Predicting Structural Damage from an Earthquake

-Lhamu Tsering

Business Context
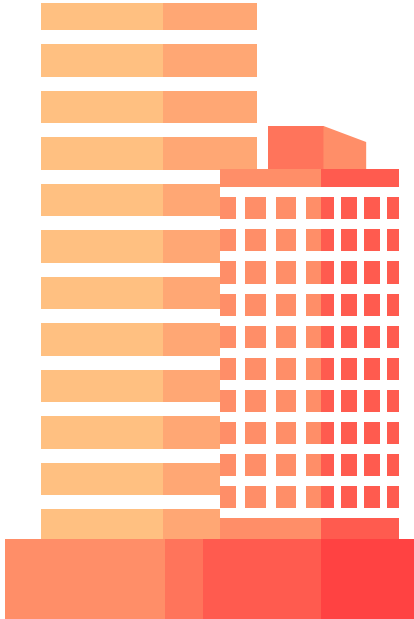
- "Earthquakes don't kill people, buildings do."

- 2015 Nepal Earthquake

- Model purpose

Process Outline

Data Collection
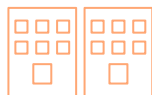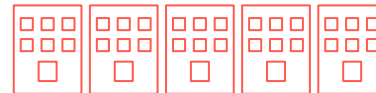
2015 Nepal
Earthquake Portal

Cleaning and EDA

Data cleaning,
Exploration and
visuals

Preprocessing

Feature Engineer,
Class Imbalance,
standardizing
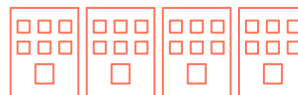
Multiclass Classification Models

Logistic Reg,
Decision Tree

Model Evaluation/ Model Selection

Evaluation Metrics
Confusion Matrix
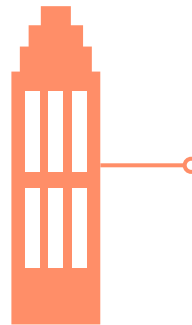
Data Introduction

2015 Earthquake Nepal Data Portal

- Building Use (762106, 17)
- Building Structure (762106, 31)
- Building Damage(762106, 12)

