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Subject
Proposal for "Walking in a College Town: A Spatial Analysis of Pedestrian Safety in Ames, Iowa"

Dear Professor Seeger,

I am writing to submit a formal proposal for my final project in CRP 5580, titled "Walking in a College Town: A Spatial Analysis of Pedestrian Safety in Ames, Iowa." This project will present a series of web maps and dashboards to examine how pedestrian infrastructure and activity patterns relate to safety in Ames through spatial analysis and visualization.

Abstract
This project presents a series of maps and dashboards to analyze pedestrian safety and walkability in Ames, Iowa, which is a college town with high pedestrian activity. Using open-source spatial data, including pedestrian crash records (2021–2025), road networks, sidewalks, crossings, and points of interest from OpenStreetMap such as shops and parks, the study explores how infrastructure and activity patterns relate to pedestrian risk. Spatial indicators such as intersection density, sidewalk and path coverage, and accessibility to key destinations will be developed and compared with crash patterns. A composite pedestrian safety index will be created to highlight spatial variations across the city. The final product will show multiple map layers and visualizations about pedestrians' safety.

Overview
Pedestrian safety is a critical component of urban livability, particularly in cities with high levels of walking activity such as college towns. Ames, home to Iowa State University, provides a unique environment where large numbers of students and residents rely on walking

as a primary mode of transportation. Based on the data released by Iowa State University enrollment office, every semester there are around 30,000 students enroll in class [1] which occupied around half of Ames population, 66,427[2] which was reported by Census Bureau on 2020. This led to interaction between pedestrians and vehicles. Therefore, it's important for us to explore and reduce this type of potential risk.

This project aims to examine pedestrian safety and walkability in Ames using spatial analysis and web-based visualization techniques. The study will integrate last five years pedestrian crash data with geographic information derived from OpenStreetMap, including road networks, sidewalks, crossings, and key destinations such as schools, parks, and commercial areas. These datasets will be used to develop spatial indicators representing both pedestrian infrastructure and activity patterns, such as intersection density, sidewalk and path availability, and proximity to destinations.

A highlight of this project is the development of a composite pedestrian safety index. This index will combine multiple spatial factors, including infrastructure characteristics and crash patterns, to identify areas of higher and lower pedestrian safety.

The outcome will consist of a set of interactive maps and dashboards that allow users to explore different aspects of pedestrian safety. Separate map layers will highlight walkability, crash locations and severity, and overall safety patterns.

Technology

For this project, R studio, QGIS or ArcGIS Pro, Tableau proposed to be used.

Data

There are three main types of data sources that will be used.

1. Pedestrian crash data (2021-2025) [3]
2. Sidewalks, roads, crossing roads, bus stops etc. from Open Street Map [4]
3. Population data [2], from United States Census Bureau.

Process

1. Data collection and cleaning.
2. Spatial joins
3. Calculations for different indicators such as intersection density, sidewalk coverage, crash density.
4. Aggregations and producing the pedestrian safety index.
5. Creating maps and dashboards.

Inspiration

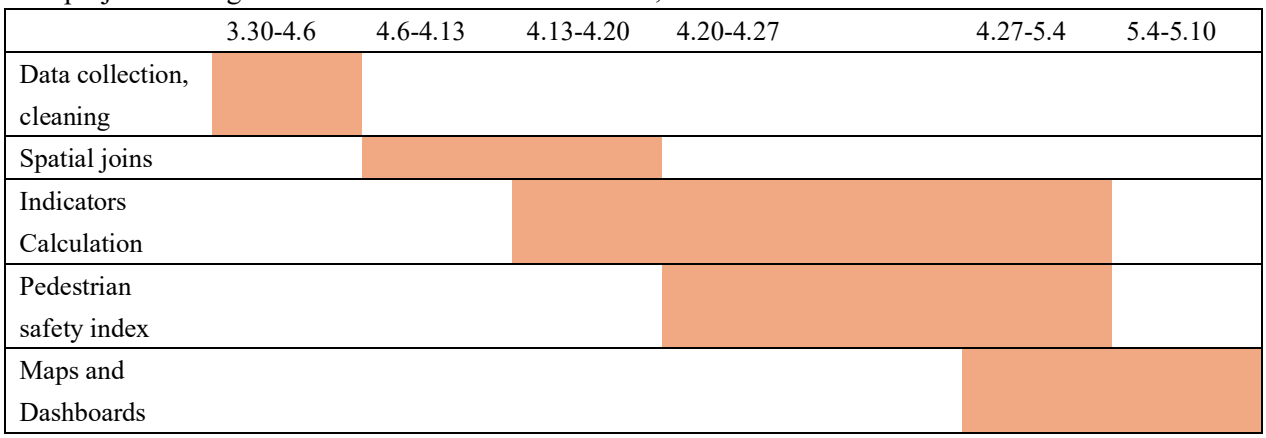
1. Pedestrian Composite, https://clfuture.org/atlas-maps/pedestrian-composite-heatmap
2. William Edmisten, Measuring Walkability with Openstreetmap and Isochrone Maps, https://wcedmisten.fyi/post/isochrone-walkability/

Challenges

1. There are lots of trails, parks, bus stops and shops in Ames, and some places have bike lanes as well. It will be a challenge when creating index, how to assign the weights for the different variables, which variables we have to include which can be dropped.
2. OSM data may be incomplete or inconsistent for sidewalks and crossings which will affect the accuracy of model results.
3. Integrating multiple datasets from different sources may present challenges due to differences in spatial scale, format, and data quality.

Timeline

This project is designed to be finished within six weeks, and scheduled as below:



Note:
ChatGPT was used to fluent the paragraphs, check the grammar and give me ideas what story needs to be told in project overview.

Reference

[1] Iowa State University, office of registrar, https://www.registrar.iastate.edu/faculty-staff/data-systems/enrollment-stats accessed on Apr 1st, 2026.
[2] United States Census Bureau, https://www.census.gov/ accessed on Apr 1st, 2026.
[3] Iowa DOT. https://public-iowadot.opendata.arcgis.com/search?tags=Crash accessed on Apr 1st, 2026.
[4] Open Street Map, https://www.openstreetmap.org/ accessed on Apr 1st, 2026.

Yours sincerely,

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