

A Real-Time Threat Analysis Tool to Improve Safety for First Responders in the Line of Duty

6th Ontario Road Safety Forum

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creative

passionate

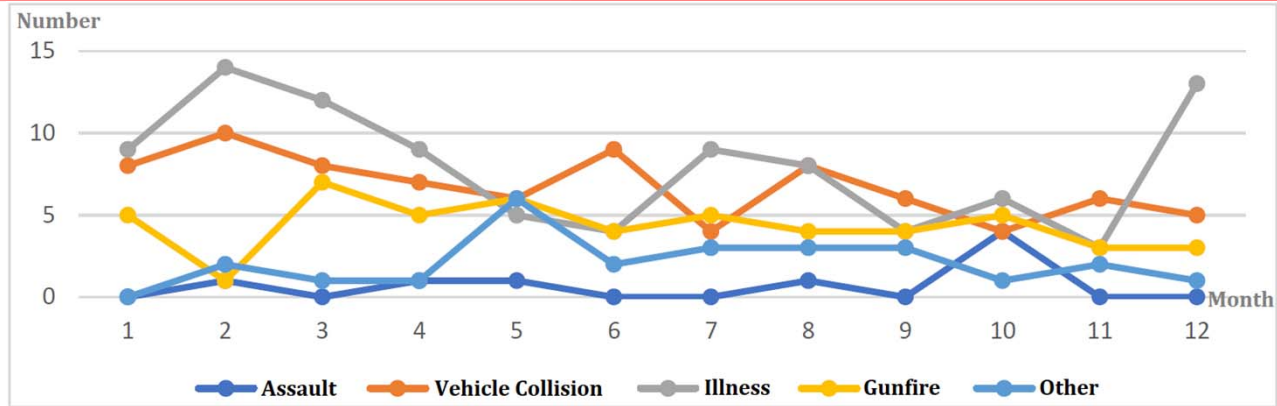
rational

confident

ingenious



Problem Statement

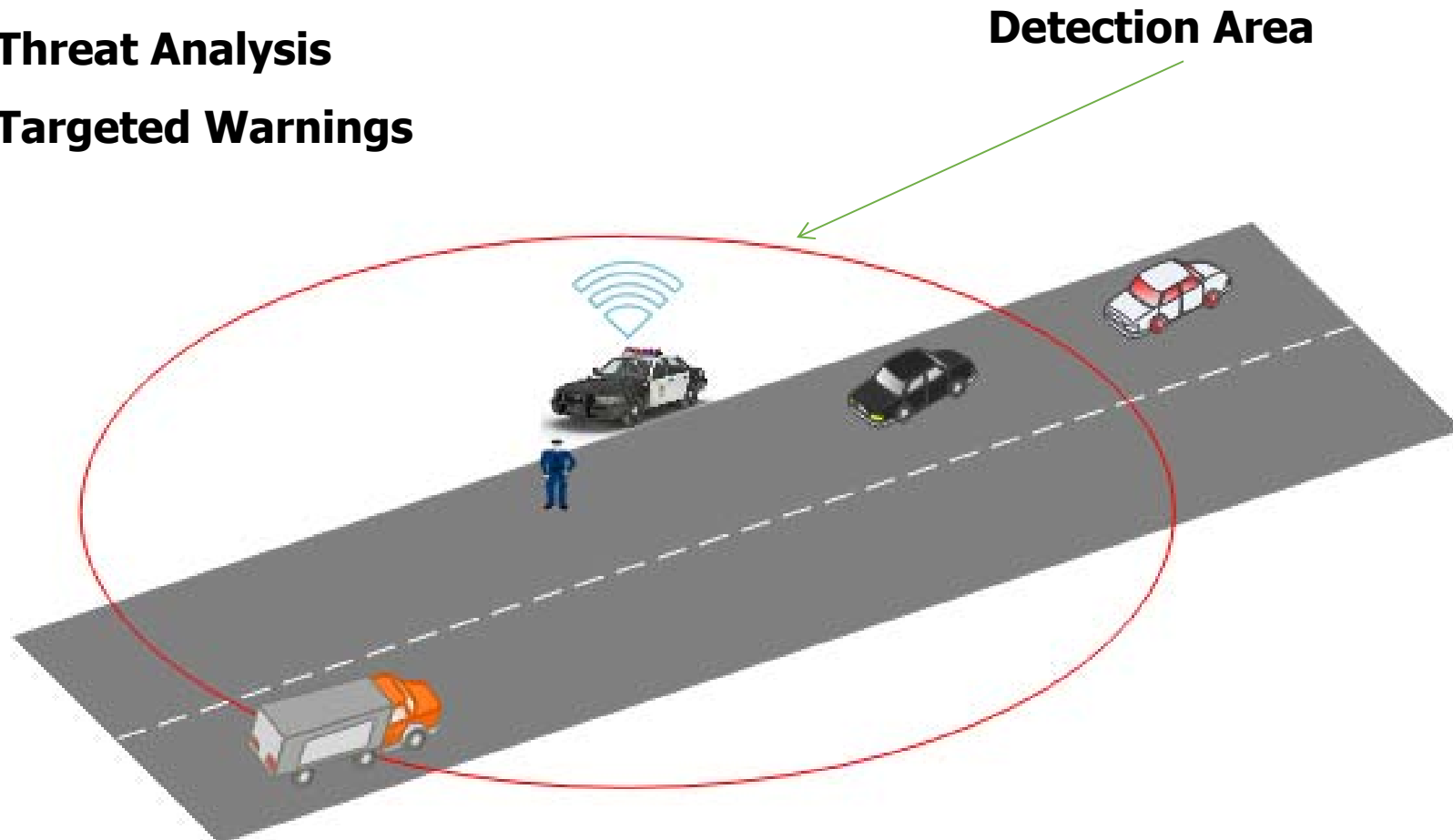


* International Public Safety Association



