

Light Pollution Final Project Proposal

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I. *Background:*

To what extent is light pollution affecting insomnia in certain populations?

Light pollution describes any excessive or poor use of artificial light. Some phenomena that we call light pollution include light trespass, over-illumination, and light clutter that floods the night sky. These phenomena are mostly easily observed as a glow in the sky after the sun has set in large cities; however, they may also occur in more remote regions well pollution alters our view of the night sky, has environmental impacts, and affects our health and safety. In recent years, the issue of light pollution has gradually come to the attention of people, adding to substantial problems and climate change. While it mostly affects migration patterns in animals, it affects humans by disrupting our circadian rhythm. While many have acclimated to the change in lighting depending on region, the consequences of light pollution on humans predominantly increase insomnia, depression, and cancer. When artificial light is used incorrectly or excessively, it not only wastes energy but also threatens the survival of humans, animals, and even plants.

Community officials or local groups may implement intervention strategies to mitigate the negative effects of light pollution. However, has both positive and negative effects that impact different locations and different populations in different ways. Now, we can use this data to hopefully amylase the effect of light pollution on different communities in an international scope. As a result, we aim to provide some data-driven guidance and prediction of ligh pollution and its effect on insomnia.

II. *Question:*

Utilizing a case study of New York, does light pollution (IV) affect insomnia (DV) in metropolitan and rural adults? To what degree?

III. *Data Utilization and Methods:*

A. Light Pollution Map

1. Scrape light pollution data filtered for New York City and Metro Boroughs
 - a) Determine high metro areas based on indicators of pop. density
2. Scrape light pollution data filtered for everything but New York City in New York State
 - a) Determine rural locations using rural indicators like forest cover rate etc.

B. CDC Behavioral Risk Factor Surveillance System (BRFSS)

1. Scrape data containing adults suffering from insomnia by state

C. Create a linear regression model to analyze the relationship between insomnia and differing populations.

1. Also, include a model to calculate the prediction of insomnia due to increasing light pollution.
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IV. Methods we aim to employ

Data Wrangling: Including removing invalid data, standardizing the coordinate system, calculating the number of light pollution by province and unit area, and separating the data between rural and metropolitan populations.

Multiple Visualizations: Use maps to show the distribution of light pollution and the distribution of insomnia across the state. Time series graphs to track the trend of light pollution in each region as time progresses (predict the effect on insomnia as well)

Text Analysis Component: Collect policy documents or research reports on light pollution, use text analysis tools to extract keywords, and identify common intervention measures and policy language to guide our prediction models.

Machine (Statistical) Learning Component: Apply a linear regression model or a classification model to predict changes in light pollution in different areas based on light pollution data, land types, population density, and other variables.

V. Success:

Understanding the Relationship:

Demonstrate the relationship between light pollution (independent variable) and insomnia prevalence (dependent variable) across metropolitan and rural populations in New York. This includes identifying the degree of impact and key contributing factors.

Accurate Modeling and Prediction:

Develop a reliable linear regression model or classification model that can predict insomnia rates based on light pollution levels, population density, and other relevant variables. The model should be validated with sufficient accuracy and robustness to provide actionable insights.

Actionable Insights for Intervention:

Propose well-informed, data-driven intervention strategies to mitigate light pollution and its effects on insomnia. These strategies should be grounded in the analysis and capable of being adapted to various geographic and demographic contexts.