


A Novel Algorithm to Detect and Transmit Human-Directed Signboard Image Text to Vehicle Using 5G-Enabled Wireless Networks

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ABSTRACT

The emerging 5G telecommunication technology uses novel aspects to fulfill the challenges of high data rate, ultra-low latency, broad bandwidth with the best user experience for text detection in sign board and thereafter transmission of identified information to the vehicles. This is performed on the images which are amorphous in nature or containing scenarios which are random or that cannot be determined. Detecting and transmission of texts over 5G wireless network from the unstructured images aids in many of the additional applications like optical character recognition (OCR) and 5G technolog such as an eMBB, mMTC, and URLLC for quality of service and customer satisfaction. This approach can be used to alert a driver about any road sign even from a captured video by using 5G wireless network irrespective of the weather condition or any obstacle which may make sign boards difficult to see for drivers. The algorithm uses maximally stable extremal regions (MSER) feature detector. The algorithm contains several steps which are briefly described in the paper.

KEYWORDS

Complex Sign Board, MSER, Natural Images, OCR, Text Extraction, Text Recognition

1. INTRODUCTION

Drivers need to be especially cautious about the lack of suitable signage, obstacles, and speed breaks. The consequence of any driving error is indeed a collision. There seem to be various places where there are insufficient signs notifying travellers of upcoming detours, and this has been the main cause of road accidents. Had it not been for a signboard, the driver would have chosen the erroneous route, which would have contributed to the catastrophe and fatalities. Attempts are being made to introduce technological innovations into the sign board system in order to improve its dependability. It could reduce fuel costs and even fatalities by using Smart Transportation Systems. The prospect of a smart running system (Pandey, Pandey, Wariya et al, 2021) for eventual commercialization is significant. As a result, these technologies are strongly connected to many other new advancements, including

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Figure 1. Diagrammatic representation of the process of detecting and recognising text in a picture



the wireless cellular mobile networks (Pandey, Nassa, Jhamb et al, 2021; Tran et al., 2021). Text data on sign board is, without a doubt, a highly significant and essential aspect of human existence.

Information and knowledge can be gained as well as acquired over time and space with the help of texts throughout the textual format of the language used by people. Since it is a tool for connection and interaction over wireless networks (Pandey, Pandey, & Wairya, 2021; Pandey et al., 2020; Pramanik, Ghosh, Ghonge et al, 2021), text plays a crucial role in society today. On the other hand, high-level semantics are exact and particular, which are demonstrated in text, are extremely beneficial for a better knowledge of the world around us. Among the many real-time practical applications of text detection and text recognition are picture search (Schroth et al., 2011; Singla et al., 2020), instant translation of text (Tsai et al., 2011), robot navigation (Dvorin & Havosha, 2009; Sharma, Singh, Singh et al, 2020), and industrial computerization (Guilherme, 2002; Sharma & Gupta, 2021). As a result, the automatic detection of text and recognition of it from natural images (Liu & Samarabandu, 2005) or photo OCR (Chowdhury & Deb, 2013). As illustrated in Figure 1, this has emerged as a predominant and widely known phenomenon under exploration. Printing technologies (Pramanik, Ghosh, Pandey, & Ghonge, 2021) were more prominent before the rush of multimedia content. Suggestions for methodology used books and newspapers to share our knowledge and thoughts that were unable to reach the majority of people across the country at the time for a variety of reasons: (i) products and tools that were not feasible for large-scale production; (ii) The ability to find large-sized content; and (iii) language barriers. Nevertheless, with the increasing utilisation of computers in the 90s, all the above obstacles were challenged as the data and content were digitised (Kashyap et al., 2016; Suryanarayana et al., 2021), which made it very easy to share things on the internet (Hasan et al., 2021; Pandey, Pandey, Wairya et al, 2021; Zhao et al., 2020), and also eliminated the language barrier. Textual symbols are automatically detected and recognised from real pictures. This is a thought-provoking problem, as they are typically fixed in the environment. It is very similar to the extraction and recognition of text from movie images, or it can also be called "Video OCR". In comparison to video OCR, sign identification occurs in a livelier setting and uses relatively few resources to implement text detection and recognition. Because of its unique characteristics (Pramanik et al., 2020), sign translation differs significantly from standard language translation.

2. TEXT DETECTION AND RECOGNITION OVER 5G ENABLED NETWORK

The intensity of signal reception indicators is once again used as a developing component for such generation 5G terminals for quick and efficient distribution of signs and images via 5G enabled wireless transfer (Pramanik, Ghosh, Pandey, Samanta et al, 2021), appropriately allocating its broadcasting

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