Bridge safety condition classification.

Milena Afeworki

August 7, 2021

Outlines

—

- Overview
- Objecties
- Data
- Methods
- Results
- Recommendation
- Further study

Overview

According to a new report from the American Road and Transportation Builders Association, of the more than 618,000 bridges across USA, 42% of them are at least 50 years old, more than 47,000 are in poor condition and in need of urgent repairs.
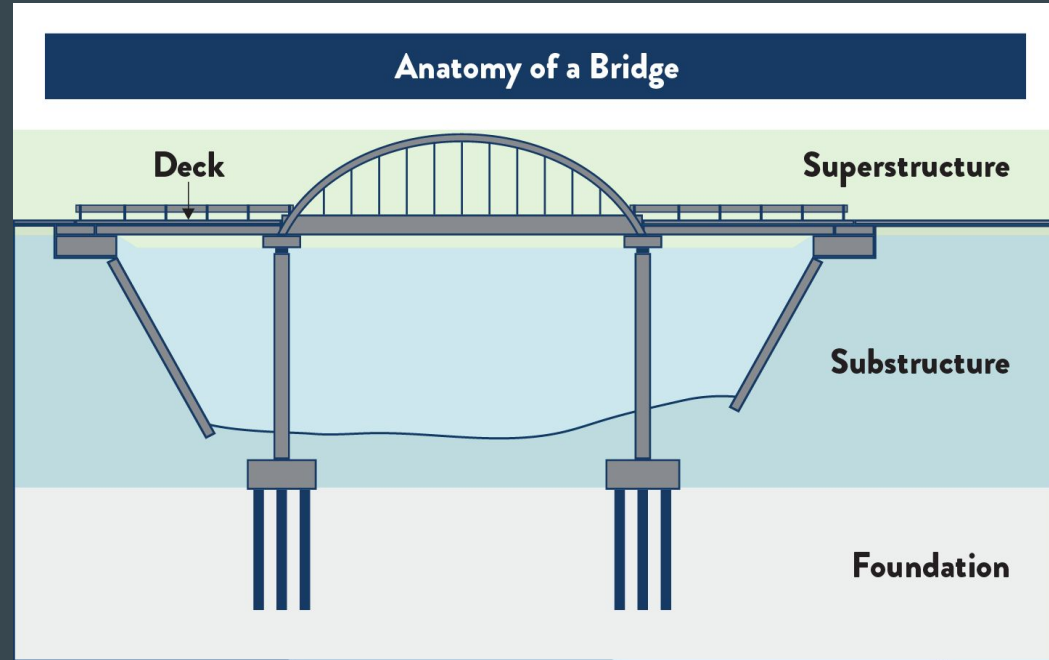
Project objective:

Build an optimum model for Predicting Bridge Condition.

Data

- 618,000 Bridges data points (LTBP - InfoBridge).
- Climate data (NASA Version 2 (MERRA-2) program).
- Bridges built as early as 1920 to late 2020.

