



Thesis Defense

Computer Science Master's Program

“Insights into Cellular Evolution: Temporal Deep Learning Models and Analysis for Cell Image Classification”

By Xinran Zhao

Abstract:

Understanding the temporal evolution of cells poses a significant challenge in developmental biology. This study embarks on a comparative analysis of various machine-learning techniques to classify sequences of cell colony images, thereby aiming to capture dynamic transitions of cellular states. Utilizing transfer learning with advanced classification networks, we achieved high accuracy in single-timestamp image categorization. We introduce temporal models—LSTM, R-Transformer, and ViViT—to explore the effectiveness of integrating temporal features in classification, comparing their performance against non-temporal models. This research benchmarks various machine learning approaches in understanding cellular dynamics, setting a foundation for future studies to enhance our understanding of cellular developments with computational methods, contributing significantly to biological research advancements.

Date: Friday, March 22, 2024

Time: 1:00 PM – 3:00 PM

Location: 14-232b

Zoom: <https://calpoly.zoom.us/j/88062946666>

Committee: Dr. Anderson, Dr. Dimitrova, Dr. Davidson, Dr. Ruys de Perez

