EAI Endorsed Transactions
on Smart Cities
Research Article EAI.EU

Vehicle counting application utilizing background subtraction method with large-scale camera data

Mien Phuoc Doan[1,*], Vu The Tran[2] and Sy Ngo Van[3]

[1]Tra Vinh University. 126 Nguyen Thien Thanh Street, Ward 5, Tra Vinh City, 87000, Vietnam
[2]Institute for Research and Executive Education, The University of Danang. 158A Le Loi Street, Hai Chau District, Da Nang city, 50000, Vietnam
[3]Vietnam Research Institute of Electronics, Informatics and Automation, Da Nang City, 50000, Vietnam

Abstract

In modern society, people are increasingly using cameras at home, in shops, and on the streets. Traffic systems have also invested in building more surveillance camera systems. The data collected by cameras contains valuable information for traffic regulation and recording traffic violations. The challenge is how to effectively use this data. In this article, we will discuss the use of real-time data from surveillance cameras on some roads in Da Nang City for vehicle counting using background subtraction methods. Additionally, we also tested the detection of red-light violations to contribute to the development of a smart traffic system. So, the use of background subtraction in analysing real-time data from surveillance cameras can greatly improve traffic management.

Keywords: Large-scale camera, background subtraction, Da Nang City

Received on 05 April 2023, accepted on 09 March 2024, published on 17 April 2024

doi: 10.4108/eetsc.3211

1. Introduction

Traffic is always the most frequently mentioned issue in modern society. Safety in traffic is always a major challenge, which causes headaches for many managers.

In developed countries, public transportation such as buses and subways are the main means of transportation. The use of cars is also very common. In addition, the infrastructure is developed, and people's awareness of traffic rules is high. Unlike the traffic situation in Vietnam, where there are many types of vehicles on the road and the awareness of participants is not always good. For example, some drivers stop their vehicles on the highway to eat or even reverse on the highway. Traffic violations such as running red lights, driving in the wrong direction, and lane encroachment are common. Therefore, the unpredictability of traffic in Vietnam in general and Danang, in particular, is quite high. Currently, there is no system deployed in Danang to automatically detect behaviors such as lane encroachment and running red lights.

After a trial period, in August 2016, a high-quality camera system at key locations such as Hue intersection, Han River Bridge, Dragon Bridge, Cham Museum, Pham Van Dong Beach, Nguyen Hue Gate (Quang Trung Street), etc., officially became operational. Currently, there is no system that utilizes data from these surveillance cameras.
With the advancement of information technology, reading and retrieving massive amounts of data or using the outputs of various applications on different technology platforms is being paid attention to. However, in the field of traffic, this is still a relatively new issue. Currently, there is no architecture that can read and interpret multiple types of output data using different programming languages. For example, the results of vehicle counting using visual C++ language can be used to connect with a system used to calculate the density using Python language.

*Corresponding author. Email:phuocmien@tvu.edu.vn