

**Project: IEEE P802.15.7a OCC TG**

**Submission Title: Accurate Data Transmitting LED Detection Scheme Employing Support Vector Machine(SVM) Classifier**

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**Abstract:** We develop a novel scheme for detecting and recognizing accurate data transmitting light-emitting diode (LED) intelligently by the camera receiver.

**Purpose:** The main goal of this contribution is to reduce bit error rate (BER) by handling all unwanted LED regions in the image frame intelligently considering limited computational capability of mostly used commercial cameras.

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# Introduction

- ❑ Optical camera communication (OWC) opened up a new frontier for the future massive connected network
- ❑ However, Deep learning techniques, notably CNN, have been proposed at the receiver side to detect LED and the data bits are retrieved using several image processing techniques. But, it is not investigated yet how a receiver can intelligently recognize actual data transmitting LED region from the frame among other unwanted LED regions and decode data intelligently from that accurate region in the OCC case.

# Accurate data transmitting LED detection scheme

# 1. Accurate data transmitting LED detection scheme

## 1.1 Proposed Idea

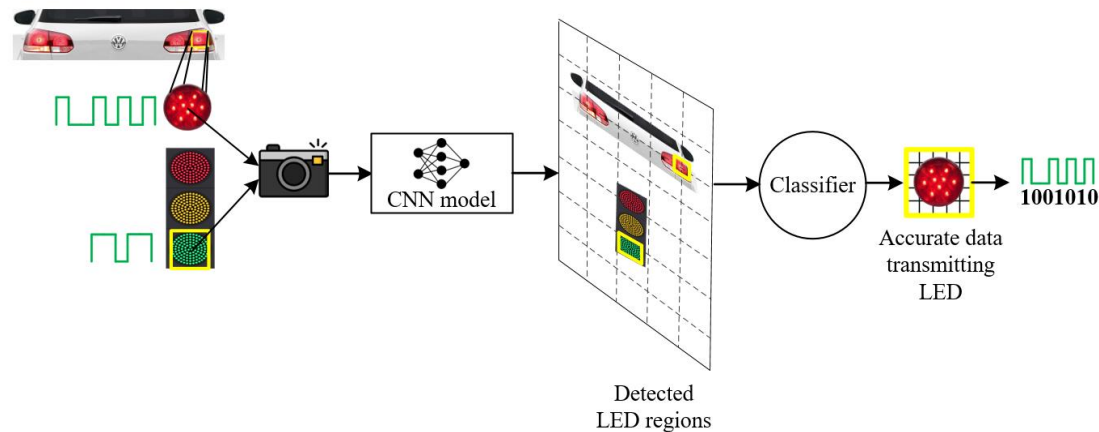


Figure 1. Proposed architecture of the system

- The camera will detect every possible LED regions employing CNN.
- Applying image processing techniques, extract necessary features, such as area of combined stripe pattern, no. of stripe, perimeter, no. of line segment.
- Feed this features into SVM classifier.
- Detection of accurate LED region and decode data.

# 1. Accurate data transmitting LED detection scheme

## 1.2 Accurate LED classification:

- Extract features from the captured LED regions.
- Splitting feature set into training and testing set.
- Train the SVM classifier.
- Checking the classifier accuracy.
- Feed new input regions to classify accurate data transmitting region.

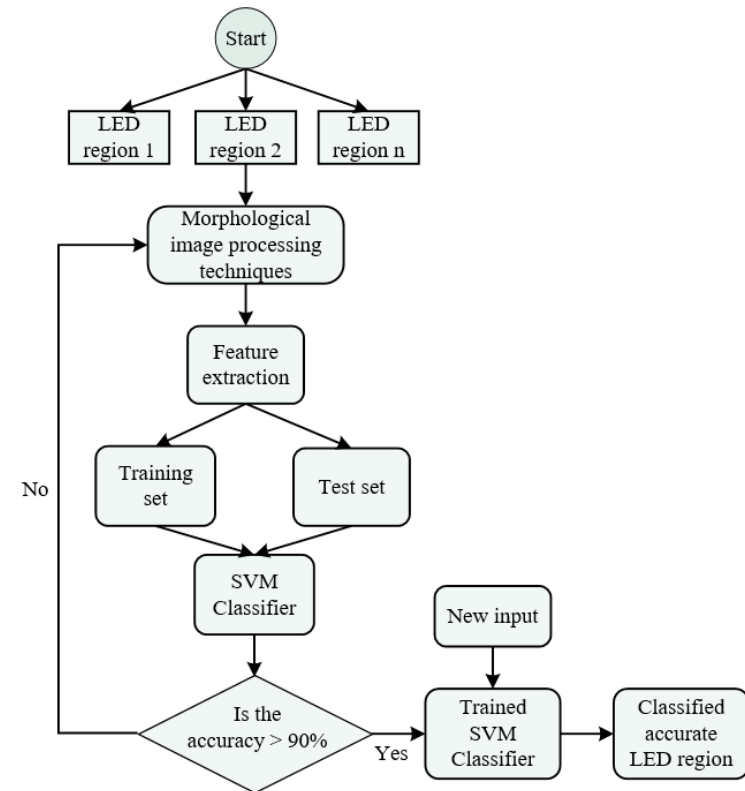


Figure 2. Flowchart of accurate LED classification