NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE
School of Computer Science and Engineering
College of Engineering

3D Surface Analysis of Coral Microatolls

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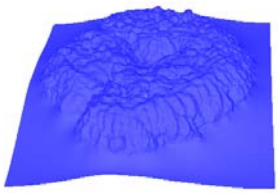
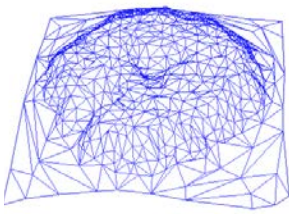
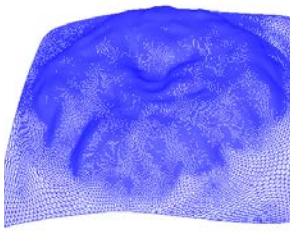
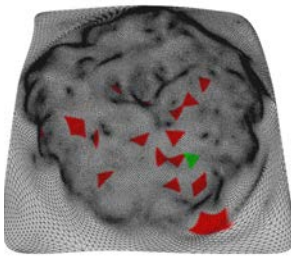

Introduction

This project presents a pipeline for application of deep neural networks in studying the regional sea level histories in the Holocene through the surface analysis of coral microatolls, which act as paleoclimate proxies.

Problem and motivation

Traditional methods of studying coral microatolls involve slabbing - an invasive process in which the coral is cut open, followed by an X-ray and U-Th dating process for further analysis. Alternatively, the ring formations on the surface of the coral can also be used to characterize the regional sea level it tracks. This could thus be an alternative for slabbing, resulting in cheaper and larger-scale analyses, and an area where AI can directly contribute.

Solution and approach

A mesh convolutional autoencoder is trained to learn representative embeddings from the surface mesh of a coral, alongside thorough mathematical analysis and characterization of the mesh surface.