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Assignment 3: Crime Analysis

Salleh, S.A., Mansor, N.S., Yusoff, Z. & Nasir, R.A. 2012, "The Crime Ecology: Ambient Temperature vs. Spatial Setting of Crime (Burglary)", *Procedia - Social and Behavioral Sciences,* vol. 42, pp. 212-222.

The purpose of this paper is manifold. The main research problem is to assess the relationship between ambient air temperature and burglaries in an urban tropical climate, however the authors also intend to investigate the potential of remote sensing and GIS analysis for crime analysis in Malaysia. The authors assert that prior to their study GIS and remote sensing has not been widely used in the country to analyze and map crime data.

The logic of the author's main argument is that stress and discomfort are significant contributing factors to crime. For their study they apply this logic to ambient air temperature. The authors claim that high ambient air temperatures are the cause of stress and discomfort and therefore will be correlated with high levels of crime.

The authors separated their analysis into three phases. Phase one consisted of data compilation. To research this issue the authors compiled data from local Malaysian authorities such as the Malaysia Royal Police Department, the Shah Alam Local Council, the Malaysia Meteorlogical Department, Alam Sekitar Malaysia, and the International Research Centre on Disaster Prevention. The data was then organized, analyzed, and displayed using Excel, Access, and ArcGis leading into phase two. Phase two contained the preparation of the data in ArcGis for further analysis. Their surface temperature data was in a raster format which they performed surface interpolation (or kriging) on to create a continuous temperature surface from which the relation to crime could be analyzed. The crime data was compiled into vector files and then into a scalable geodatabase which the final analysis was performed with. In the third phase the author's analyzed the vector data in four steps and the temperature and crime data in two steps. First, they mapped the raw distributions of crime from 2007-2009 to identify initial spatial trends. They then organized raw totals of crime by month on a graph to identify initial temporal and meteorological trends. Third, to statistically analyze the

spatial distribution of their crime data the authors did a nearest neighbour analysis of each year. Finally, they used a hot spot analysis to find statistically significant clusters of crime on a map. Using the temperature and crime data the authors conduct a linear regression creating a graph of the results. They then overlay the 2009 crime data with the temperature surface they created using spatial interpolation earlier in their methods.

The methodological approach utilized is very basic and a more advanced analysis could offer deeper insight into the phenomenon. The linear regression the researchers performed returned an r^2 value of .436 indicating that a significant amount of variability in the incidence of crime in the area is not explained by ambient temperature alone. However, there is a strong relationship between higher temperatures and crime. Considering this I would suggest performing a multiple regression which aside from identifying other contributing factors could be used to assess their hypothesis that heat causes stress and discomfort leading to crime. The alternate hypothesis which was briefly introduced, that warmer days often cause people to leave their homes opening opportunity to criminals seems more likely than the main hypothesis introduced by the research team. Using a multiple regression could offer insight into which is correct.

The main evidence in support of the authors argument that high ambient air temperature leads to high crime rate is the correlation found through the linear regression performed in the analysis. The authors found an r^2 value of .436 for this correlation which is significant as it accounts for almost half of the variability in the crime data. However, there are many issues with the analysis carried out by the research team and while it is clear there is a relationship between air temperature and crime, the claim that it is due to discomfort and stress does not seem plausible based on the evidence.

There were many areas in the paper that could have been improved. The format of the article made it very difficult to see the maps the authors produced even when zoomed in. The units the crimes were in was never explained. The paper is clearly a poor translation with many grammatical errors. The map of the temperature surface had the raw totals of crime in 2009 overlaid instead of the hotspot map the team had produced and did not offer much in terms of analysis. The hotspots would have offered deeper insight into the relationship between crime and heat on the map. Finally,

the sample size is too small to find significant trends as is clear by the initial crime/month plot. Due to these many issues and shortcomings I would rate this article 5/10.