Advanced Surveillance Technology Multicast Using Optical Wireless Transceiver in Smart Environment

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Certification

This is to certify that Israel Oluwagbejamija FAKUNLE with matriculation number LCU/PG/002520 carried out this research work titled "Advance Optical Wireless Surveillance Technology Decentralization For Smart Cities" in the Department of Computer Science, Faculty of Natural and Applied Sciences, Lead City University, Ibadan, Oyo state, for the award of Master Degree (MSc) in Computer and Information Science and that this has not been previously submitted.

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(Head of Department)	

Dedication

This research work is dedicated to God Almighty, my parents, and siblings.

Acknowledgement

I want to thank the prestigious institution Lead City University for the opportunity to learn and complete my Master's Program and to the University Library for provision of adequate materials needed.

I am grateful to the Department of Computer Science for giving me the privileged and opportunity to study and to learn, my appreciation goes to my supervisor Dr. W. Sakpere, I also like to acknowledge my lecturers, Dr. A Waheed, Dr. R. Badru, Dr. W. Ajayi for their supports and always ensuring that things are done rightly.

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"Even though the above-mentioned institutions and persons have assisted in the process of this research work, I alone stand responsible for the errors, if any, found in the work."

Abstract

Security practice is crucial peaceful living. In the old times, before the advancement of technology, security was a major concern due to invasions, robbery, and wars. According to history, security personnel in those days known as vigilante also served as police. The security responsibilities then require 100% human effort, having to go over an assign geographical area, restlessly and sleeplessly, to secure lives and properties. But today with technological advancements, people are able to live in security without the need for protection. The advancement in technology as relieved human a whole lot of security threats and stress. This study aims to develop a real-time surveillance system that utilizes multicast technology to prevent and detect crime in an enclosed geographical location. The objective is to empower residents to work together and contribute to the security of their environment, lives, and properties. Real-time surveillance multicast is faced with numerous challenges, such as; lags / interruption in transmission, due to error from the framework or internet connections, high internet data consumption, due to enormous data transmission and limited number of users allowed. A Close-Circuit Television system will be designed using an analogue camera and digital video recorder with a hard drive for data capturing and storage allowing decentralization of the system using a wireless video transceiver through integration. Overall, this study aims to develop a surveillance system that empowers residents to work together and contribute to the security of their community. The system will leverage advanced technologies such as wireless video transceivers and multicast technology to improve the efficiency and effectiveness of surveillance.

Keywords: Technological Advancement, Security Threats, need for protection, real-time surveillance, multicast, lags in transmission, empower residents.

Word Count: 260

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List of Acronyms

Abbreviation	Meaning
RF	Radio Frequency
OWC	Optics Wireless Communication
IoT	Internet of Things
ISP	Internet Service provider
SS	Surveillance System
UX	User Experience
M2M	Machine-to-Machine
nLos	Non-Line-of-Sight
DVR	Digital Video Recorder
NVR	Network Video Recorder
IP	Internet Protocol
CCTV	Closed Circuit Television
VMS	Video Management Software
HDD	Hard-drive
PoE	Power over Ethernet
PCB	Printed Circuit Board
EM	Electromagnetic
APP	Application
MAC	Media Access Control
PHY	Physical
VLC	Visible Light Communication
OCC	Optical Camera communication
IR	Infrared

WLAN	Wireless Local Area Networks
LAN	Local Area Networks
FSO	Free-space Optical Communications
WBAN	Wireless Body Area Network
WPAN	Wireless Personal Area Network
CWSNs	Cooperative Wireless a Sensor Networks
REMP	Reliable Efficient Multicast Protocol
DHS	Department of Homeland Security
SAVER	System Assessment and Validation for Emergency Responders
M2M	Machine-to-Machine
DHS	Department of Homeland Security
EPROM	Erasable Programmable Read-only Memory
CMOS	Complementary Metal Oxide Semiconductor)
CCD	Charged Coupled Device
QIE	Quality Implementation and Evaluation
BWVC	Body Worn Video Camera
GDT	Gun Detection Technology
UML	Unified Model Language
GT	Grand Truth
AR	Algorithm Result
VGA	Video Graphic Adapter
VCA	Video Content Analysis