Methods

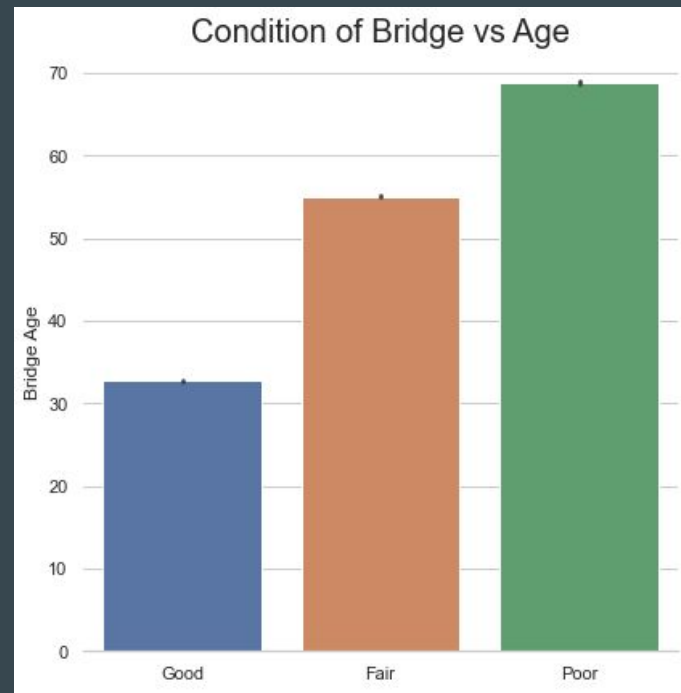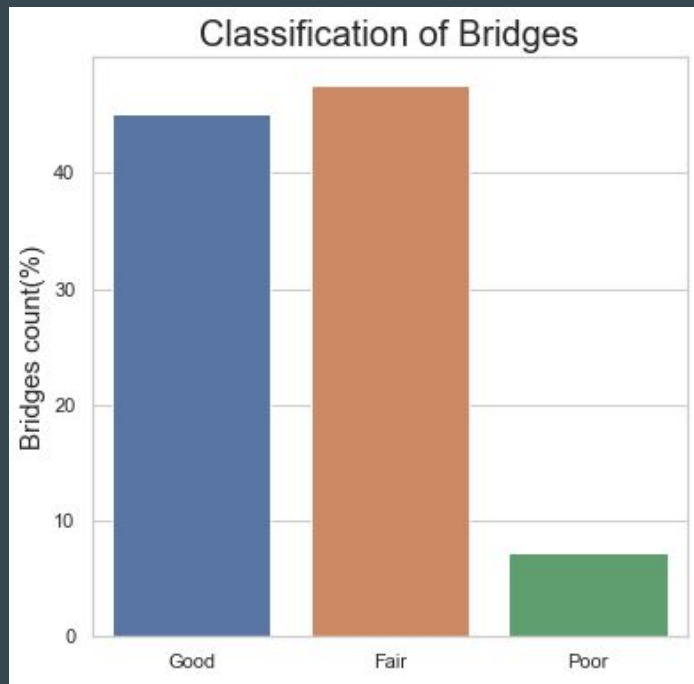| OSEMN	Modeling	Item 3
• Obtain • Scrub • Explore • Model • Interpret	• Create model • Optimization • Test Model • Interpret result	• Deployment • Streamlit

