The SHULGI Project: Agent-Based Simulations of Pedestrian Activity

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The SHULGI project was conceived as a way to provide a set of easy-to-use tools that can make use of high-performance computational resources in order to explore the movements and interactions of people within geographical space using an agent-based modeling framework. It can be used to answer critical questions about how the movements of individuals affect activities and the use of space both at particular places and within physical and social systems. For disciplines in the Humanities the movement and interactions of people underlie an astonishing range of lines of academic inquiry. This can range from the spread and transmission of language, to the development of cities and regions, or even actors moving across a stage. It also cross-cuts academic efforts in the Social, Physical, and Biological Sciences, as movement and transportation play a foundational role in defining and interpreting human-human and human-environment interactions.

SHULGI was developed within the context of the University of Chicago's Kerkenes Dağ archaeological project. It was built upon a groundbreaking GIS method employed by the project to explore the major 2,500 year old city located at this site in central Turkey. The method used the GIS-T tools of modern urban and regional planners, tools used to model mechanized modes of transportation such as cars or trains. However these tools were modified through the incorporation of detailed physiological and ergonomic models of how different types of people walk. This allows one to in effect place virtual individuals derived from these physiological models, women and men of various ages, within the streets and buildings of ancient or modern cities. How these people move within this plan and interact with each other can be used to provide insights into social and political dynamics at work in the city. This paper will present an overview of the development and utilization of the SHULGI simulations as well as the latest results of the ongoing validation and verification program at Kerkenes Dağ in Turkey.