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Final Essay
Apr 30^{th} 2020

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Abstract

This research seeks to improve the existing cellular automata models for simulating sustainable city development. The existing literature has taken land use dynamics as a direct representation of city development. This literature has accounted for the economic, environmental, and social factors affecting land use transition probabilities within a context of a growing city. We will expand upon this model to investigate how changes to the transition probabilities could influence the way a city develops.

Introduction

In this research, we started building out a simple land simulation system with four different land use types: Nature, Residential, Commercial and Industrial, where all cells change follows a specific transition matrix. Then, we expand this model to look at how neighbouring cells would effect the transition probabilities of an existing cell by first looking at a simpler model where we only take in the different number of land types into account, and then look at a combination of different number of land use types and a set of given transition matrices. And, we look at the percentage of nature and residential, and the average distance from a cell to all three other types of land uses.