Feature assembly

- Building Location
- Superstructure make up
- Geotechnical risk
- Secondary use info
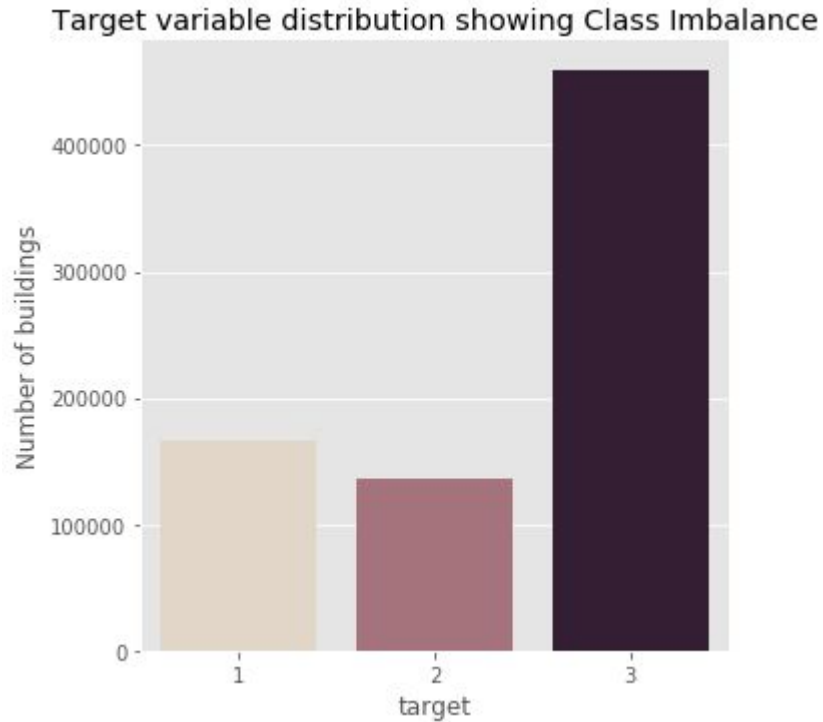- Other building construction properties
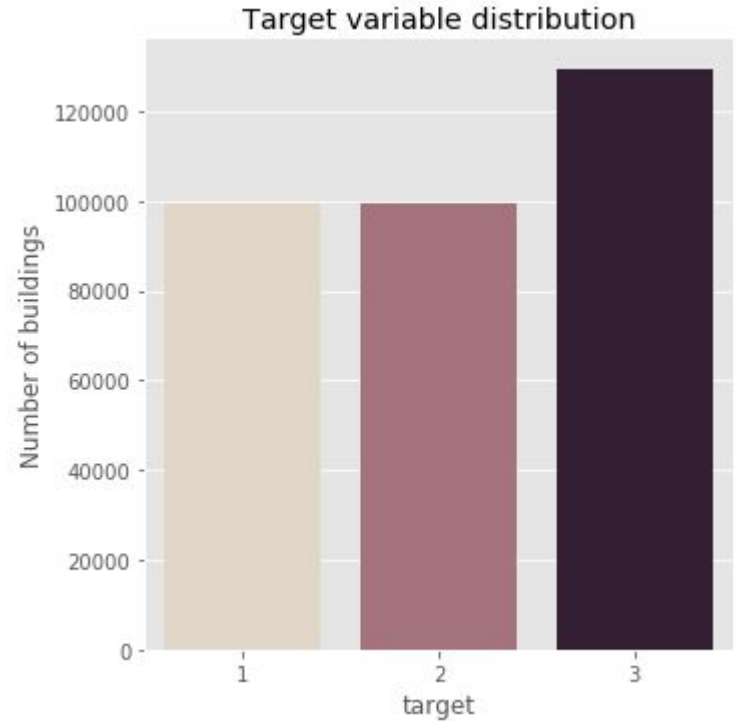
Target variable