A Real-Time Threat Analysis Tool

1. Accurate Detection and Localization
2. Threat Analysis
3. Targeted Warnings



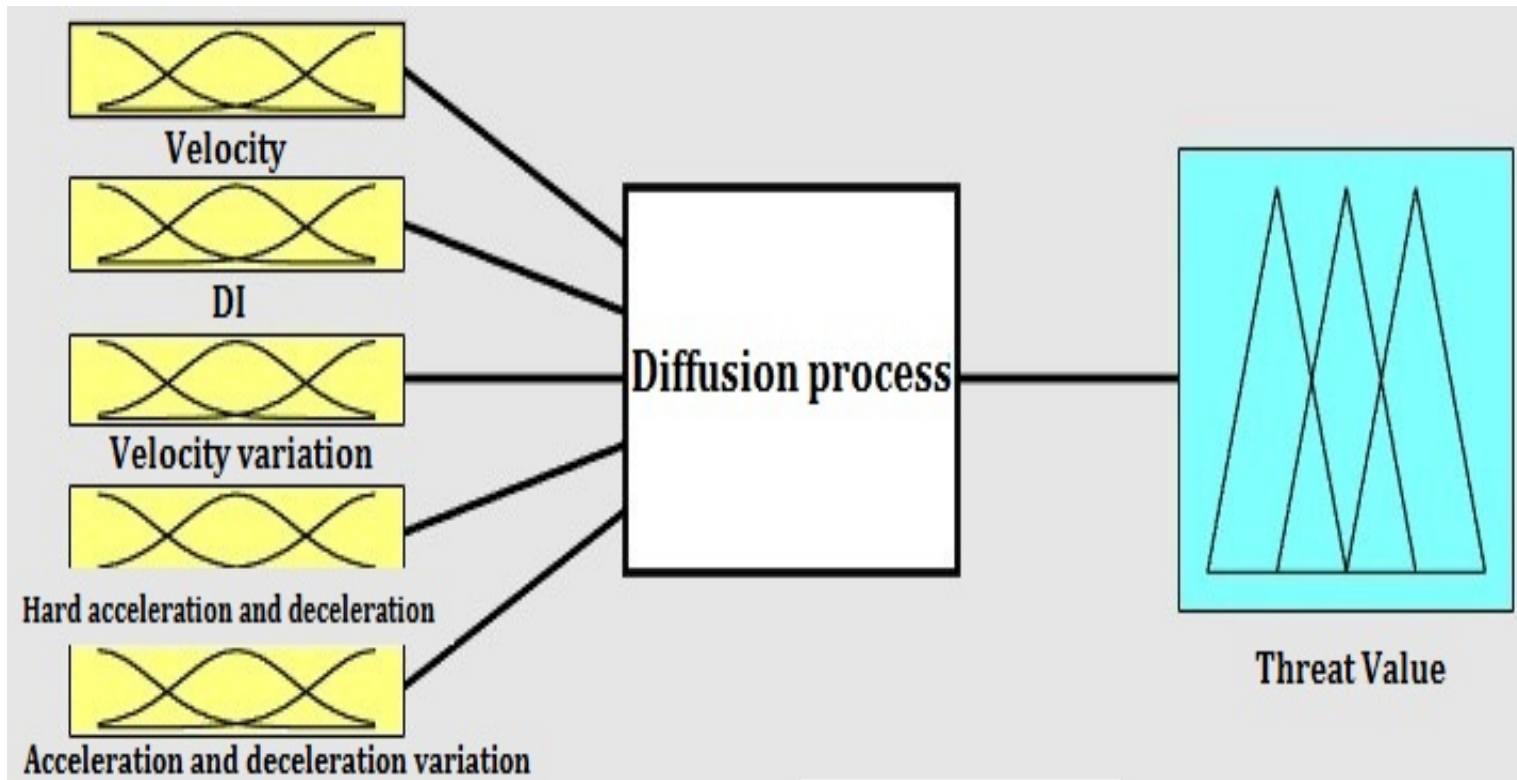
Methodology

1. **Identifying** the most relevant indicators

Source of Information	Initial Input Indicator	Note
Radar system	Velocity	
	Stopping Sight Distance (SSD)*	Minimum stopping distance before colliding
	Velocity Variation	Standard deviation of velocity
