

Epidemiological Models for Transportation Applications: Secondary Crashes

Abstract

Highway crashes can have an immediate and significant impact on the mobility of individuals and goods traveling within the area. Crashes that occur as a result of an initial or primary crash are known as secondary crashes. Estimates suggest that nearly ten percent of freeway crashes can be classified as secondary. These secondary crashes are exceptionally dangerous for the victims of the primary crash and the first responders dispatched to support them. Understanding why secondary crashes occur and predicting where and when secondary crashes are more likely can significantly improve emergency response and protect vulnerable road users such as primary crash victims and emergency responders. We will introduce a new paradigm in modeling this problem by utilizing the mathematical modeling concepts from epidemiology. In particular, we will analyze the data on secondary crashes in Florida for the past two years, and develop a self-excitation point process model for spatial and temporal distribution of secondary crashes. In addition, we will develop agent based models for detailed analysis of mitigation strategies. We will use this combination of models to analyze and suggest effective policies to the transportation and emergency response policymakers.

CATM Research Affiliates:

Sirish Namilae (ERAU: Lead)

Dahai Liu (ERAU)

Scott Parr (ERAU)