Damage grade
1 - Minor Damage
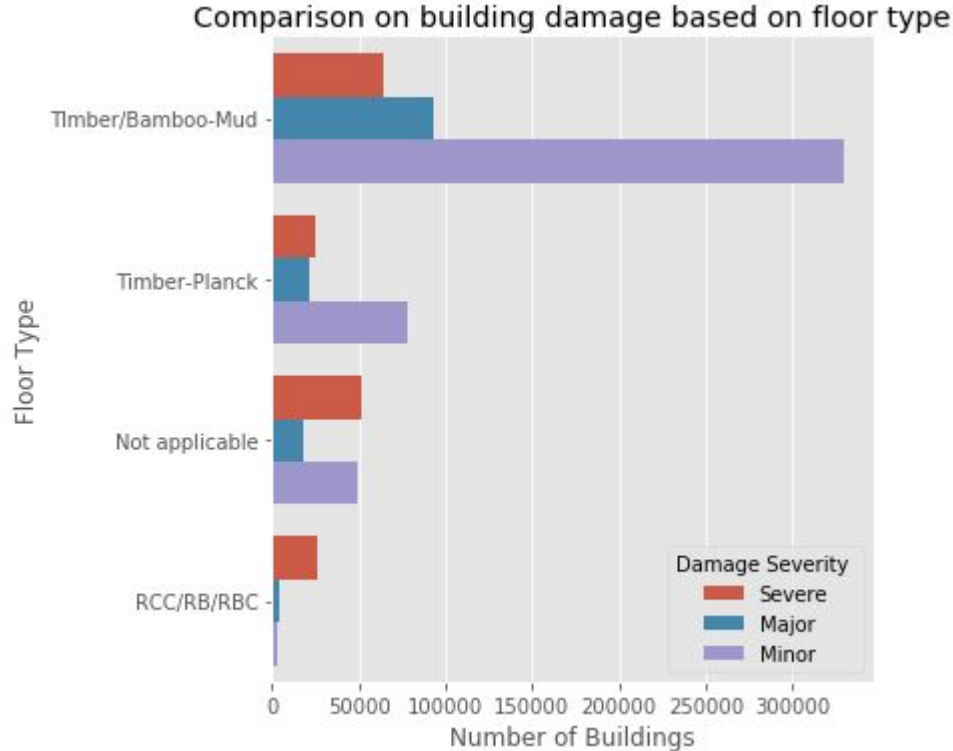2 - Major Damage
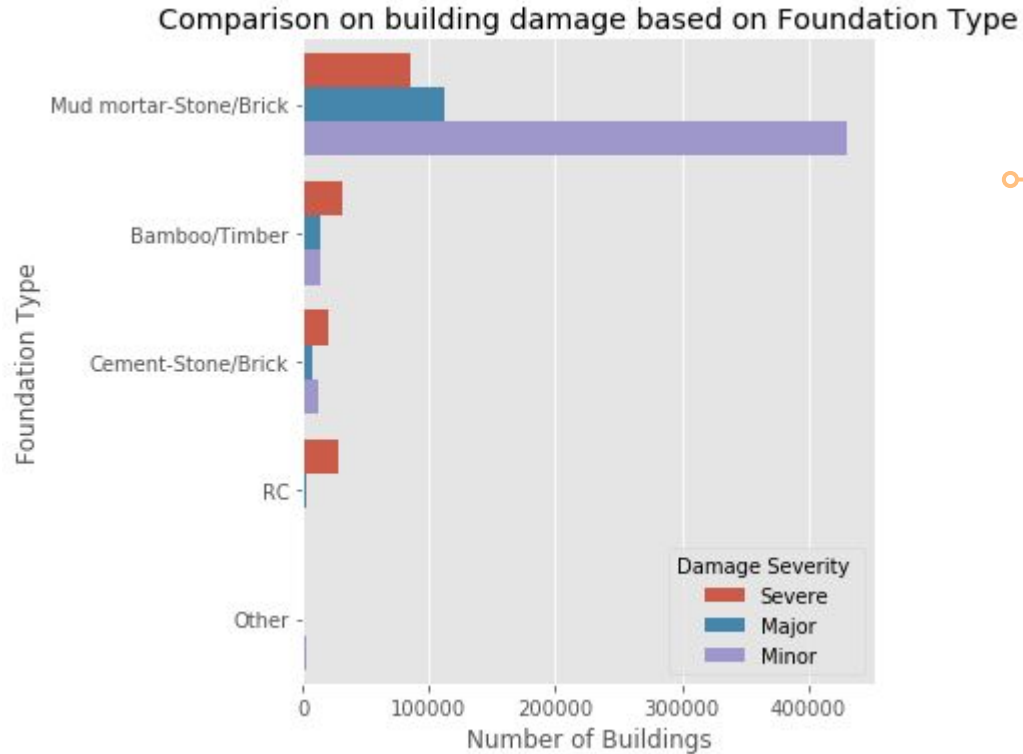3 - Sever Damage

