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INTEGRATING SATELLITE IMAGERY AND SOCIAL MEDIA DATA TO STUDY THE
SOCIO-ECONOMIC AFTERMATHS OF 2021 HURRICANE IDA

Abstract

On August 29, 2021, Category 4 Atlantic Hurricane Ida, the fifth strongest storm in terms of wind speed (~ 150 mph) at the time of landfall, hit the United States, reached the coast of Louisiana. This storm delivered misery and destruction with torrential rains that pummeling across the Gulf coast of United States. It displaced a large fraction of the population, caused unprecedented levels of damages and exposed residents across the South-eastern to North-eastern United States to a traumatic event.

Hurricane Ida produced economic losses over 65 billion USD and killed 115 lives. Damages to properties made it the most expensive natural disaster of 2021. Ida's steep cost is tied partly to the Covid-19 pandemic. According to risk modellers, disruptions to constructions and automotive-industry supply chains, and labour shortages, are driving up insurance claims costs. The majority of those reported deaths in New York City were due to floods. Some streets in Brooklyn were flooded by 0.3 - 0.4 m of water.

According to the global indicator framework of United Nations Sustainable Development Goals (UNSDGs), the key indicator is the reduction of economic losses as a proportion of total economic activities which can be contributed by mitigating impacts of natural disasters. Understanding loss trends in the context of development can therefore aid in assessing sustainable development, which is why our work emphasises on the context normalised losses of economical aspects and changes in social structure. Analysis of Earth Observation data, such as Synthetic Aperture Radar (SAR) and optical images along with data from National Oceanic and Atmospheric Administration (NOAA), shows the effect of floods, strengths of wind gusts, changes in the landscape and climate change patterns. Integrating these satellite-based products with the social media data (e.g. Twitter etc.) processed using machine learning-based Natural Language Processing, we are able to further assess sentiment of individuals affected to quantify also the mental impacts of Hurricane Ida. Through this case study, we have shown that we are able to provide a more complete landscape of the aftermaths of the Hurricane Ida by combining satellite imagery with social sensing.