Predicting Structural Damage from an Earthquake

-Lhamu Tsering

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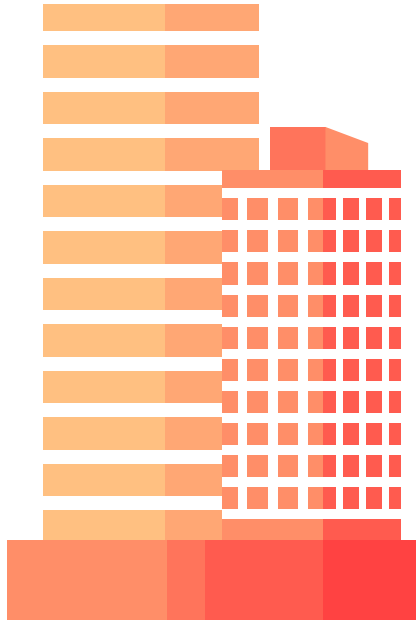
- "Earthquakes don't kill people, buildings do."

- 2015 Nepal Earthquake

- Model purpose

Process Outline

Data Collection
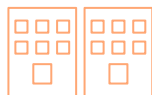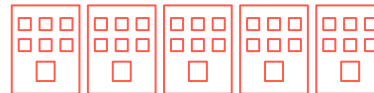
2015 Nepal
Earthquake Portal

Preprocessing

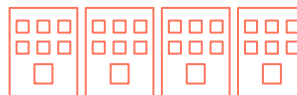Feature Engineer,
Class Imbalance,
standardizing

**Model Evaluation/
Model Selection**

Evaluation Metrics
Confusion Matrix

**Cleaning and
EDA**

Data cleaning,
Exploration and
visuals

Multiclass Classification Models

Logistic Reg,
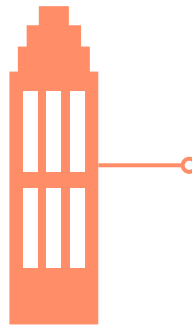Decision Tree

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
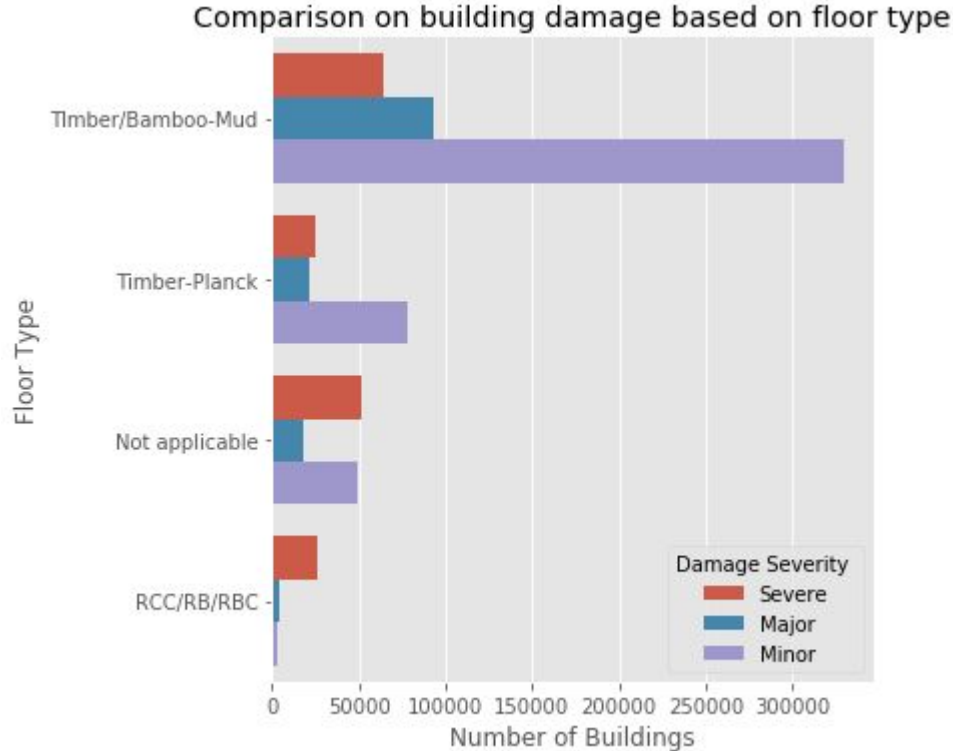- Secondary use info
- Other building construction properties
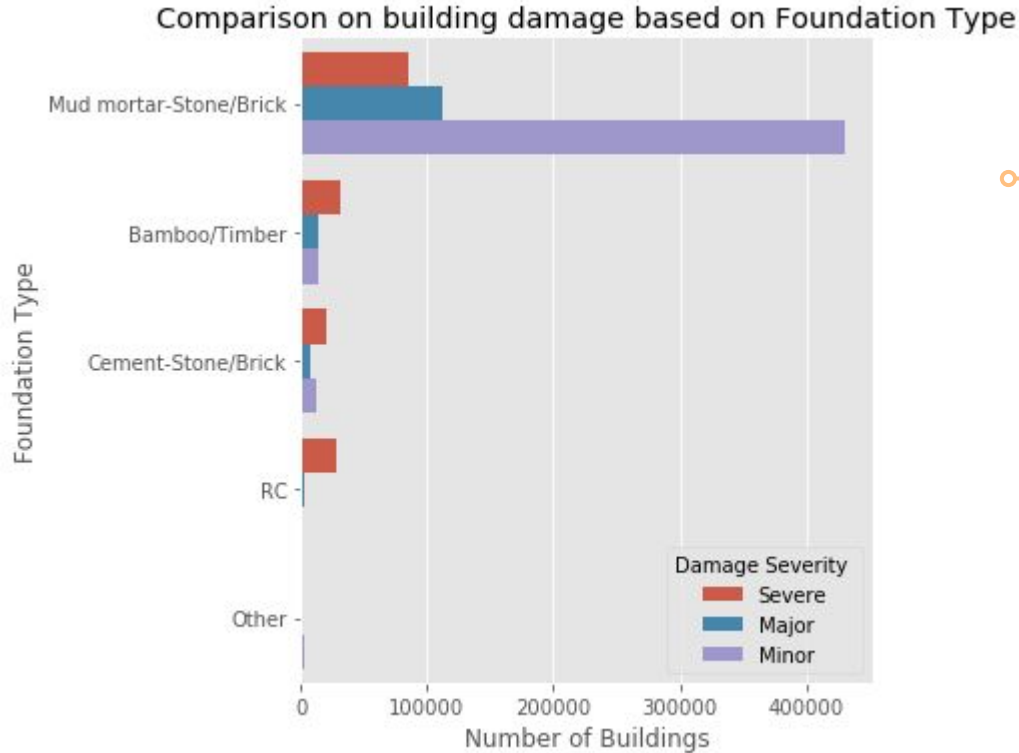
Target variable

