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IT AND BIG DATA AS TOOLS OF PREDICTION NATURAL DISASTERS AND QUICKLY SPREAD INFORMATION

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ІТ І BIGDATA ЯК ІНСТРУМЕНТИ ПРОГНОЗУВАННЯ СТИХІЙНИХ ЛИХ ТА ШВИДКОГО ПОШИРЕННЯ ІНФОРМАЦІЇ

Nowadays, one of the biggest question, all around the world, is how to predict natural disasters and quickly spread information about it among people in order to avoid panic and situation when people are not informed.

Information and communication technology (ICT) is being used widely around the world during different disasters. In this case, key for spreading information in high-technological society is social media platforms such as Twitter and Facebook. They give access to users for updating information on social activities. Twitter is an American microblogging and social networking service on which users post and interact with messages known as "tweets" [1].

Facebook is an American online social media and social networking service company [2].

The biggest advantage for both social networking is opportunity to update information due to low Internet connection. This fact makes those ICT a great information`s provider. Moreover, it is possible to work with it during disaster.

However, question of prediction natural disasters is still open. It is obvious that the best way to increase level of human surviving during any disaster is informing people about its arrival. For this purpose special systems have been created.

For instance, natural hazards have been perceived as random acts of nature, symbolized by extremes in physical processes [3]. Although it is almost impossible to avoid the occurrence of disasters and completely recoup the damage caused by the natural hazards, the sufferings and risks can be minimized by developing suitable strategies for disaster management, such as the developing of early warning systems, detecting of the pre-disaster developmental plans, implementing of disaster preparedness and emergency response, mobilizing of relief resources, and helping in rehabilitation and post-disaster reconstruction, etc. [4].

The main process of disaster management requires real-time disaster information collections, analyses, compilations, decision support, interpretations, illustrations and predictions. Monitors have to be installed to collect the disaster information. Statistical data (as well as mathematical models and databases) is included in process of analyzing the information about hazards. It may be observed that advancement of information technology in the form of the Internet, Geographic Information System (GIS), remote sensing and satellite communication can help a great deal in planning and implementation of disaster management [5, 6].

Special place in providing mechanism for increasing human survival rate takes Big Data. Its technologies play a huge role in:

- monitoring hazards;
- determining the exposure of human societies to disaster risk;
- tracking influence disasters and monitoring recovery efforts;
- mitigating vulnerabilities;

- reinforcement communities` resilience.

Particularly interesting is the role of Big Data for detecting floods,earthquakes, hurricanes, also forecasting future appearance of hazards.

In 2014 a group of scientists (Musaev, Wang, and Pu) developed LITMUS, a model to detect landslides following earthquakes by integrating multiple data sources.[7] With the help of social (Twitter, Instagram, and YouTube) and physical sensors (USGS seismometers and TRMM satellite) the model scored better than traditional techniques employed by USGS [8] for real-time hazard mapping. Their Twitter Earthquake Dispatch monitors earthquakes worldwide with magnitudes of 5.5 which helps issuing alerts about them more broadly.

Social media enables qualitative situational analysis before, during, and after disasters. Floodtags is a social media analytics platform. It has been implemented to take information from Twitter and enable the filtering, mapping and visualization of social media content based on keywords and location. Global Flood Detection System (GFDS) provides a service for rapid inundated areas` identification through day-to-day passive microwave satellite observations. The approach of using those data has been tested in two case studies. It has been carried out in Pakistan and in the Philippines. It has been discovered that such research is particularly appropriate for monitoring large floods in densely populated areas.

Big Data has also proved to be helpful in assessing and monitoring the impacts of storms, whether these are hurricanes, cyclones or typhoons. Social networks data like data from mobile telecommunication operators obviously can be useful for analyzing and mapping meteorological hazards. Mobile Data, Environmental Extremes and Population (MDEEP) project located in Bangladesh investigated how data extracted from Grameenphone (the national telecommunication operator) could have provided insights on the early warning systems` effectiveness during the cyclone Mahasen in 2013.

To sum up, without Big Data and social networks (as well as data from mobile telecommunication operators) it would be almost impossible to develop any hazards-warning systems and to predict such hazards happening.

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