

Abstract

Recent earthquakes, such as the 2023 Kahramanmaraş earthquake in Turkey and the Syrian earthquake, have highlighted the importance of assessing damage to buildings after major seismic events. Building collapses during earthquakes can result in fatalities and significant financial losses, particularly in areas where many structures were built before modern seismic regulations were implemented. This project aims to create AI models where the model can be used to identify potential faults and determine failure modes. It can be used as a support tool for engineers or practitioners. This project will be done using AI methods and data analysis techniques. The dataset includes both categorical data and images. The first step will be data analysis, getting useful information from the data, handling the wrong values and dropping the useless features in it, and then trying to build conclusions based on the figures and the histograms we get from the data to understand the data's nature. The next stage will be using AI models to predict the probability of house damage. We will work with deep learning models. The third stage is to integrate these models to create an effective tool that can take image input to predict the extent of damage to a house. Finally, we will evaluate the models we got using metrics such as accuracy, precision, recall, and F1 score to ensure that the predictions are reliable. We will perform Cross-validation and testing on unseen data to measure the model's performance in real-world scenarios.

Keywords: Earthquakes; Image Processing; Building Vulnerability; Disaster Recovery.