Class Imbalance

Before Resampling

Target variable distribution showing Class Imbalance

After Resampling

Target variable distribution

Building Floor Type

Comparison on building damage based on floor type

RCC/RB/RBC floor type buildings faired better

Foundation Type

Comparison on building damage based on Foundation Type

RC foundation type buildings faired better

Roof Type

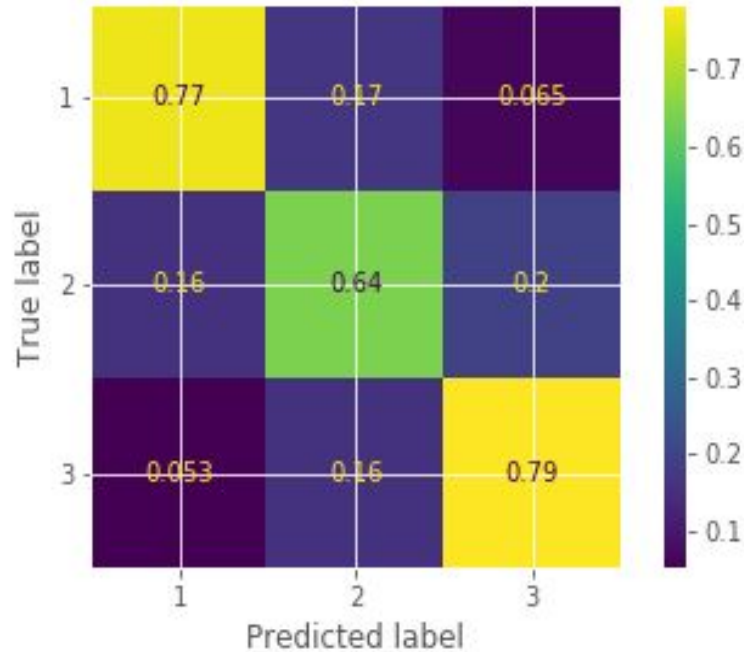Comparison on building damage based on Roof Type
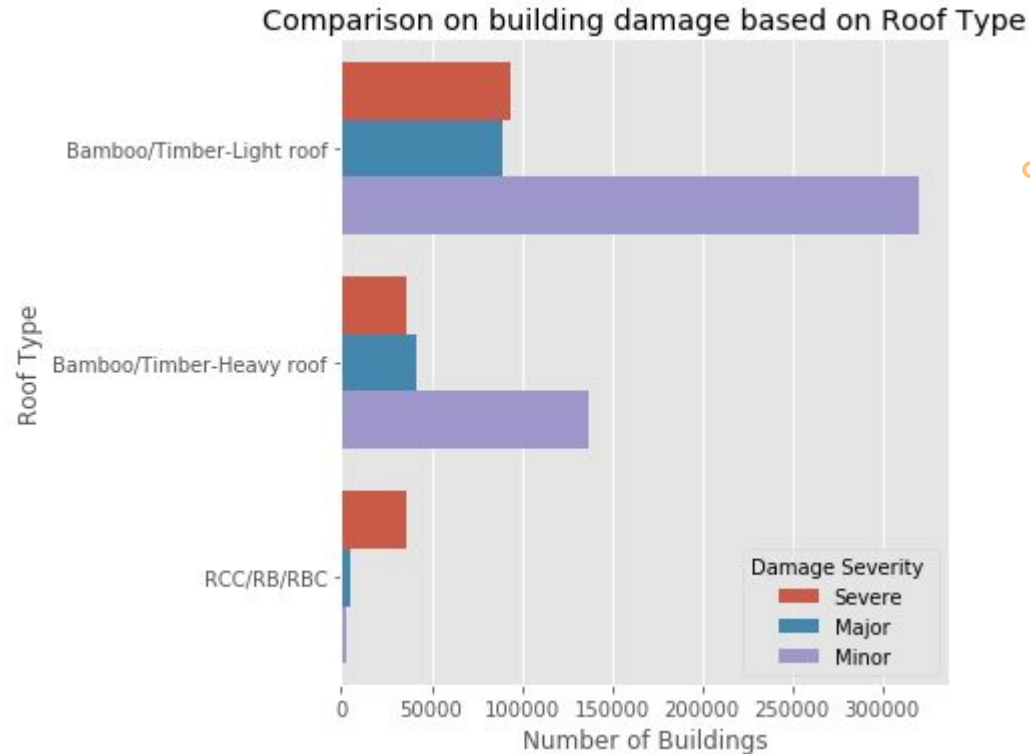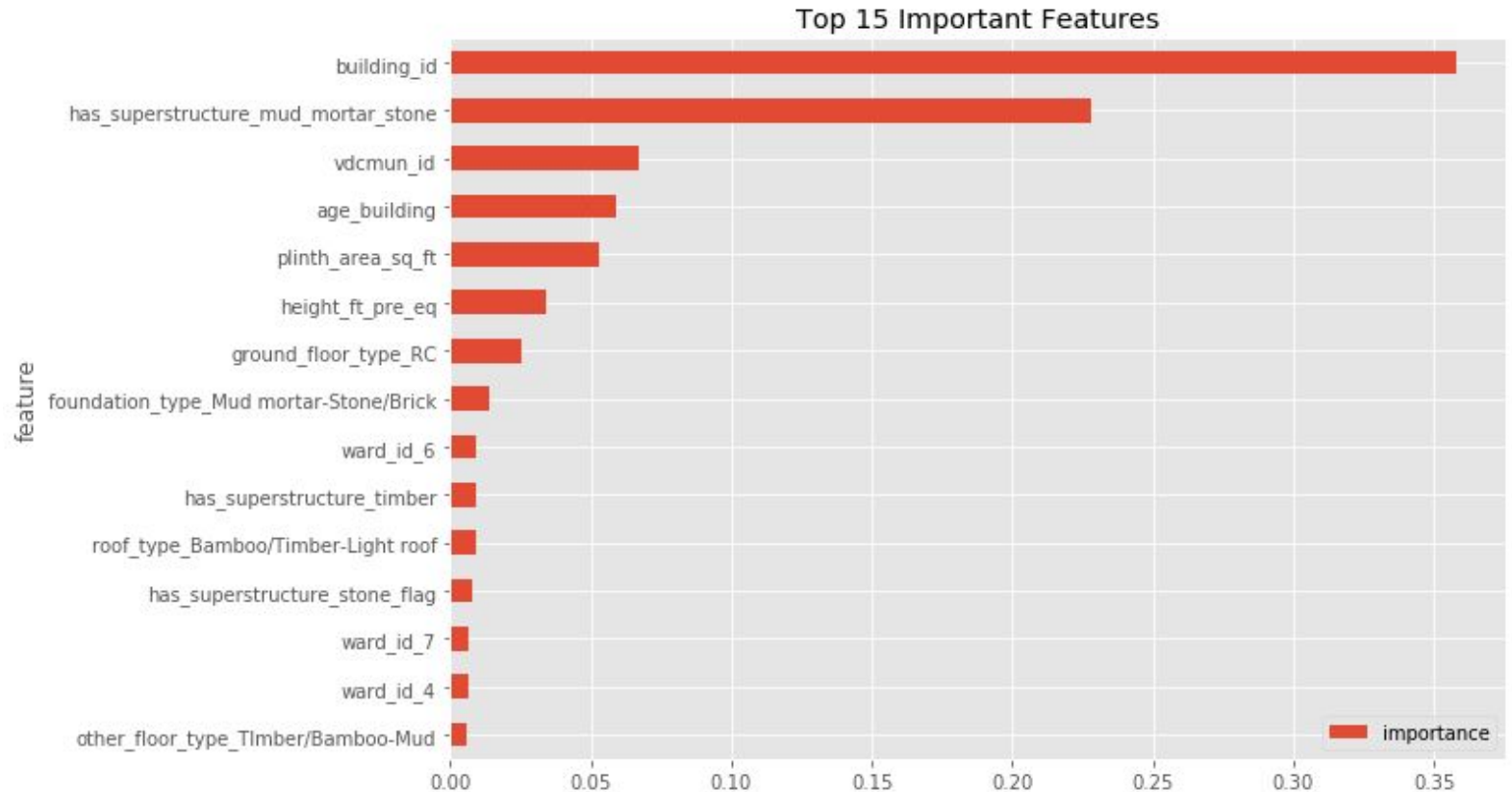
RCC/RB/RBC roof type buildings faired better

