dynamic range)

- Single or multiple detectors
- Larger aperture increases receive power, reduces scintillation fades.

IMPORTANT FEATURES

1. Communication is possible up to several hundred meters.
2. The communication range can be extended up to several kilometers by using parabolic reflectors
3. It transmits high quality audio.
4. It ensures privacy
5. Alignment of transmitter and receiver is easy.
6. Audio-visual indication of the interruption.
7. The person at receiver is alerted of an impending audio message.
8. Voice output from the microphone in transmitter is reproduced through a loudspeaker in receiver section.

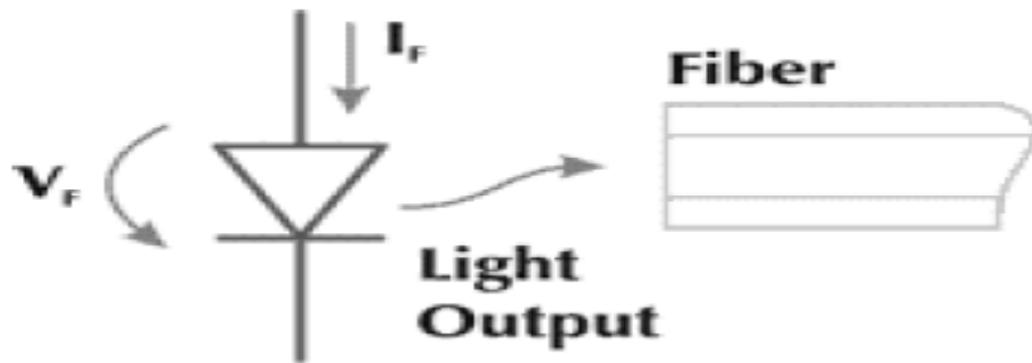


Fig. 4

ADDITIONAL FACILITIES:

It also offers the following facilities:-

- When someone intercepts the beam, the communication link breaks and the receiver circuit provides an audio- visual indication of the interruption by sounding an alarm and incrementing the count of a seven segment display.
- The person at the receiver end is alerted of an impending audio message through a buzzer sound by depressing a call switch at transmitter end.
- The voice output from the microphone in the transmitter is reproduced through a loudspeaker in the receiver section after suitable amplification.

CONCLUSION AND SCOPE IN FUTURE

The light beam is very narrow, which makes that kind of wireless transmission secure. FSO provides best EMI behavior using light instead of microwaves, it has a facility of license free operation, data bit rates are high, full duplex transmission and Quick link setup is possible.

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