Towards Computational Social Sustainability

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Why have recent years seen falling standards of living for large segments of people in the industrialized West? What role does growing economic inequalities in these countries play? What are the chances that rising instability will lead to open, possibly violent conflict? A new discipline of Computational Social Sustainability (CSS) addresses the challenge of proper assessment of such issues in order to trace the dynamics in key social factors and to forecast how they are likely to play out in the coming years. This challenge requires complex and sophisticated analyses and may appear impossible at the scholarly level—given the incredible quantity and size of the humanities and social science data involved, the large number of variables, and the diversity of social well-being measures needed. However, new opportunities for interdisciplinary cooperation, backed by recent advances in data science methods and high performance computing, provide an opening toward resolution of this important issue that should not be passed up. The mission of Computational Social Sustainability is to improve people's lives in meaningful ways by establishing a new paradigm for forecasting, assessing, and preventing the triggers that diminish social well-being in societies at risk of falling into cycles of instability and conflict.

We will report on research of our CSS Group (http://www.sis.pitt.edu/css) that explores advanced methods of data science to monitor prevailing trends in a comprehensive set of well-being indicators, importantly combining both micro- and macro-level dynamics in an integrated multi-dimensional system. CSS Group focuses on (1) collaborative theorization and analysis bridging the work of data scientists and social scientists from several fields. Further, it relies on (2) an innovative digital-analytic infrastructure now being developed for collecting and integrating socio-historical data. These two dimensions of the group are linked by several years of shared work between the Collaborative for Historical Information and Analysis (CHIA – http://chia.pitt.edu), and the Seshat Global History Databank (http://seshatdatabank.info/). The goal of CHIA project is to design a novel collaborative platform assembling historical data that brings substantial steps forward toward building infrastructure for a world-historical data resource. It integrated research by social scientists and information scientists through multi-institutional collaboration. We implemented a Col*Fusion infrastructure to collect, documents, and analyze historical data in a Wikipedia-like manner to permit cross-disciplinary analysis of human society over time. The Seshat brings together the most current and comprehensive body of knowledge about human history in one place. It systematically collects what is currently known about the social and political organization of human societies and how civilizations have evolved over time.

We aim at building a comprehensive information recource on social well-being through a combination of *historical and contemporary social information* with simulation modeling based on social-science theory and on data science methods. The CSS Group consolidates unique computational and data handling resources of Pittsburgh Supercomputing Center and scalable cloud infrastructure for the advanced information processing required for large-scale socio-historical data integration, data quality enhancement and data analysis.