Statistical Correlations of Detector Data, Traffic Light Signalization and other Traffic Control Information

Master's Thesis by Wai Yu Lee

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BACKGROUND

Traffic controllers generate data captured by the detectors and traffic signals. However, such data is lack of information on the relationship between the detectors and the signals, i.e., it does not reveal the relevant detectors or detection zones which trigger a respond from a certain traffic signal.

Timestamp	VK10G	VK11G	VK20	TM1a
1368526230	-110	L	H	L
1368526231	L	+390	H	L
1368526232	+430	-430+840	H	L
1368526233	-590+780	-080+510	H	L
1368526234	H	-090	H	L

Table 1: Traffic detector raw data

Timestamp	K1a	K2a	K3a	K4a
1368526230	R	G	R	G
1368526231	R	G	R	G
1368526232	R	G	R	G
1368526233	R	G	R	G
1368526234	R	G	R	G

Table 2: Traffic signal raw data

OBJECTIVE

This thesis proposes a method for determining the relevant configuration of the intersection by investigating their raw data and parameters generated. Hence, the corresponding detectors or detection zones of the traffic signals can be found simply by using the data generated from the traffic controllers.

Example of result:

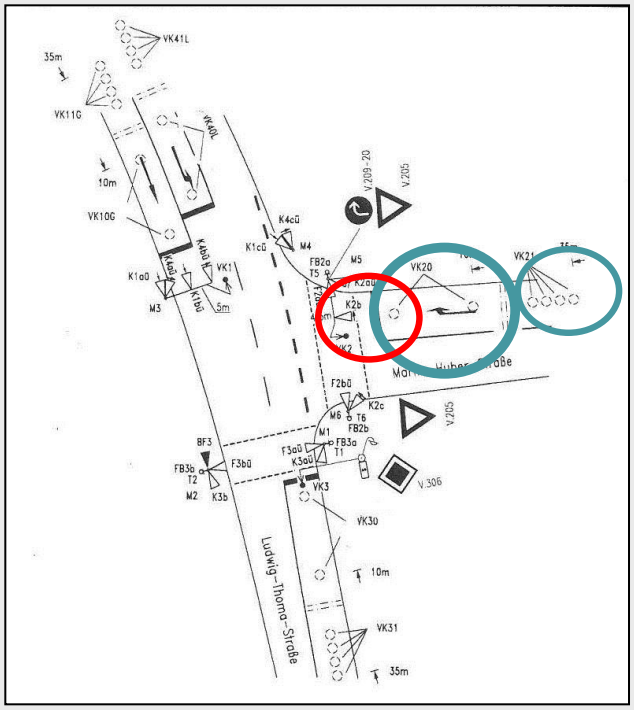

Fig 1. Layout plan of an investigated instersection
(Source: *Planungsbüro für Verkehrstechnik Essen GmbH)*

Traffic signal K2 responds to the demand on stop-line detection zone VK20 and VK21 is an advance detection zone of the corresponding lane.

METHODOLOGY

The proposed method consist of two main parts, namely the classifers and the configuration search.

Classfiers

To classify the data generated by the traffic controller into vehicle or pedestrian related information. The vehicle related information will be extracted and utilized to further develop the configuration search method.

Configuration search

A set of logics that is developed based on two typical phenomena of an actuated traffic behavior. They are:

- Stop-line detector - traffic controller respond to the demand registered on it by allocating a green phase to the corresponding signal.
- Advance detector – shares similar traffic flow characteristics with the stop-line detector, as it is placed in advance of the stop-line detector to identify vehicles earlier on to assist in decision of green phase extension.

RESULT

The method delivers an acceptable result as an initial study and provides a foundation for further development and parameters incorporation.