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The Spatial, Temporal, and Individual Dimensions of Child Maltreatment Recurrence in the US: A Survival Analysis

TREO Talk Paper

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Abstract

The current research aims at improving the efficacy of applying data analytics methods such as survival analysis (Coeurderoy, Guilmot, & Vas, 2014) on big human data to create insights into complex social problems recurrent child maltreatment as a representative case. Social welfare agencies collect and produce vast volumes of data from various sources that can be utilized to illuminate social issues and facilitate effective solutions (Coulton, Goerge, Putnam-Hornstein, & de Haan, 2015). However, social welfare agencies face several challenges in converting data into analytical power. First, effective analysis of a massive amount of data that requires recording a large number of features associated with diverse individuals can become challenging. Furthermore, even though the models produced by data analytics are inherently predictive, taking primitive action at the individual level in most social problems is very difficult, if not impossible. Additionally, the interaction between humans and society can be highly intricate, making it difficult to determine if certain features of an individual are essential regarding the occurrence of an event.

Responding to these challenges, the current study proposes three inter-connected categories of features available in most big human data sets: spatial, temporal, and individual/event-related features. These three categories of features are recognized based on two theoretical frameworks, the Routine Activities Theory (Felson & Cohen, 1980; Miró, 2014) and Fogg Behavior Model (Fogg, 2009). Supported by the results of an empirical study on an extensive, national data set of child maltreatment cases in the United States (US Department of Health and Human Services, 2017), we argue that features in each of these categories can have a strong indication of social welfare-related occurrence events. In contrast, analysis of these features—individually or jointly—can reveal spatial, temporal, and individual patterns. Therefore, the current study aims to answer the following research questions: (1) *What are the spatial, temporal, and individual-related features to be considered to predict recurrent child maltreatment patterns?* (2) *How is the relative significance of these features when victims of different geographical locations, time frames, demographic groups, and maltreatment types are considered?* Survival analysis was conducted in each of or across the victim groups above. Victims' survival rate of recurrent child maltreatment was examined as the prediction target. Based on the results of survival analysis, the discussion was made on how to improve the predictive capability of individual features in the use of big human data.

The results of our study can be helpful for both researchers and policymakers. Researchers can apply the results to improve the efficacy of data analytics methods on big human data. Researchers can also correlate the observed trends with other social and economic factors to explain and predict the target problem's prevalence. Policymakers may use the resulting temporal trends to fine-tune the child welfare policies for the current and subsequent years to optimize child welfare resource allocation.

References will be available upon request