Understanding the data

Fair   - 47%

Good - 45%

Poor - 7.5%

- 42% of Poor class > 50 yrs old

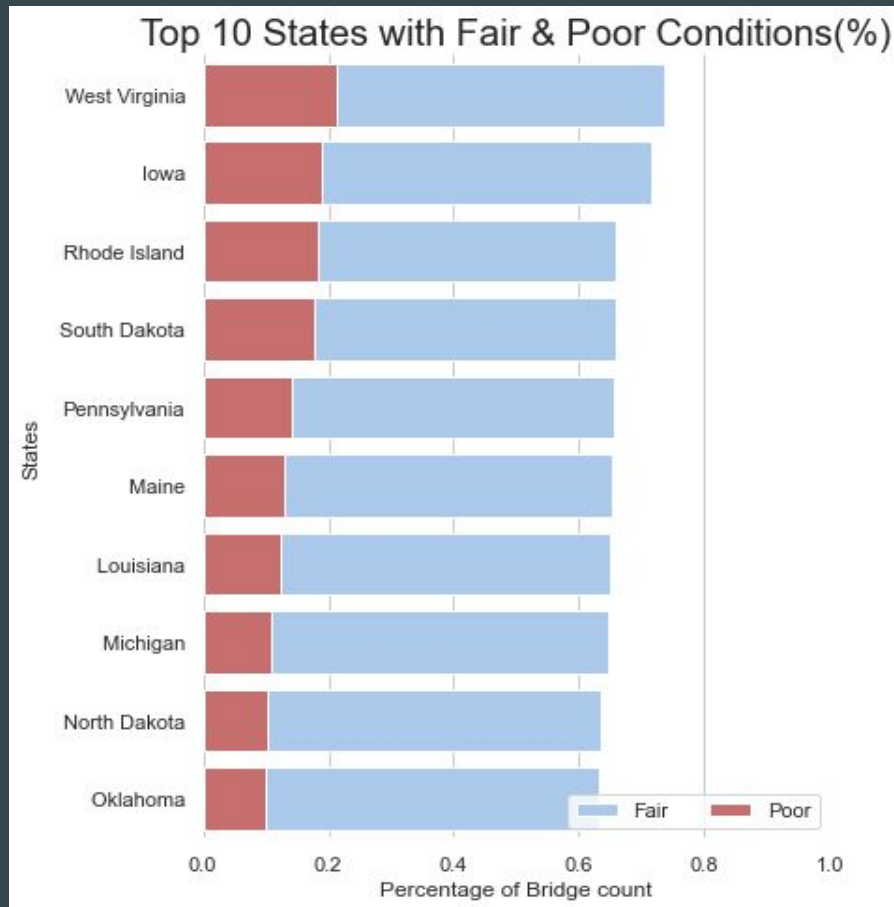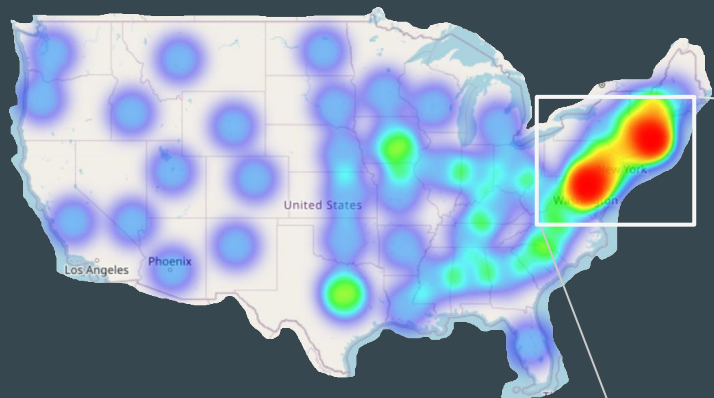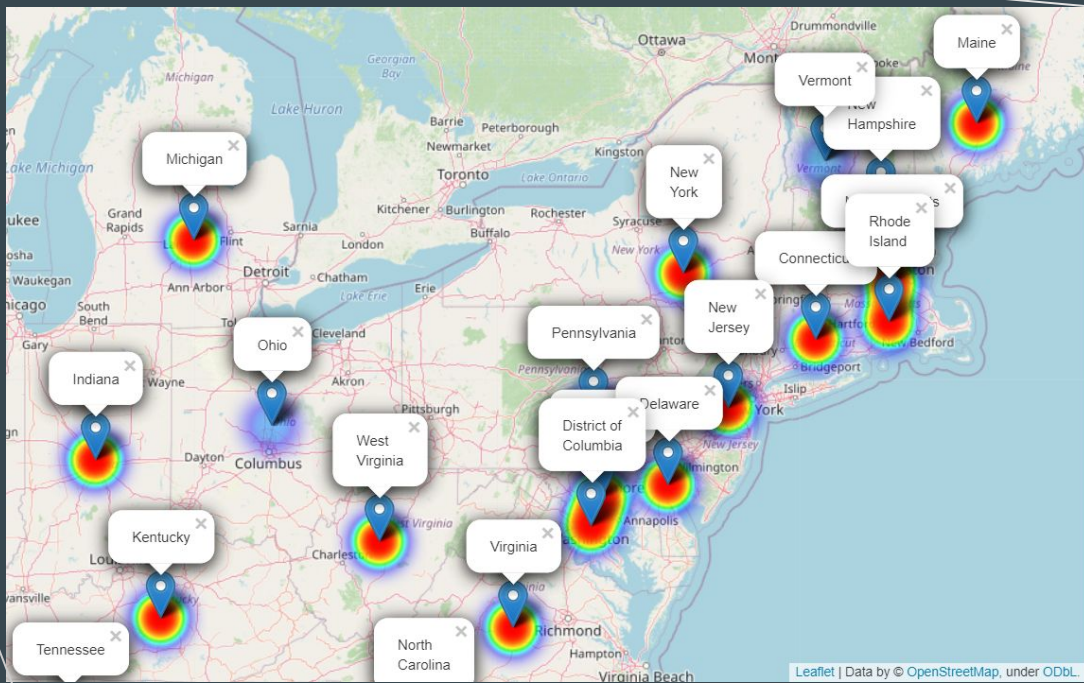# Results

