Programmer guide for incident duration prediction program

This document introduces the core model logic of the incident duration prediction program. More coding details can be found in the comments in /incident-clearance/javascript/tab.js.

After the user selects the incident location, each incident will be first categorized based on its type and the number of blocked lanes, and classification rules (please refer to the Excel files) will then be applied to each individual category to estimate the duration.

1. Initial Incident Categorization

a. Each collision incident would be first categorized into two incident types: 1) Collision with travel lane blockage and 2) collision with only shoulder blockage
b. Collision incidents with travel lane blockage are further categorized into three types: 1) Collision with fatality (CF); 2) collision with personal injury (CPI); 3) collision with only property damage (CPD)
c. CPI and CPD are further categorized into a number of sub-categories depending on the number of travel lanes being blocked. For example, CPI-1 represent CPI with one-travel-lane-blockage; CPI-2 represent CPI with two-travel-lane-blockage; and CPI-3+ represent CPI with at least three-travel-lane-blockage
d. During categorization, the estimated duration will be updated whenever the user provides any information.

2. The sequential logic of using rules

When all information regarding the incident has been entered by the user, it will be then processed by a set of classification rules that are specifically developed for its corresponding category (e.g., rules of CPI-1), one by one with the order from top to bottom.

For example, let the table below illustrate a set of ten classification rules, where each rule is modeled by the IF-THEN pattern. Below sequential logic of using those rules will be followed:

	Description		Case	
If	Description of Rule 1	Then	>30	
	Description of Rule 2		<30	CPI-1 Lane-1
	Description of Rule 3		<30	CPI-1 Lane-1
	Description of Rule 4		>30	
	Else then		<30	CPI-1 Lane-1
If	Description of Rule 5	Then	>60	
	Description of Rule 6		>60	
	Description of Rule 7		>60	
	Description of Rule 8		>60	
	Else then		<60	CPI-1 Lane-2
If	Description of Rule 9	Then	>120	CPI-1 Lane-4
	Description of Rule 10		>120	CPI-1 Lane-4
	Else then		<120	CPI-1 Lane-3

I. An incident will be first evaluated to determine whether the estimated duration is longer than 30 minutes, starting from checking Rule 1
   - *If the features of the incident match the description of Rule 1, then the incident is expected to last longer than 30 minutes.*
   - *If the features of the incident do not match the description of Rule 1, then the next rule (i.e., Rule 2) will be examined*
   - Such a procedure will be followed until one rule is matched or 'Else then' is reached

II. If the incident is expected to last shorter than 30 minutes, it will be classified into CPI-1 Lane 1. If the incident is expected to last longer than 30 minutes, further examination is needed to check whether it would last more than 60 minutes, starting from checking Rule 5 and following the above logic.

III. The same logic will apply to examine whether an incident would last longer than 120 minutes if it is expected to last longer than 60 minutes.

IV. Each incident will eventually fall into one of the classifications: CPI-1 Lane-1: <30 mins; CPI-1 Lane-2: 30~60 mins; CPI-1 Lane-3: 60~120 mins; CPI-1 Lane-4: >120 mins

Note that the classification rules for all roads can be found in the attached Excel files and they are coded in /incident-clearance/javascript/tab.js. They can be found by searching ‘core model’

3. Prediction result demonstration

Based on which classification an incident falls into, the program will show estimated duration with various probabilities. The estimated duration ranges after all classification rules have been examined can be found by searching ‘demonstrating results’ in /incident-clearance/javascript/tab.js.

Note that before the incident information is completely collected, the demonstrated incident duration estimation is consistent with the estimation results at the end of the categorization. To obtain more accurate estimation, the user needs to complete information input on all the tabs.