

Analyzing the Impact of Multi-site Manufacturing on Increasing the Organization Capabilities in Reducing Hazards and Vulnerability of Supply Chain

Mohammad Ali Beheshtinia^{1*}, Mostafa Moghimi²

1. Assistant Professor, Material and Industrial Engineering Faculty, Semnan University, Semnan, Iran

2. MS in MBA, Material and Industrial Engineering Faculty, Semnan University, Semnan, Iran (nmmoghimi@gmail.com)

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Abstract

Hazards in different areas have different effects and consequences. Nowadays considering industries sensitive conditions, it seems necessary to boost organizations' capabilities to confront uncertainties and risks. One solution for reducing these risks is increasing agility, stability and flexibility in production process. This study tries to increase organizations capabilities in handling supply chain hazards, using integration of production and transportation planning, shared transportation navigation and Multi-site manufacturing to minimize total tardiness in supplying required raw material and parts for a manufacturer. Considering that it is a NP-hard problem, it is not possible to solve it in a reasonable time using exact methods. Hence, a genetic algorithm named as dynamic genetic algorithm (DGA) is proposed to solve it. After that, results in single-site and multi-site problems are compared. The results show that multi-site manufacturing caused less tardiness than single-site manufacturing in reality. Also, increasing the number of suppliers, the number of vehicles and reducing the number of orders, the value of process times and transportation times causes tardiness reduction in a supply chain.

Keywords: genetic algorithm, hazards, multi-site manufacturing, supply chain, reduce vulnerability, tardiness.

* Corresponding Author: beheshtinia@semnan.ac.ir

Evaluating the Process of Information Dissemination in Ahar-Varzaghan Twin Earthquakes and the Associated Risks

Parvaneh Pishnamazi^{1*}, Yasamin O. Izadkhah²

1. PhD in Communication Science and Researcher in Risk Management Research Centre, International Inst. of Earthquake Engr. and Seismology (IIEES), Tehran, Iran

2. Assistant Professor, Risk Management Research Centre, International Inst. of Earthquake Engr. and Seismology (IIEES), Tehran, Iran (izad@iiees.ac.ir)

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Abstract

The Ahar-Varzaghan double earthquakes happened in August 11, 2012 in north-west of Iran. There were two main tremors, the first with 6.2 happened only eleven minutes before the second one with 6.3 in the Richter scale. More than 300 people lost their lives and 3000 were injured. Although there is no way to prevent the negative consequences of an earthquake at the moment, reducing the impact of the damages is possible through disaster management. In reverse, it has been proved that in the absence of disaster management, which basically also rooted in inaccurate dissemination of information, the damage can increase and result in secondary environmental effects such as social disorders, objections and chaos. In this regard, dissemination of information during disasters and broadcasting accurate, thorough and transparent news about an earthquake and its impact in the first hours after an event has a crucial role in the process of disaster management and preventing its disastrous consequences. In this paper, the information has been gathered through library research as well as interviews with responsible officials after the twin Ahar-Varzaghan earthquakes. The new coverage, especially by Islamic Republic of Iran Broadcasting (IRIB), as the national and official media, is evaluated. In this regard, two main factors have been considered, that is “information about the earthquake and its characteristics” and “dissemination of information about the effects of an earthquake”. The results show that quick and on time information dissemination regarding the effects of Ahar-Varzaghan earthquakes have been weak and reveals that a quick system for estimating the casualties and damages need to be reinforced. It also shows that media specially broadcasting media has not paid much attention to the accuracy of the disseminated news. The broadcasting of news is immediate, but its accuracy is under question. Also, with regard to the experience of twin Ahar-Varzaghan earthquakes and comparing the process of information dissemination between national and local networks, the latter showed a quicker and more effective performance than the national networks.

Keywords: Ahar-Varzaghan Earthquakes, broadcasting, consequences, dissemination, information fast communication.

