a Neural Network based on the Mean Square Error, will investigate the possibility of estimating the model parameters according to Machine Learning algorithms for model fitting.

24-2024 R3-0004

RFA-057: Towards mitigating human-induced changes on coastal communities employing advanced data analytics (SMD-ESD)

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Coastal ecosystems are experiencing unprecedented pressures from human activities that disturb the subtle ecological equilibrium within coastal ecosystems, leading to impacts on habitats and biodiversity. Human activities play a pivotal role in affecting coastal physical, geomorphological, and ecological variability. Increasing human population and urbanization have resulted in insightful variations in coastal environments.

Urbanization is changing land use patterns, which leads to habitat loss. An eminent hazard is posed to marine life due to pollution from industrial and agricultural activities. Further, extreme weather events (e.g., hurricanes, floods, storms) due to climate change have exacerbated coastal vulnerability. As such, it is imperative to comprehend and mitigate the impacts of human activities on coastal communities to enhance resilience while sustaining the long-term health of coastal environments. This project aims to explore these intricacies to develop a profound understanding of the complexities confronted by coastal ecosystems in the State of Louisiana. Even though progress has been made in understanding the impacts of human-induced variations on coastal ecosystems, existing approaches fail to fully account for the complexities due to the integration of socioeconomic characteristics with environmental data and predicting the long-term effects of human activities on coastal communities.

This project contributes to bridge these important gaps by leveraging data analytics and socioeconomic data to enhance our understanding of the hurdles encountered by coastal communities in Louisiana. We propose a data-driven model employing advanced data analytics to interpret remotely sensed data to achieve inclusive insights into the human-induced changes influencing coastal communities. The model will be developed based on the integration of convolutional neural networks and long-short term memory to interpret vast amounts of remotely sensed data (e.g., satellite imagery, aerial photographs, LiDAR data) as well as socioeconomic characteristics. By predicting future scenarios and exploring associated risks, the proposed deep learning-based model empowers decision-makers with valuable insights to develop proactive mitigation strategies while considering both ecological and socioeconomic features.