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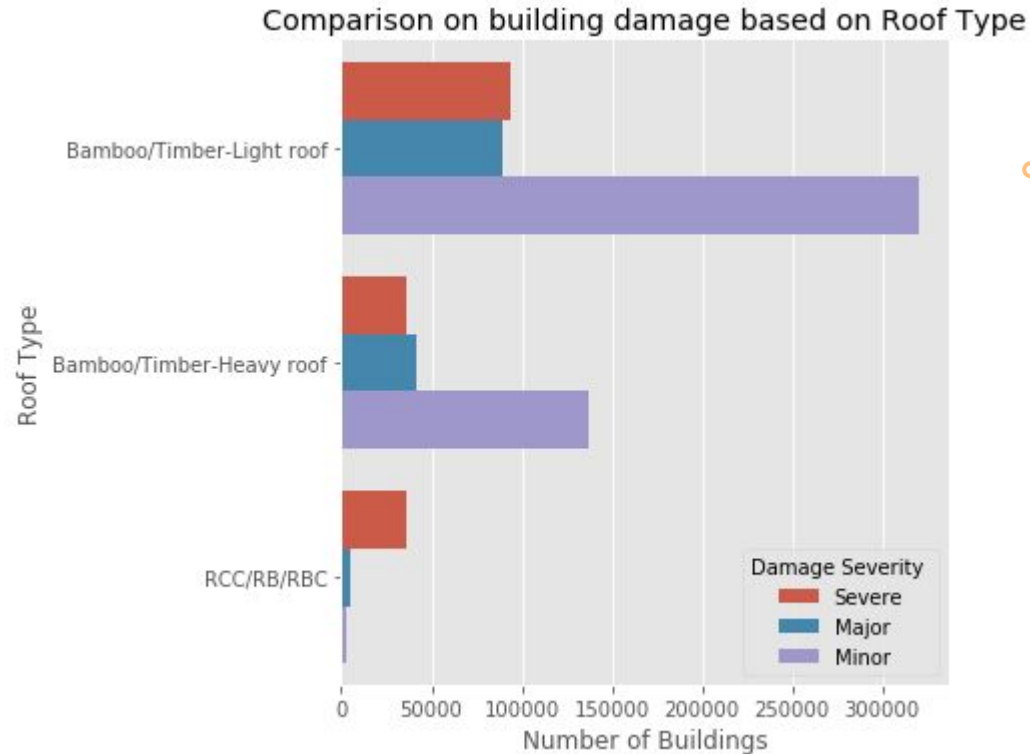2 - Major Damage
3 - Sever Damage