* Corresponding Author: p.pishnamazi@iiees.ac.ir

The Factors Involving in Contaminated Food and the Hazards Arising from

Mohammad Ebrahim Shams Natery^{1*}, Maryam Mohazab²

1. Associate Professor, Criminal Law and Criminology, Law Faculty, College of Farabi, University of Tehran, Iran
2. MA in Criminal Law and Criminology, Islamic Azad University, Science and Research Branch of Qom, Iran (maryam.mohazzab@yahoo.com)

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Abstract

The increase of food production in various fields has had a positive effect on the growth of human population over time. The importance of food in human lives especially in economy and their health is undeniable. Due to the increasing demand for food around the world, some individuals- inadvertently or deliberately- cause illness and death among fellow humans, by producing, distributing, importing and exporting of spoiled and contaminated food. The importance of this matter will be more vital if lack of food safety- as one of the potential hazards- occurs and becomes a real risk, would cause immediate response of body and poisoning. However, in most cases, the symptoms would express themselves over time and mostly in later adulthood and it would lead to chronic diseases. Other consequences of this kind of hazards realization are financial losses, reduced food trade, decline in tourism, and increase in medical and economic cost, etc. In the present study, library research methods have been used and in some cases the suggestions of the experts have been considered. Identifying the causes of food poisoning from a criminological perspective, can help preventing such crimes and therefore may decrease the threshold of such hazards. The risk factors involving in spoiled and contaminated food include lack of adequate monitoring, regulatory deficiencies, violating laws and regulations by certain health inspectors, economic fluctuation and the prevailing organizational culture of food industry.

Keywords: crime prevention, food safety, hazard, involvement in spoiled and contaminated food, reducing risk threshold.

* Corresponding Author: eshams@ut.ac.ir

Mystical Analysis of the Hazards

Majid Jahani^{1*}, Sayed Mohamad Reza Hosseini Beheshti², Sayed Hamid Talebzade³, Mahdi Ghavam Safari⁴

1. PhD Student in Philosophy, University of Tehran, Iran
2. Associate Professor, Faculty of Philosophy, University of Tehran, Iran
(drmrhosseini@yahoo.com)
3. Associate Professor, Faculty of philosophy, University of Tehran, Iran
(talebzade@ut.ac.ir)
4. Associate Professor, Faculty of, Philosophy, University of Tehran, Iran
(safary@ut.ac.ir)

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Abstract

Human beings have worked hard to get to know their hazardous surroundings. People and societies have always construed all events and phenomenon as having meaningful relations and interpreted them mostly through feelings and mental images. The present paper deals with the relationship between mystical knowledge and hazardous phenomena. The main question here is why different cultures have adopted various approaches and interpretations towards human and natural hazards. Mystical approach is distinct from scientific or intellectual one in that it is based on the past history and stories, or notion based on them. However, such an approach is not dated itself and the modern world has its own myths which like those of the past are shaped according to our humane wishes, desires and anxieties.

Keywords: hazards, knowledge, mystical, outlook.

* Corresponding Author: majidjahani@ut.ac.ir

Thermal Anomaly Detection prior to Earthquakes Combining Artificial Neural Networks Algorithms and Ant Colony Optimization

Sepehr Choubsaz^{1*}, Mehdi Akhoondzadeh², Mohammad Reza Serajian³

1. Graduate Student in Remote Sensing Department, Surveying and Geo-spatial Information Faculty, College of Engineering, University of Tehran, Tehran, Iran

2. Assistant Professor, Remote Sensing Department, Surveying and Geo-spatial Information Faculty, College of Engineering, University of Tehran, Tehran, Iran
(makhonz@ut.ac.ir)

3. Associate Professor, Remote Sensing Department, Surveying and Geo-spatial Information Faculty, College of Engineering, University of Tehran, Tehran, Iran
(sarajian@ut.ac.ir)

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Abstract

Remote sensing techniques made it possible to study thermal anomalies prior to major earthquakes regardless of complications in comprehending earthquake mechanisms. Thermal pre-cursors are one of the main resources for earthquake prediction. In this paper, land surface temperature, atmospheric temperature, surface latent heat flux and outgoing long-wave radiation have been studied to detect anomalies prior to Varzaghan (August 11, 2012), Boushehr (April 9, 2013) and Saravan (April 16, 2013) earthquakes. To detect earthquake related anomalies, time series of each pre-cursor has been produced within the period of earthquake, land surface temperature and atmospheric temperature were acquired from MODIS products, surface latent heat flux from GLDAS library and outgoing long-wave radiation from AIRS products. These time series were predicted by an artificial neural network with ant colony optimization training method. The results of this study were compared with artificial neural network with Levenberg-Marquardt training algorithm. It has been shown that 10 to 13 days before Varzaghan earthquake, anomalies has appeared in all of the mentioned precursors, in case of Boushehr earthquake 6 to 9 days before the event, anomalies appeared in atmospheric temperature and outgoing long-wave radiation and also a strong anomaly appeared in surface latent heat flux 2 days prior to earthquake and in Saravan earthquakes anomalies have been detected 5 to 8 days before the earthquake in all of the studied thermal pre-cursors.

