**LITERATURE REVIEW**

**“NATURAL DISASTER INTENSITY ANALYSIS**

**AND CLASSIFICATION USING ARTIFICIAL INTELLIGENCE”**

**TITLE: “Natural disasters intensity analysis and classification based on multi spectral images using multilayer deep convolutional neural network”**

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We proposed a multi-layered deep convolutional neural network. The proposed model worksin two blocks: Block-I convolutional neural network (B-I CNN), for detection and occurrence ofdisasters, and (Block-II) convolutional neural network (B-II CNN), for classification of natural disasterintensity types with different filters and parameters. It is used to find the overall accuracy for the whole model.

# **TITLE: Simultaneous earthquake detection on multiple stations via a convolutional neural network**

Author(s): Yang Shaobohu Jing Zhang haijiang Liu Guiquan.In recent years, as the amount of seismic data has grown rapidly, it is very important to develop a fast and reliable event detection and association algorithm. Generally, event detection is first performed on individual stations followed by event association through linking phase arrivals to a common event generating them. This study considers earthquake detection as the problem of image classification and convolutional neural networks (CNNs), as some of the widely used deep-learning tools in image processing, can be well used to solve this problem. In contrast to existing studies training the network using seismic data from individual stations, in this study, we train a CNN model jointly using records of multiple stations. Because the CNN automatically synthesizes information among multiple stations, the detector can more reliably detect seismic events and is less affected by spurious signals. The CNN is trained using aftershock data of the 2013 Mw 6.6 Lushan earthquake. We have applied it on two very different datasets of Gofar transform fault, East Pacific Rise and Changningshale gas field in southern Sichuan basin, China. The tests show that the trained CNN has strong generalization ability and is flexible with the number of available stations, different instrument types, and different data sampling rates. It can detect many more events than the conventional short-term average/long-term average detector and is more efficient than template-matching methods.

TITLE: **Neural network applications in earthquake prediction (1994-2019); meta-analytic and statistical insights on their limitations.Arnaud Mignan and Marco BroccardoNeural network applications in earthquake prediction (1994-2019); meta-analytic and statistical insights on their limitationsSeismological Research Letters (May 2020)**

In the last few years, deep learning has solved seemingly intractable problems, boosting the hope to find approximate solutions to problems that now are considered unsolvable. Earthquake prediction, the Grail of Seismology, is, in this context of continuous exciting discoveries, an obvious choice for deep learning exploration. We reviewed the literature of artificial neural network (ANN) applications for earthquake prediction (77 articles, 1994-2019 period) and found two emerging trends: an increasing interest in this domain over time and a complexification of ANN models toward deep learning. Despite the relatively positive results claimed in those studies, we verified that far simpler (and traditional) models seem to offer similar predictive powers, if not better ones. Those include an exponential law for magnitude prediction and a power law (approximated by a logistic regression or one artificial neuron) for aftershock prediction in space. Because of the structured, tabulated nature of earthquake catalogs, and the limited number of features so far considered, simpler and more transparent machine-learning models than ANNs seem preferable at the present stage of research. Those baseline models follow first physical principles and are consistent with the known empirical laws of statistical seismology (e.g., the Gutenberg-Richter law), which are already known to have minimal abilities to predict large earthquakes.

# **TITLE :A Deep Learning Approach of Recognizing Natural Disasters on Images using Convolutional Neural Network and Transfer Learning December 2021icARTi ’21: International Conference on Artificial Intelligence and its ApplicationsDaryl B. ValdezRey Anthony G. Godmalin.**

Natural disasters are uncontrollable phenomena occurring yearly which cause extensive damage to lives, property and cause permanent damage to the environment. However by, using Deep Learning, real-time recognition of these disasters can help the victims and emergency response agencies during the onset of these destructive events. At present, there are still gaps in the literature regarding real-time natural disaster recognition. In this paper, we present a dataset for the joint classification of natural disasters and intensity. We also proposed a lightweight convolutional neural network with two classification heads for the two tasks. This study leveraged on transfer learning in training the network to recognize natural disasters, as well as detecting normal, no-disaster images. At the same time, it is also capable of recognizing disaster intensity. Under controlled conditions, the model showed promising results on the two classification tasks. Thus, the study proved that accurate recognition of natural disasters is possible using a lightweight model and transfer learning. We hope that this study would lead to development of monitoring or surveillance systems that can perform accurate, on-the-ground, and real-time recognition of natural disasters allowing for rapid emergency responses mitigating the loss of lives and damages to properties.

**TITLE: Keeping Disaster Human: Empathy, Systematization, and the Law J.D., Yale Law School; Ph.D., Cambridge University, expected 2016.For valuable comments and encouragement, I sincerely thank Doug Kysar,**

Paul Slovic, Richard Brooks, Rob Verchick, Kenneth Townsend, Ann DiamondHarrison, Taylor Steel man, Jacqueline Carter, Michael P. Bennett, Erwann Michel-Kerjan, Michele Landis Dauber, Dan Farber, and Emily Harrison and The MJLST editorial staff. I am also grateful to psychologists Dan Batson and Paul Bloom, economist Steven Horwitz and neuroscientists Jean Decety,Jeremy R.Gray and Claus Lam for useful discussion and feedback.In response to recent disasters, legal scholars and policymakers have condemned the lack of a universal and systematic characterization of disaster and response. They contend that more formally standardizing disaster definitions and protocols will improve efficiency, clarity, and coordination. Despite some truth to these claims, they fail to consider that increase systematization may result in unintended, deleterious consequences. In particular, it may subvert or distort the empathic decision-making and prosocial motivation essential to effective disaster management. Innovative research in psychology and neuroscience indicates that empathy and prosocial motivation are not automatic responses to the plight of others, but are fragile and easily weakened. Who conceptualizes harm, risk, and disaster, with which tools, and for what purpose all substantially influence whether affective reactions effectively translate into prosocial behavior. The systematization of disaster, victims, and harm via statistics, quanta, and impersonal procedures may thus compromise the vital human dimensions of disaster response. It can also impair elite decision-making, weaken political will, and decrease donations. As such, failure to take into consideration the broader implications of systematizing reforms risks inadvertently undermining meaningful improvements in disaster risk management.