1167-86-342 **Thomas Y Chen***, thomaschen7@acm.org, NJ. *Novel, interpretable machine learning applications for disaster assessment and relief using satellite imagery.* Preliminary report.

Machine learning, which is largely built upon the mathematical principles of linear algebra, calculus, and probability theory, has been widely utilized in a variety of fields in recent years to develop accurate and efficient computational prediction models. Particularly, within geosciences, deep learning has gained popularity in the literature in the last decade for remote sensing analysis. In this work, we recognize that having precise and efficient mechanisms for assessing infrastructure damage after natural disasters is essential to channel resources and minimize the loss of life. Using a dataset that includes labeled pre and post- disaster satellite imagery, we train multiple convolutional neural networks to assess building damage on a per-building basis. In order to investigate how to best classify building damage, we present a deep-learning methodology that seeks to explicitly convey the most useful information required to train an accurate classification model. We also delve into which loss functions best optimize these models. Our findings include that ordinal-cross entropy loss is the most optimal loss function to use and that including the type of disaster that caused the damage in combination with a pre- and post-disaster image best predicts the level of damage caused. (Received March 10, 2021)