Adapting Tools for Text Monitoring and for Scenario Analysis Related to the Field of Social Disasters

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Abstract : Humanity faces more and more often with different social disasters, which in turn can generate new accidents and catastrophes. To mitigate their consequences, it is important to obtain early possible signals about the events which are or can occur and to prepare the corresponding scenarios that could be applied. Our research is focused on solving two problems in this domain: identifying signals related that an accident occurred or may occur and mitigation of some consequences of disasters. To solve the first problem, methods of selecting and processing texts from global network Internet are developed. Information in Romanian is of special interest for us. In order to obtain the mentioned tools, we should follow several steps, divided into preparatory stage and processing stage. Throughout the first stage, we manually collected over 724 news articles and classified them into 10 categories of social disasters. It constitutes more than 150 thousand words. Using this information, a controlled vocabulary of more than 300 keywords was elaborated, that will help in the process of classification and identification of the texts related to the field of social disasters. To solve the second problem, the formalism of Petri net has been used. We deal with the problem of inhabitants’ evacuation in useful time. The analysis methods such as reachability or coverability tree and invariants technique to determine dynamic properties of the modeled systems will be used. To perform a case study of properties of extended evacuation system by adding time, the analysis modules of PIPE such as Generalized Stochastic Petri Nets (GSPN) Analysis, Simulation, State Space Analysis, and Invariant Analysis have been used. These modules helped us to obtain the average number of persons situated in the rooms and the other quantitative properties and characteristics related to its dynamics.

Keywords : lexicon of disasters, modelling, Petri nets, text annotation, social disasters