Leveraging Logistic Regression to Identify Earthquake Vulnerability: A Multi-Factorial Approach Considering Earthquake Data and Building Characteristics

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***Abstract*—Earthquakes pose a significant threat to life and infrastructure. This study investigates the potential of logistic regression to identify areas and building types vulnerable to severe earthquake damage. We employ a multi-factorial approach, incorporating earthquake data (magnitude, location, depth) and building characteristics (age, construction material, building code compliance). The logistic regression model will be trained on historical earthquake events and associated damage data. The analysis will assess the influence of each factor on earthquake vulnerability and develop a probabilistic model to predict areas and buildings at higher risk of experiencing severe damage during future earthquakes. The findings of this research can be instrumental in earthquake risk mitigation strategies, enabling targeted preparedness measures and prioritizing building retrofits for improved earthquake resilience.**

```
earthquakes_data <- read.delim2("./earthquakes_2010_2024.tsv")
```

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