GIS-Based Evaluation of Selective Law Enforcement Campaigns in Alabama

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Introduction

• Selective Enforcement Campaigns: Intensify law enforcement at targeted high crash frequency locations
• Attempt to change driver negative behaviors (speeding, DUI, seat belt use)
• In Alabama: 80,000 Electronic Citations (eCitations) issued per month
• Accurate location information is needed
• In Alabama: State Trooper’s vehicle location polled every 30 seconds
• Citations, location tracks, and crashes can be analyzed together in one spatial-temporal map

Objectives

Use Microsoft SQL Server Management Studio and Geographic Information Systems (GIS) to:
• Accurately locate citations
• Integrate officer patrol patterns, citations issued, and crash locations
• Evaluate crash reductions by citation counts before, during, and after selective enforcement periods along police driven routes

Methods

1. Obtain UserIDs for officers in Selective Enforcement data
2. Organize GPS trace data and eCitation data
3. Accurately locate eCitations using temporal analysis
   - 600 second tolerance
   - 70.9% located with join and after accepting existing XY points
4. Define hours worked using GPS trace data
   - Calculate difference between successive GPS points
   - Find beginning and ending of shift
   - 6921 generated shifts
5. Incorporate Selective Enforcement (SE) Data
   - Join SE Data to GPS shifts based on UserID and Day Worked
   - Calculate cumulative time between GPS points and difference between GPS hrs. and SE hrs.
   - Define a GPS point: Yes or No for during SE shift

Conclusions and Results

15% of the officers had no GPS trace data so their data were not conclusive
- Early years of GPS implementation
  Percentage of Located eCitations and Selective Enforcement Shifts Accounted for Before and After Exclusion of Officers without GPS Data

Future Work

- Integrate crash severity data
- Perform Return on Investment studies for Selective Enforcement
- Develop Crash Modification Factors

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