	Hard Acceleration or Deceleration	$a > 0.2 \text{ g}$ $a < -0.2 \text{ g}$
	Acceleration and Deceleration Variation	Standard deviation of acceleration or Deceleration

Methodology

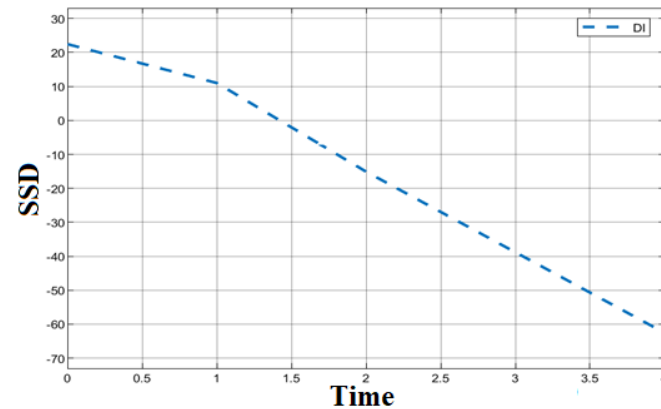
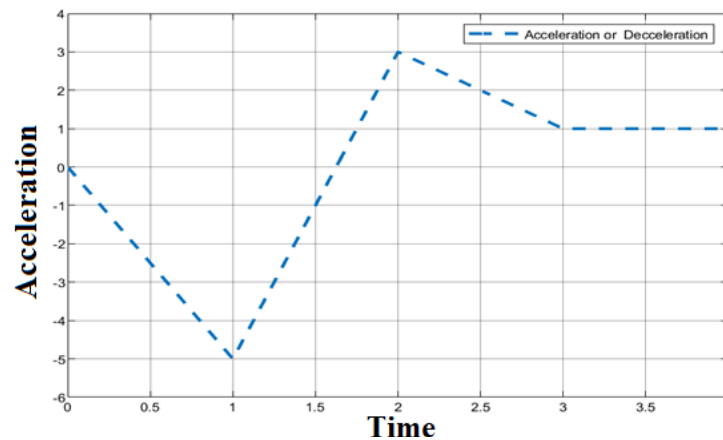
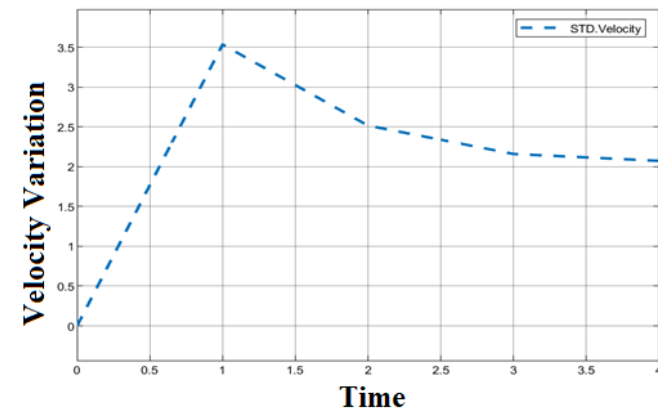
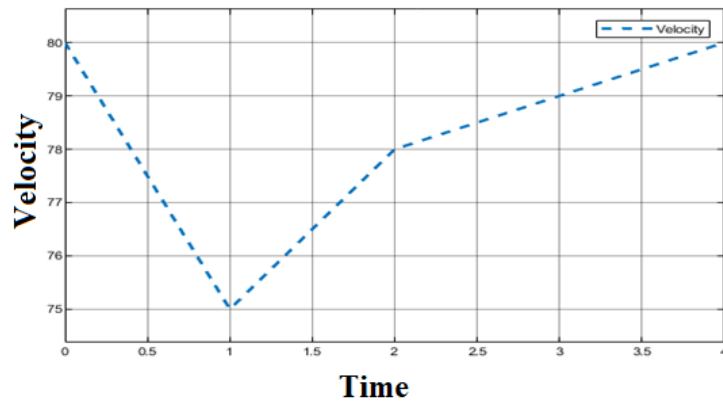
2. Designing threat analysis system