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

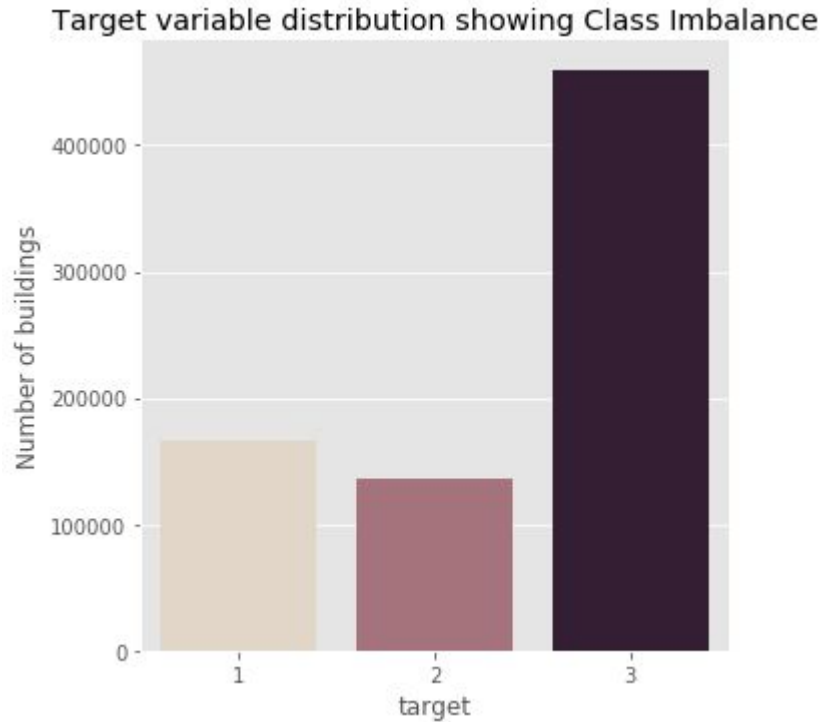# Roof Type

Comparison on building damage based on Roof Type

RCC/RB/RBC roof type buildings faired better

Class Imbalance

Before Resampling

After Resampling

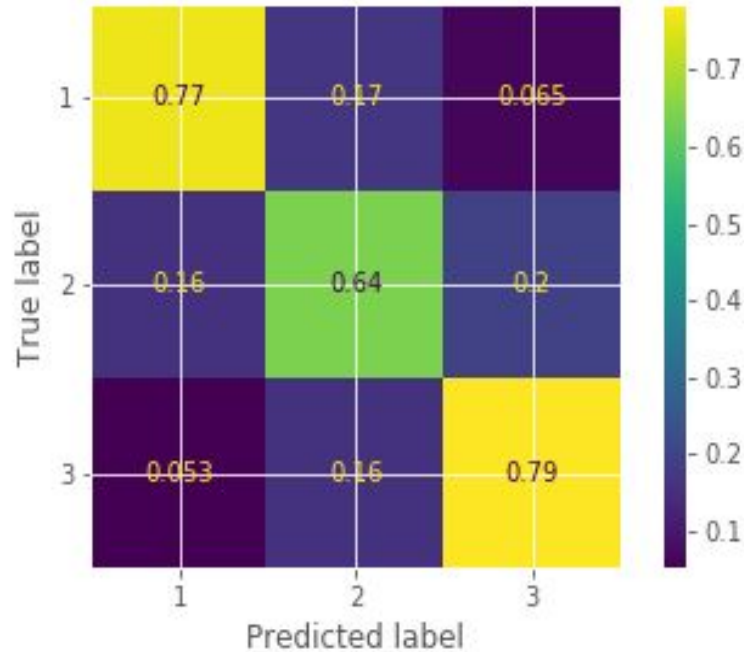Target variable distribution showing Class Imbalance

