TIPS! | Reading a Scholarly Journal Article (also referred to as Peer Reviewed or Refereed)

NOTE: structure and section titles within articles can vary depending on the discipline and journal. This example is from the Journal of Transportation Engineering.

Ask a friendly UCBA Librarian!
(513) 745-5710 | ucbalibrary@ucblueash.edu | Muntz 113

---

Detecting Unsafe Roadways with Spatial Statistics: Point Patterns and Geostatistical Models

Paul J. Ossenbruggen¹; Ernst Linder²; and Belinda Nguyen³

Abstract: A detection scheme that has been used to identify roadways with the most severe safety needs. It is based on the null hypothesis that the occurrence rates throughout the entire study area are the same or that the areas, they are predicted with a geostatistical model. If the hypothesis is rejected, safety improvement measures are needed. The results from alternative analyses—-one using vehicle mile traveled and another using population as measures of traffic exposure—are conducted and compared. The state of New Hampshire is used in a case study. The effects of analyzing areas with small traffic exposures, the so-called “small-area estimation” problem, and the aim to develop a data-driven detection that meets the requirements as an effective decision-making tool are discussed.

DID YOU NOTICE? Info about authors… found at beginning or end of article.

Title of article and author(s)

1. ABSTRACT briefly summarizes article and can help you quickly determine if it addresses your topic.

2. PROBLEM OR INTRODUCTION gives background information and authors’ purpose for study. The research question is usually near end of section.
Method

Conceptually, identifying a hazardous road is a straightforward process. Simply, if the crash rate is significantly higher than an "unsafe" or "hazardous," otherwise, a critical determination can be made. Since no safety standards exist and crash rate estimates for small areas can be unstable, we use a more complex method of

3. METHOD explains how experiments were conducted and who/what was studied.

<table>
<thead>
<tr>
<th>Table 5. Manchester, New Hampshire</th>
</tr>
</thead>
<tbody>
<tr>
<td>P value</td>
</tr>
<tr>
<td>9 × 10</td>
</tr>
<tr>
<td>15 × 10</td>
</tr>
<tr>
<td>32</td>
</tr>
<tr>
<td>308</td>
</tr>
<tr>
<td>685</td>
</tr>
<tr>
<td>614</td>
</tr>
<tr>
<td>1,326</td>
</tr>
</tbody>
</table>

Discussion

The policies and procedures presented in this paper are based on an objective crash analysis tool attempt to overcome the problem by using the following techniques:

- Marked point patterns modeling to simultaneously estimate reliable nonfatal and fatal crash rate parameters;
- Geostatistical modeling to estimate the population and VMT—our risk exposure measures—at a crash location where exposure is typically unknown; and
- Hypothesis testing to identify areas that exhibit higher than expected number of nonfatal and fatal crashes based on state-wide data.

The problem of dealing with rare random crash events by testing. When the probability of \( \alpha = 0.01 \), virtually the entire rural hazardous for fatal crash risk. This is the combination of a small farm or small traffic volume, is expected to be realized in a risk ranking detection scheme is that it is data-driven and free of preconceived notions as to where hazardous conditions exist to where resources should be spent. Another advantage is the difficulties associated with the

4. DISCUSSION explains experiment results, what they mean, and how study contributes to existing knowledge on topic.

Conclusions

This paper offers an objective method to evaluate crash risk that eliminates the use of point estimates and addresses the uncertainties associated with the analysis of small areas. In order to satisfy the demand for identifying dangerous roadways and intersections, a fine grid of one-square mile blocks was constructed. Estimating crash rates with these conditions—small areas and small counts—is a textbook example of a "small-area parameter estimation" problem. Our performance-based crash analysis tool attempts to overcome the problem by using the following techniques:

- Marked point patterns modeling to simultaneously estimate reliable nonfatal and fatal crash rate parameters;
- Geostatistical modeling to estimate the population and VMT—our risk exposure measures—at a crash location where exposure is typically unknown; and
- Hypothesis testing to identify areas that exhibit higher than expected number of nonfatal and fatal crashes based on state-wide data.

The problem of dealing with rare random crash events by testing. When the probability of \( \alpha = 0.01 \), virtually the entire rural hazardous for fatal crash risk. This is the combination of a small farm or small traffic volume, is expected to be realized in a risk ranking detection scheme is that it is data-driven and free of preconceived notions as to where hazardous conditions exist to where resources should be spent. Another advantage is the difficulties associated with the

5. CONCLUSION discusses importance of research and possible paths for future research.

DID YOU NOTICE?

Data from study can be included.

References


