# Modeling the Tragedy of the Commons Using Agent-Based Modeling

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Abstract

The "Tragedy of the Commons" is an experimental economics social scenario, wherein a community of autonomous individuals share a pool of resources. Conventional economic wisdom dictates that each member of the community should act selfishly, for his/her own benefit. However, the Tragedy demonstrates this to lead to unforeseen negative consequences - in some cases, the collapse of the entire community. Agent Based Modeling Simulations (ABMS) can be programmed to model the Tragedy of the Commons. This research aims to create an ABMS model of the Tragedy using the programming language NetLogo, and then demonstrate how agent behavior may be altered to find a more optimal solution the scenario.
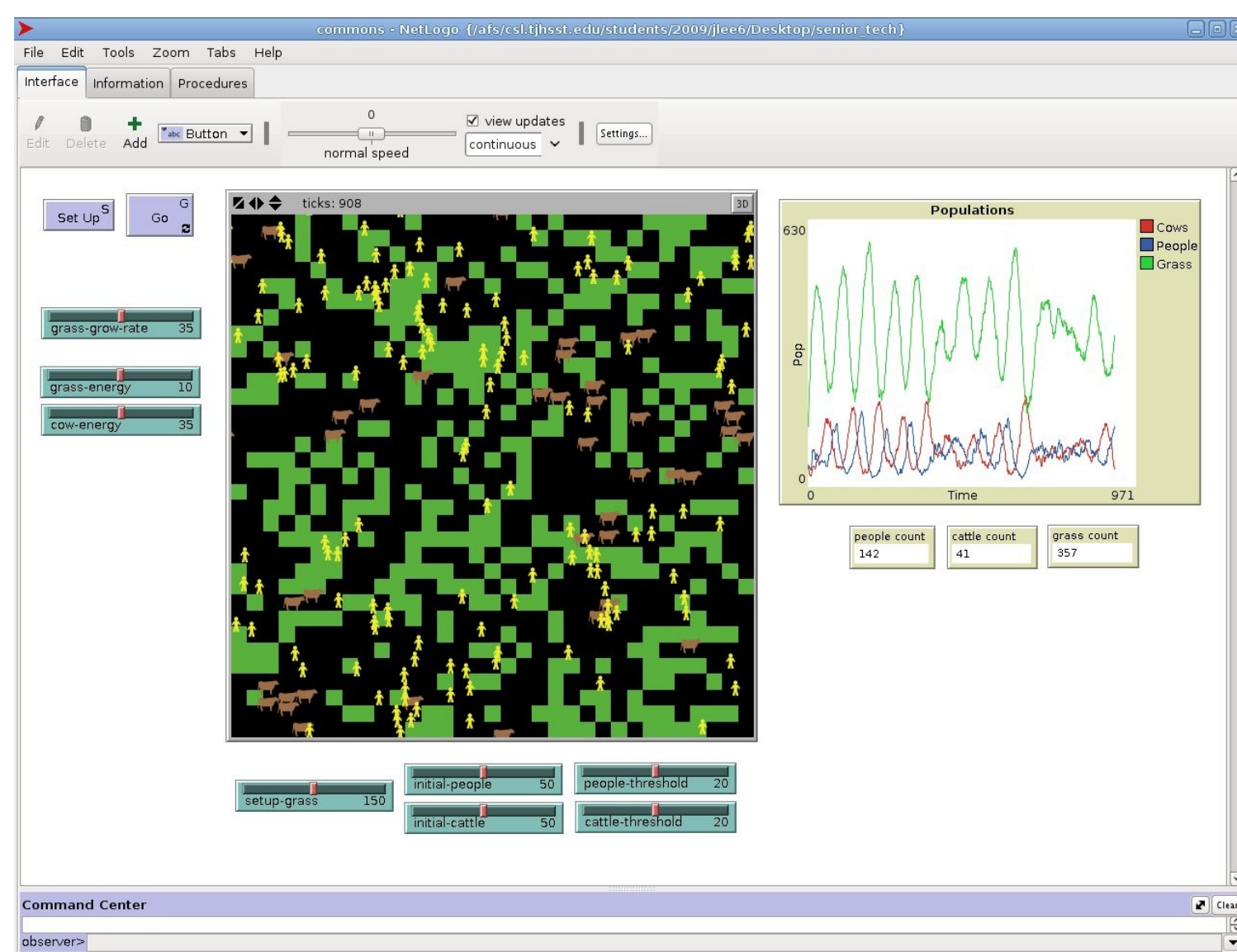
Fig. 1:
A typical demo of the program

Overview

This model was designed to mimic the Tragedy of the Sahel scenario. The Tragedy of the Sahel features grass, cattle, and people populations. The focus of this research was on the behavior of the people agents. The behavior was programmed to be realistically "fair." The goal was for this behavior to be intelligent and dynamic, ultimately leadnig to the stabilization of the scenario. The model was written with the NetLogo programming language.