Target variable distribution
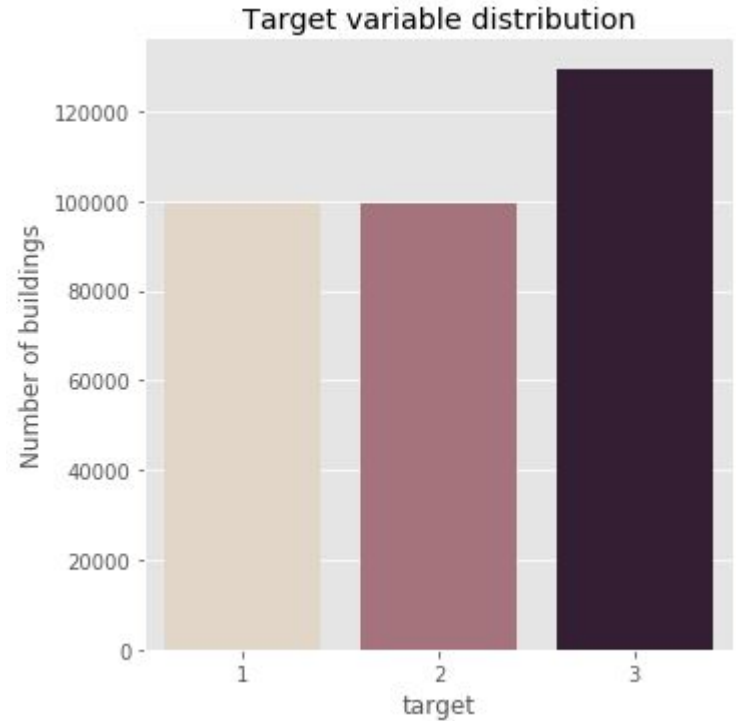
Model Results
Decision Tree Classifier