Model Results
Decision Tree Classifier

Evaluation Metric
Recall Score: 0.70
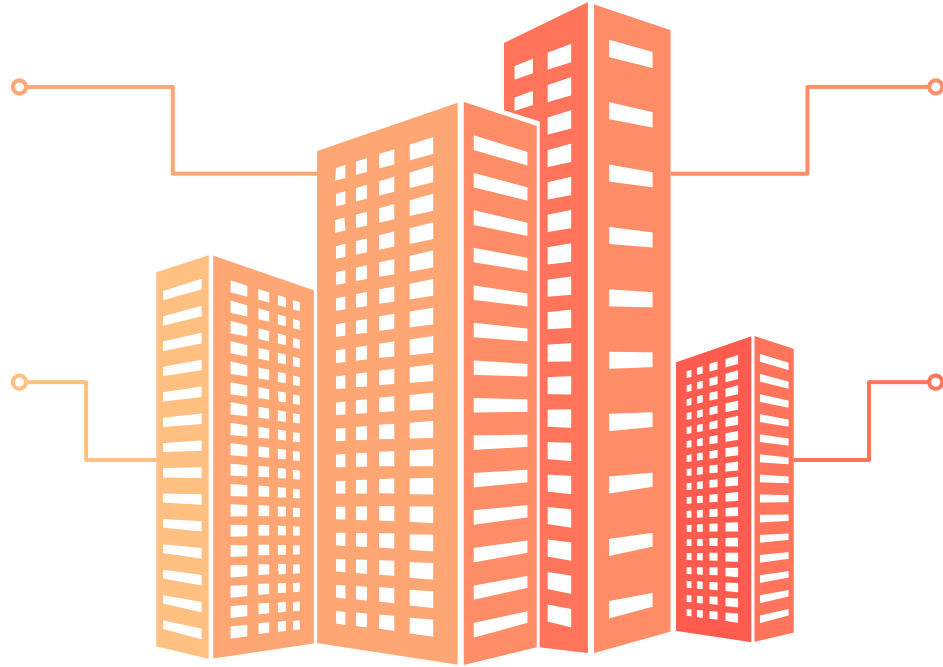
Decision Tree Model Important Features

Top 15 Important Features

Next Steps

SVM, Random Forest, XGBoost

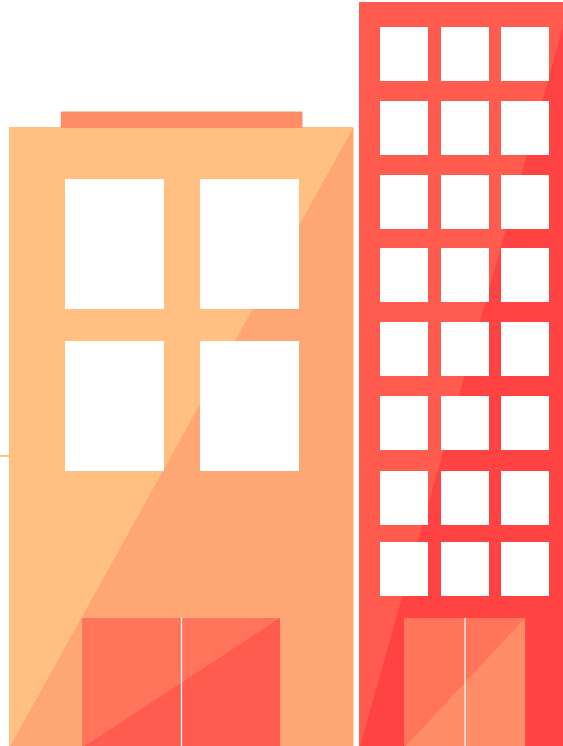Gauge the importance of location

Class Imbalance

Better Visuals

Thank You!

GitHub Repo

https://github.com/Yeshi341/structural_damage_from_earthquake

Contact

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