Complex networks and Agent-based modeling for innovation spreading in ancient times

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Abstract

In recent years, research in the field of computational social science offered various new approaches for modeling, prediction and control of modern social systems. However, dealing with prehistorical social systems faces an additional challenge that the available knowledge and data is limited, uncertain and sparse.

In this talk, we will present a new framework for modeling of the wool-bearing sheep spreading in the Near East and Europe, between 6200 and 4200 BC. The introduction of wool had an important influence on the growth of the textile production and had strongly affected the socioeconomic development of past societies. Our new agent-based model combines a data-driven dynamics of human movements with a time-evolving network for possible social interactions. In this way, we merge the rich attribute information of agents with the structural properties of the underlying complex network. We will further exploit this connection between networks and agent-based models by examining how do agents' movements and the inferred network structure influence the dynamical properties of the spreading process. Our approach offers an instructive way for studying the qualitative effect of different aspects affecting the speed and spatial evolution of the spreading process in ancient times.

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