**2017 Thesis Research**

**Visible Light Communication Using Reflected Light**

Takuma MURATA

**Abstract**

日本語：

---前回までの添削分

近年、高速に明滅することのできるLEDが登場してからLEDの光に信号を重畳させ伝送する可視光通信が提案された。

従来の可視光通信に関連する開発研究では主に直接光を用いていた。そのため、同じ部屋内でも通信できない場所があった。

---以下を英文にする

本研究では反射光受信を目的とした装置を製作する。次に、装置の受信性能を検証する。検証結果から、通信精度の向上及び通信可能範囲の拡大のため取り組むべき課題を明確にする。

受信性能について、通信精度と受信可能距離と伝送速度の評価を行った。評価の結果、製作した装置について次のことが分かった：

1. 少なくとも伝送速度115200[bps]まではケーブル接続と反射光で受信精度が落ちない。
2. 光源から7.2[cm]の距離から反射光を受信できた。

課題は次の通り：

1. 受信信号を増幅しなければならない。通信精度及び通信可能範囲を向上させるために。
2. より高速動作可能な素子を用いなければならない。転送速度を向上させるために。

---前回までの添削分

Visible Light Communication (VLC) is an optical wireless communication system that carries information by modulating light of LEDs recently developed for high frequency blinking. Previous researches related to the VLC mainly used line-of-sight communication. Therefore, communication failures frequently occur even in the same room.

---新しく追加した内容(日本語文章より)

In this study ~~work~~, we ~~fabricate~~ made ~~dedicated~~ a experimental device ~~aimed at~~ receiving reflected light. ~~Next~~ and ~~we~~ verified the reception performance of the device. ~~From the results~~, Then we clarified issues to improve the communication accuracy and the communication range in ~~a~~ the same room as follows; communication accuracy, receivable range, and transmission speed.  ~~we clarify issues to be addressed~~. We evaluated them on the experimental device and found the following results; ~~For the reception performance, we evaluated communication accuracy, receivable distance and transmission speed. As a result, the following was found:~~ 1) ~~Until at least~~ Under the transmission speed of 115200 [bps], the reception accuracy does not decrease ~~between~~ with cable connection and with reflected light. 2) Reflected light could be received source at a distance of 7.2 cm from the LED.

The received signal must be amplified to improve communication accuracy and communication range. In addition to that, an element capable of high-speed operation ~~at higher speed~~ must be used~~,~~ to improve ~~transfer~~ transmission speed.

--------以下、読みにくいという指摘を受けた内容(日本語文章を変更したため内容が一部違う)

As a result of evaluating communication accuracy, receivable distance and transmission speed of the fabricated device, the reception precision does not change with cable connection, direct light and reflected light until at least the transmission speed of 115200 [bps] in this system, It was found that it can receive from the light source at a distance of 7.2 cm.

~~In the conventional development research related to the VLC, these had the disadvantage that there is a place where can not communication even in the same room because it was communicating using direct light.~~

~~In this research, we aim to improve communication accuracy and communication range in the room by fabricating a dedicated device and verifying the performance of communication using reflected light from the wall.~~

As a result of evaluating communication accuracy, receivable distance and transmission speed of the fabricated device, the reception precision does not change with cable connection, direct light and reflected light until at least the transmission speed of 115200 [bps] in this system, It was found that it can receive from the light source at a distance of 7.2 cm.

キーワード：可視光通信、反射光、機密性、IoT、FPGA

*Keywords: Visible Light Communication(VLC), Reflected Light, Confidentiality, IoT, FPGA*