CSML (AI 395T) Fall 2024

Final project proposal

Machine Learning Project Proposal: Optimizing Rural Broadband Deployment with RDOF Data

1. Introduction

The Rural Digital Opportunity Fund (RDOF) is a significant United States Government initiative monitored and run by the Federal Communications Commission (FCC). It is aimed at bridging the digital divide in the United States. As part of this initiative the FCC has earmarked $20.4 billion fund to bring high speed fixed broadband service to rural homes and small businesses that currently don't have access to high-speed internet. The fund was established in 2020. This project proposal outlines a machine learning approach to leverage RDOF data for optimizing rural broadband deployment. By applying advanced analytics to this rich dataset, I aim to provide valuable insights that can enhance the effectiveness of broadband expansion efforts.

2. Project Objectives

The primary objective of this project is to develop predictive models that can inform strategic decisions in rural broadband deployment.

It is possible that there are secondary benefits from this project that could identify potential gaps and opportunities in current RDOF implementation plans

3. Proposed Machine Learning Applications

3.1 Broadband Deployment Prediction

I propose to develop a model to predict the most likely locations for broadband infrastructure deployment. This model will consider:

- RDOF auction results
- Demographic data
- Geographic features

- Census data

By identifying areas that may still lack coverage after initial RDOF implementation, this model can help prioritize future expansion efforts.

3.2 Economic Impact Analysis

A regression model will be developed to predict the economic impact of broadband deployment in rural areas. Factors to be analyzed include:

- Employment rates
- Business creation
- Property values
- Educational outcomes

This analysis can provide valuable insights into the broader societal benefits of rural broadband expansion.

4. Data Sources and Methodology

The project will primarily utilize RDOF auction and deployment data, supplemented by additional datasets including:

- U.S. Census demographic data
- FCC broadband availability data
- Geographic and terrain data
- Economic indicators from the Bureau of Economic Analysis

I will attempt to employ a variety of machine learning techniques, including:

- Supervised learning (e.g., regression, classification)
- Unsupervised learning (e.g., clustering)
- Ensemble methods
- Deep learning (if appropriate)

The project will follow a standard machine learning workflow:

1. Data collection and preprocessing
2. Exploratory data analysis
3. Feature engineering
4. Model selection and training
5. Model evaluation and refinement
6. Interpretation and visualization of results

5. Conclusion

This machine learning project aims to leverage RDOF data to optimize rural broadband deployment, potentially accelerating efforts to bridge the digital divide. By applying advanced analytics to this critical domain, it is my endeavor to provide valuable insights to stakeholders, ultimately contributing to more effective and equitable broadband access across rural America.