

الآية:

بسم الله الرحمن الرحيم

قال تعالى:

(الْحَمْدُ لِلَّهِ الَّذِي خَلَقَ السَّمَاوَاتِ وَالْأَرْضَ وَجَعَلَ الظُّلُمَاتِ وَالنُّورَ ۚ ثُمَّ
الَّذِينَ كَفَرُوا بِرَبِّهِمْ يَعْدِلُونَ ﴿١﴾)

صدق الله العظيم

سورة الأنعام

الآية (1)

DEDICATION

I dedicate my dissertation work to my family. A special feeling of gratitude to my loving parents whose words of encouragement and push for tenacity ring in my ears. To my sisters and my brother have never left my side and are very special. I also dedicate this dissertation to my friends and teachers who have supported me throughout the process. I will always appreciate all they have done.

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Alaa Salah Eldin A.M.

Abstract

Today Wi-Fi (Wireless Fidelity) is used as wireless communication medium but Wi-Fi uses radio waves which are not allowed everywhere due to radio waves effect. Li-Fi (Light Fidelity) technology can be used in areas where Wi-Fi is not allowed. This technology will not only improve communication but also illuminate work place, and many public places. Li-Fi not only gives opportunity to create wireless communication but it also helps to save energy as technology uses LED (Light Emitting Diode) lights which consume very less electricity.

The design of Worcester Polytechnic Institute team was used as a reference in this design, but the receiver circuit was changed with solar cell and computer speaker to allow it to receive an audio signal, and then the transmitter circuit was simplified.

Firstly the audio signals that have been received at the end of the receiver were tested. The louder and most clear sound was received at distance 11cm between the transmitter and the receiver, and the receiver can receive signal until the distance became almost 60cm; this results was with a surround light. Then the experiment done in less surrounding light sources and the system transmit and receive signal until the distance become 1 meter.

Secondly the signals from transmitter and receiver were tested by digital oscilloscope to compare about them. The signals from the transmitter and the receiver are similar on the wavelength and the frequency but different on the amplitude.

المستخلص

اليوم ال (Wi-Fi) يستخدم كوسط اتصال لاسلكي لكن ال (Wi-Fi) يستخدم موجات الراديو و التي لا يمكن ان تتوفر في كل مكان بسبب تأثيرات موجات الراديو. تكنولوجيا ال (Li-Fi) يمكن استخدامها في المناطق التي لا يتوفر فيها ال (Wi-Fi). هذه التكنولوجيا لن تحسن فقط الاتصال و لكنها أيضا تضيء مكان العمل، و عدة أماكن عامة. ال (Li-Fi) لا تعطي الفرصة فقط لانتاج اتصال لاسلكي و لكنها أيضا تساعد في حفظ الطاقة لانها تستخدم أضواء الدايود الضوئي (LED) و التي تستهلك كهرباء قليلة جدا.

أستخدم تصميم فريق معهد ووركستر (WPI) كمرجع في التصميم، حيث استبدلت دائرة المستقبل بخلية شمسية و مكبر صوت حاسوبي لجعلها قادرة على استقبال الإشارة الصوتية، و بعدها تم تبسيط دائرة الإرسال.

أولا تم اختبار الموجات الصوتية التي تم استقبالها في نهاية المستقبل. تم استقبال أعلى و أوضح صوت على مسافة 11 سم بين المرسل و المستقبل، و المستقبل يمكنه استقبال الإشارة حتى تصبح المسافة تقريبا 60 سم؛ هذه النتائج بوجود ضوء محيط. بعدها أعيدت التجربة مع تقليل مصادر الضوء المحيطة و أصبح النظام قادرا على ارسال و استقبال الإشارة حتى مسافة 1 متر.

ثانيا تم اختبار اشارات المرسل و المستقبل باستخدام راسم الذبذبات الإلكتروني للمقارنة بينهما. ووجد أن الاشارات من المرسل و المستقبل متشابهة في الطول الموجي و التردد و لكنها مختلفة في الإتساع.

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List of Abbreviations

AC	Alternating Current.
AM	Amplitude Modulation.
AT&T	American Telephone and Telegraph.
BBC	British Broadcasting Corporation.
BJT	Bipolar Junction Transistor.
DC	Direct Current.
DVD	Digital Video Disc.
FCC	Federal Communications Commission.
FM	Frequency Modulation.
GB	Giga Byte.
IEEE	Institute of Electrical and Electronics Engineers.
Kbps	Kilobit per second.
KDKA	Kristiansand D Kinoallians As.
LAN	Local Area Network.
LED	Light emitting diode.
Li-Fi	Light Fidelity.
MRI	Magnetic Resonance Imaging.
NCR	National Cash Register.
OEM	Original Equipment Manufacturer.
Op-Am	Operational Amplifier.
OTs	Operation Theatres.
RF	Radio frequency.
ROV	Remotely Operated Vehicles.
Sec.	Second.

TDS	Tektronix Digital Oscilloscope.
TED	Technology Entertainment Design.
TV	Television.
UK	United Kingdom.
VLC	Visible Light Communication.
Wi-Fi	Wireless Fidelity.