West Virginia:

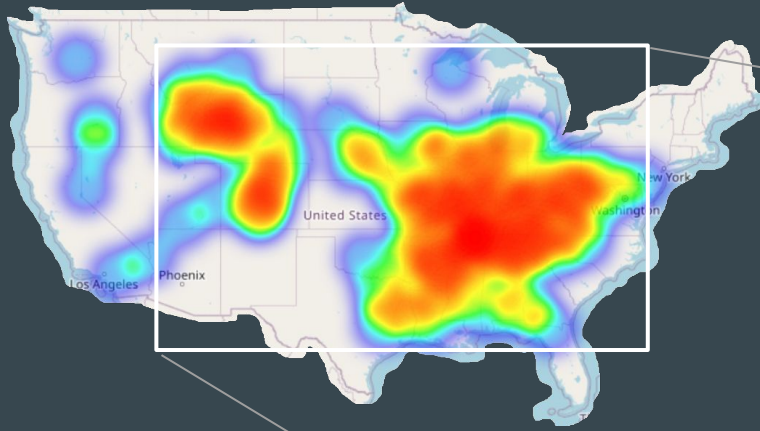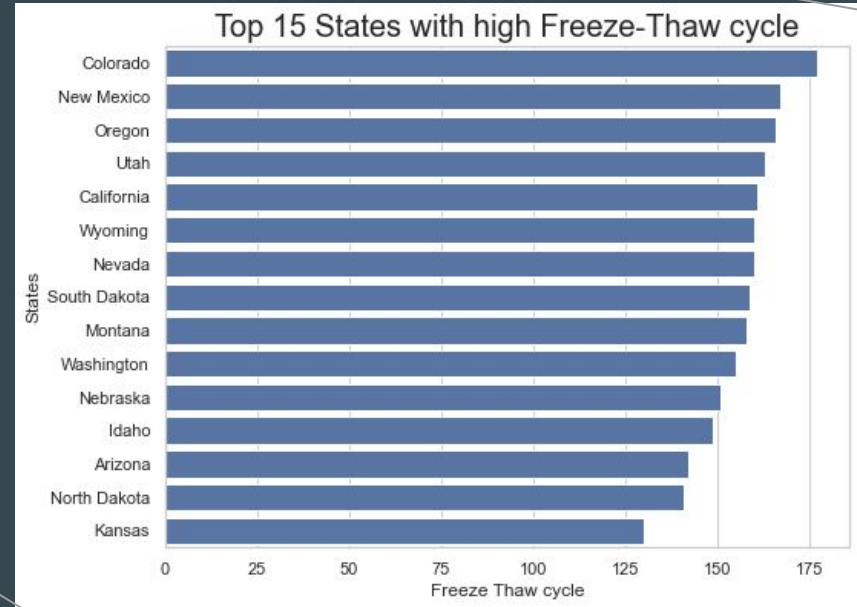- Poor - 21.2%
- Fair - 54%

Iowa:

- Poor - 19%
- Fair - 50%

Top 10 States with Fair & Poor Conditions(%)

Results

Average Bridge Condition Per State.

Results

Bridge condition in areas affected by Freeze-Thaw cycles.

Top 15 States with high Freeze-Thaw cycle

Recommendation

Model Performance

Final optimized model was able to capture and label:

- Good (77%)
- Fair   (73%)
- Poor   (41%)

Further Study

1. Investigate if past failures help identify vulnerable bridges to extreme events.
2. Explore Load rating (live load) of structure and its life span.
3. Incorporate wind load significance on long span bridges.

Thank you!

Do you have any questions?

E-mail	Github	Medium	LinkedIn
milena22peter@gmail.com	@Milenaafeworki	@milena-pa	Milena Afeworki