Evaluation Metric
Recall Score: 0.70

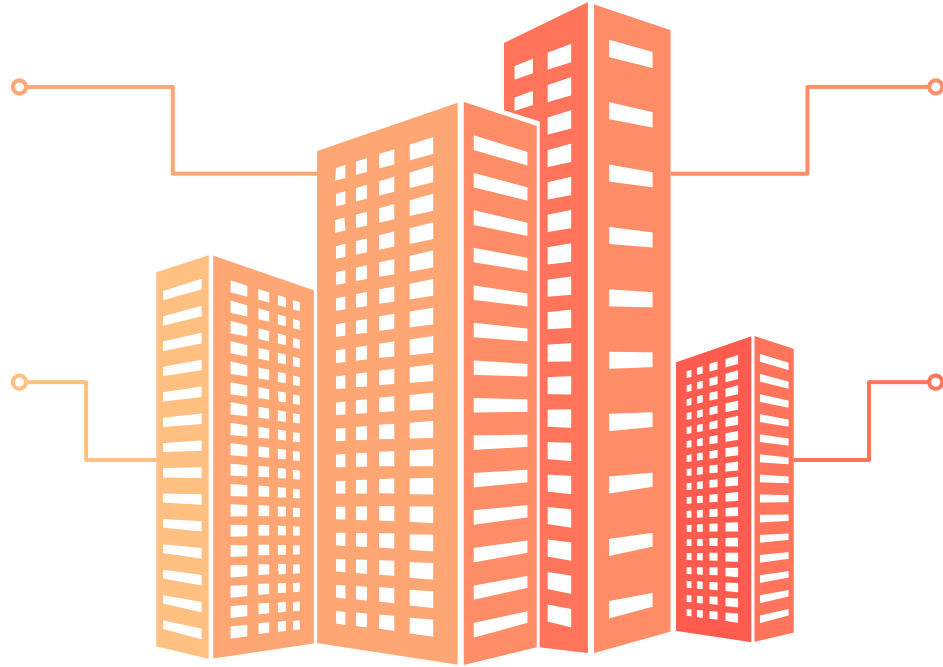# Decision Tree Model Important Features

Top 15 Important Features
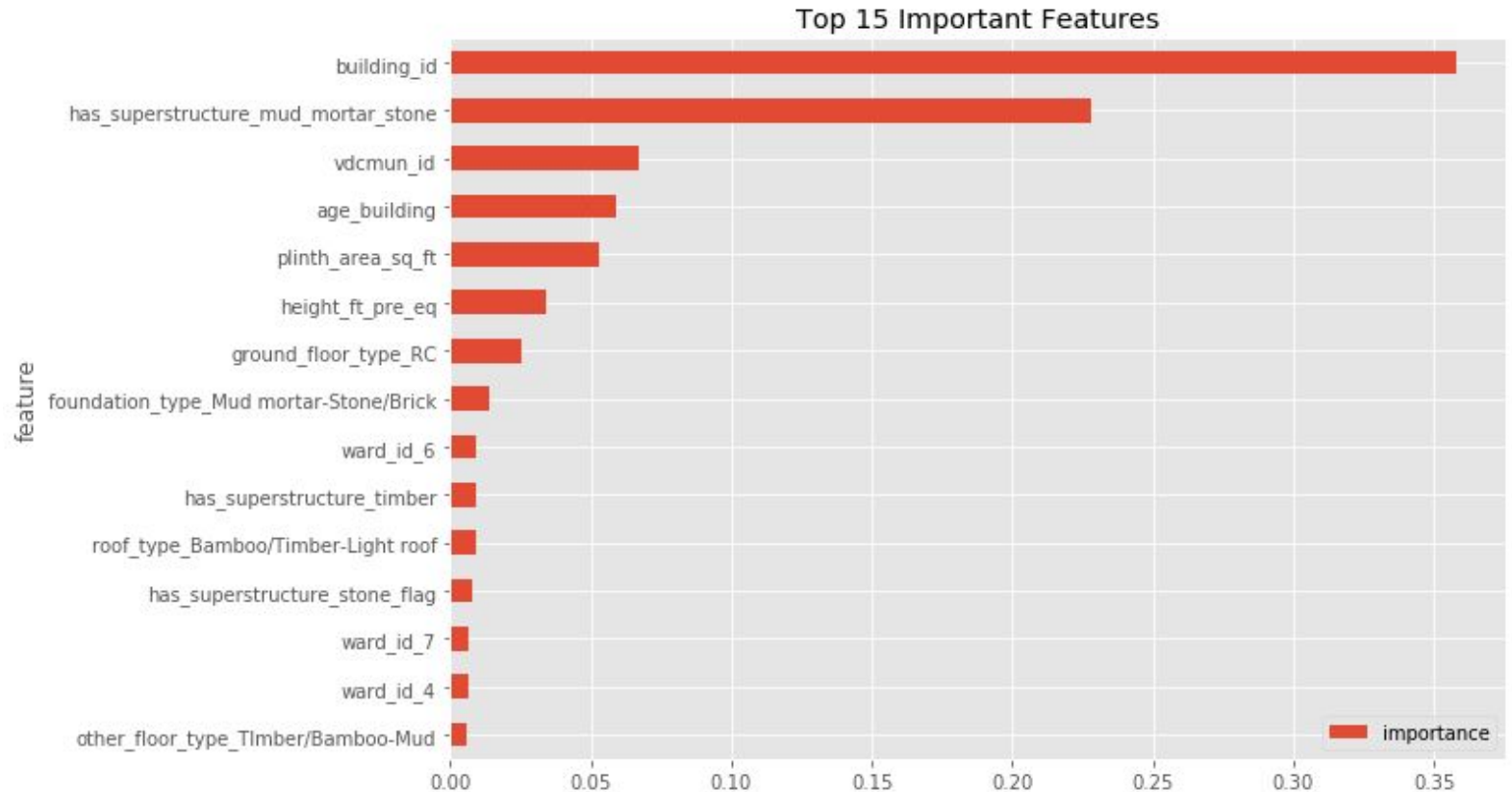
Further Steps

SVM, Random Forest, XGBoost

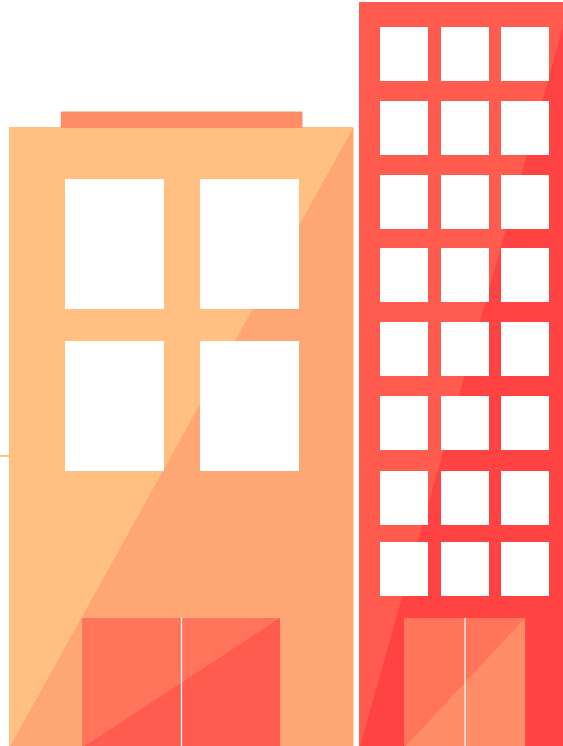Gauge the importance of location

Class Imbalance

Better Visuals

Thank You!

GitHub Repo

https://github.com/Yeshi341/structural_damage_from_earthquake

Contact

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