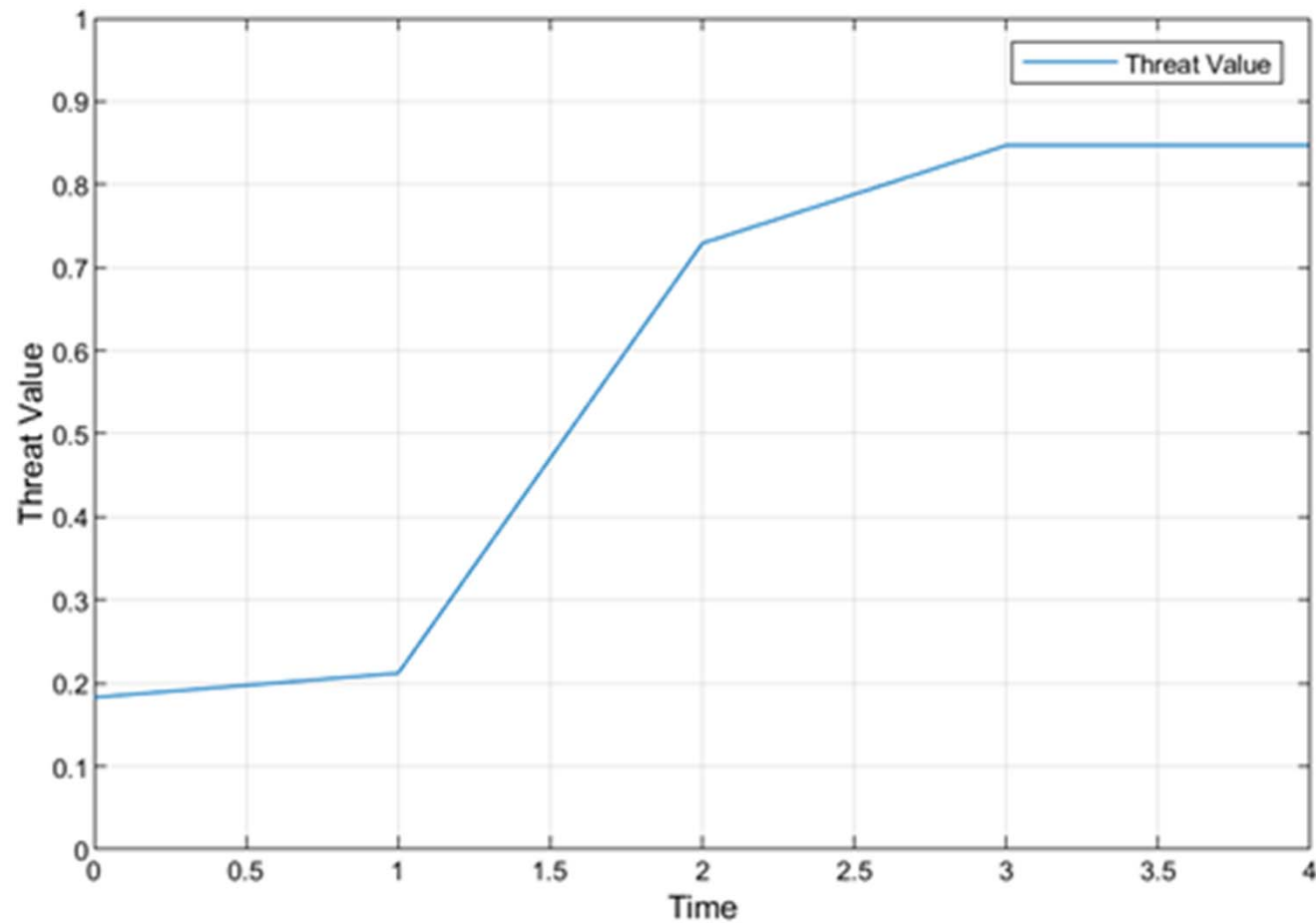
Fuzzy Inference System

Simulation Scenario: Input

Time of detection(s)	Velocity (km/h)	Distance (m)
0	80	120
1	75	100
2	78	79
3	79	57
4	80	35



Output: Different Level of Threat



Conclusion and Future Works

Conclusion

1. Analyzing drivers' behavior to generate threat value
2. Using threat value to warn first responders

Future Works

1. Warning first responder considering human perception and reaction time
2. Developing wearable IoT device for first responders

Acknowledgement

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