Testing and Analysis

Grass, cattle, and human populations should demonstrate inverse correlations with one another. If realistic human behavior is effectively implemented via the Homo Egualis utiltiy function, humans should be able to learn from and curb negative behavior. Thus, the more realistic and "fair" the behavior implemented, the stabler the model should become.
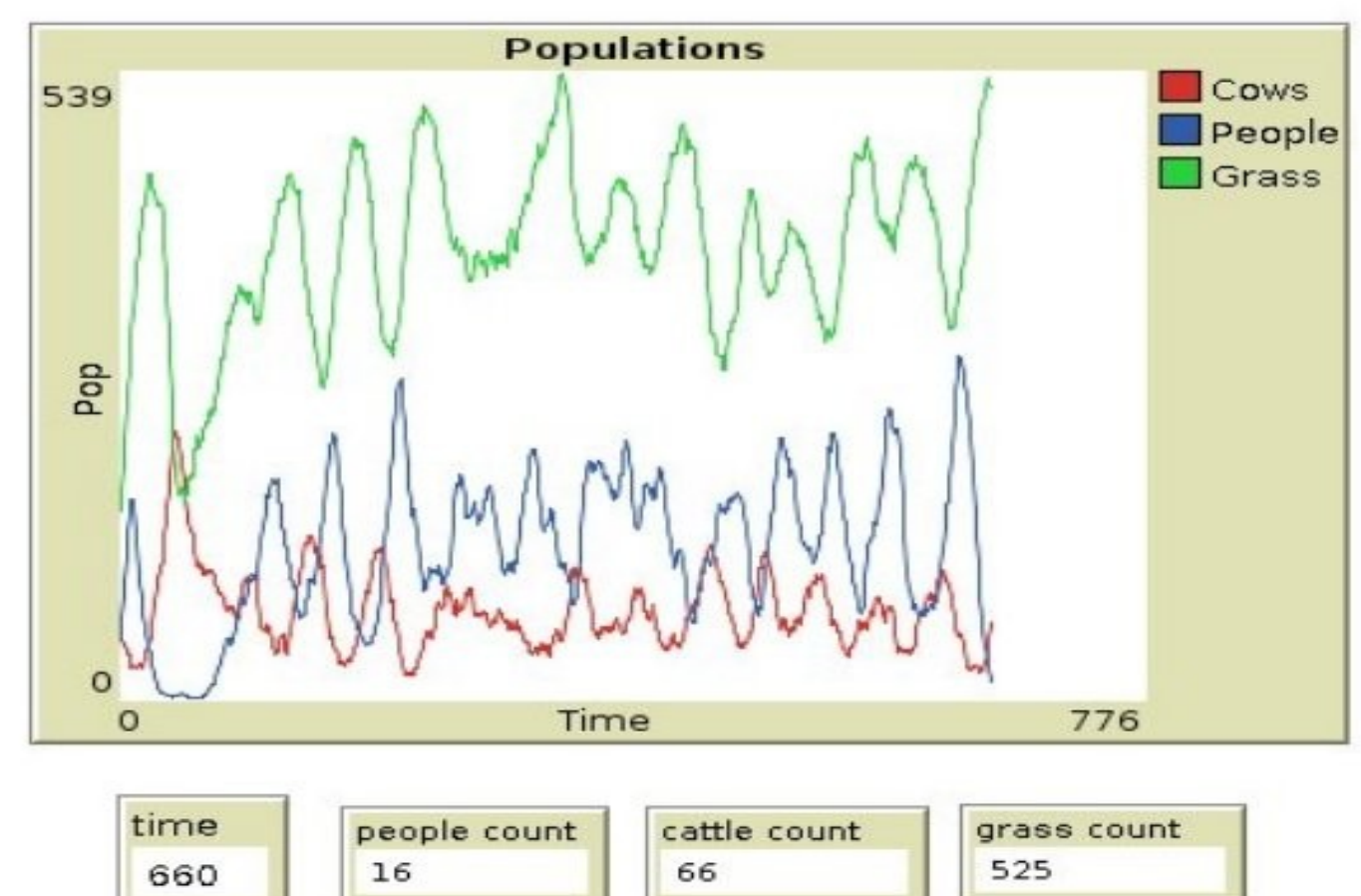
Fig. 2:
Oscilating population tendlines