Keywords: anomaly, ant colony optimization, artificial neural network, earthquake, thermal pre-cursor.

* Corresponding Author: sepehr.ch@gmail.com

Comparison of Artificial Neural Network Model with Analytical Hierarchy Process in Landslide Hazard Assessment Using Geographic Information Systems

Iman Ali Belvasi^{1*}, Mohammad Hossein Rezaei Moghaddam², Mohammad Reza Nikjoo³, Khalil Valizadeh Kamran⁴

1. MS. Graduated in Remote Sensing & Geographic Information Systems, University of Tabriz, Iran
2. Professor of Geomorphology, Faculty of Geography and Planning, University of Tabriz, Iran (Rezmogh@yahoo.com)
3. Assistant Professor, Department of Geomorphology, Faculty of Geography & Planning, University of Tabriz, Tabriz, Iran (nikjoo13471@gmail.com)
4. Assistance Professor, Department of Climatology, Faculty of Geography & Planning, University of Tabriz, Tabriz, Iran (valizadeh1@tabrizu.ac.ir)

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Abstract

Landslide is one of the natural hazards in mountainous regions that results in huge losses every year. Alashtar Doab watershed with mountainous terrains, uplands and different natural conditions has the potential for landslide. The purpose of this study is to compare the ANN¹ model with AHP to evaluate landslide in Alashtar Doab watershed. In order to prepare the map, first of all, parameters of the landslide were extracted and then the layers were prepared and after that a landslide distribution map that was occurred in the basin was prepared and then by combining landslide influencing factors with landslide distribution map, the impact of each of these factors such as slope, aspect, elevation, lithology, rainfall, land use, distance from fault and stream in ArcGIS software were measured. In this study, in order to zone landslide hazard in Alashtar Doab watershed, the ANN and AHP² were used. Back propagation algorithm and sigmoid activation function were used in ANN. The final structure of the network consisted of eight neurons in the input layer, eleven neurons in the hidden layer and one neuron in the output layer. After optimization of the network structure, all area information was imported to the network and finally, landslide hazard zoning map was prepared according to output weight. In AHP method, after paired comparisons and extracting the weight of parameters, the potential landslide area was obtained by combining them. The kappa statistic factor was used for assessment and classification output results of model that were used to estimate landslide hazard. The result shows that the ANN model with 0.9 kappa coefficient is a more efficient method than AHP to map landslide hazard in Alashtar Doab watershed.

Keywords: Alashtar Doab watershed, artificial neural network, GIS and AHP, landslide.

* Corresponding Author: belvasi@yahoo.com

1. Artificial Neural Network
2. Analytical Hierarchy Process

Analysis and Zoning of Morphotectonic Hazards of Kamyaran City, Iran

Bakhtiyar Valadi^{1*}, Saeed Khezri², Mohammad Sedigh Ghorbani³

1. MS. in Environmental Hazards, University of Kurdistan, Sanandaj, Iran
2. Associate Professor of Geomorphology, University of Kurdistan, Sanandaj, Iran
3. Assistant Professor of Geomorphology, Payame Noor University, Sanandaj, Iran

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Abstract

This research quantitatively evaluates the role of active tectonic in the development of landforms and zoning of tectonic vulnerability in Kamyaran County, south of Kurdistan Province. The research area includes two basins called Sirwan and Razavar. The extracted data from topographic and geologic maps, satellite imagery and field work, were analyzed by means of Arc GIS and Excel software. For quantitative assessment of the role of active tectonic in the evolution of landforms, the morphotectonic indexes (river longitudinal gradient, mountain- front sinuosity, the ratio of valley floor width to valley height, and asymmetric index of watershed) were used and the results were presented as the relative index of tectonic activity (Iat). To provide tectonic vulnerability zoning, the maps of natural variables (slope, water table, lithological resistant, distance from faults) were overlaid and data was analyzed using AHP model in Arc GIS software. The results indicate that due to geographical position of the county in both Sanandaj-Sirjan and High Zagros zones, variety of lithology and existence of faults, geographically and geologically is of great importance. The results of morphometric parameters in both basins indicate that the area tectonically is active. Based on the Iat index, both northern and southern basins are in the class of intense tectonic activity. According to the vulnerability map of AHP model, the highest relative risk areas are located in the north, south west and some parts of north east of the area. The central parts of the northern and southern basins have a moderate vulnerability. Most part of the research area is rated as the most vulnerable and the lowest relative.

Keywords: AHP, Kamyaran, morphotectonic, tectonic hazards, zoning.

* Corresponding Author: valadi264@yahoo.com