BESC2021 (author)

BESC2021 Submission 47

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Submission 47	
Title:	ExVis: Explainable Visual Decision Support System for Risk Management
Paper:	(Aug 09, 11:35 GMT)
Track:	BESC (main track and special sessions)
Author keywords:	Decision support system explainable visualization multiple coordinated view risk management
EasyChair keyphrases:	risk management (180), visual decision support system (120), explainable visual decision support (100), bayesian network (90), decision making (80), visual analytic (70), visual interactive system (63), visual explanation (60), decision maker (60), recommendation system (50), insurance data (50), clinical decision support (47), ashma diabetes rel (47), diabetes cancer travel (47), cancer travel alcohol (47), rel diabetes cancer (47), multiple coordinated view (47), diabetes rel diabetes (47), life insurance industry (47), decision support (43), visualization system (40), evidence item (40), networked guarantee loan risk (40), probability distribution (40), user study (40)
Topics:	Main Conference
Abstract:	In today's economy and society, managing and communicating risk has become crucial task, where data visualization can play a vital role in this regard. In assessing the risks, existing researches have applied various methods and have shown various traditional visualization ways such as maps, charts and diagrams etc. Although, recent development on visualization approaches provide better design, developments and evaluations, lack of proper explanations have decreased their reliability in decision making. In this regard, we propose a solution named "Explainable visual decision support system-(ExVis)" to present all the relevant information in a concise way and provide a visual recommendation for risk management. ExVis combines the state-of-the-art interactive visualizations blending with Bayesian network (BN) model. Our approach is used to analyse insurance data as a case study. Thus, in this study, we have three main implications: (i) insurance data are potentially useful for understanding business risk; (ii) stakeholder decision-making is aided by a visual explanation dashboard; and (iii) some key insights into the underwriting of policyholders have been deduced. Finally, we evaluate the usefulness of our visualization system by a user study.

Submitted:	Aug 05, 13:22 GMT
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Reviews

Review 1	
Overall evaluation:	**-3**: (strong reject) As the authors rightly observe, visualization of complex data can result in improved understanding that, in turn, can result in better decision-making. The ExVis tool described in this paper processes insurance data using, among others, a Bayesian network and measures of symmetric distance, and represents the results in a visual framework. This premise has great potential to tame data complexity and be a useful contribution to the literature on risk management. However, there are multiple issues with this paper. A major concern is that the user study sample size is small consisting of only 5 subjects. These users are students or academic staff and not insurance risk managers for whom the ExVis system is intended. Even in this small sample, results are presented only in general terms that the system "would effectively understand" and no numerical evaluation results are provided. The system is stated as providing multiple views (Evidence, Document, Network, Outcome) as shown in Figure 2. However, this single picture is not sufficient for the reader to understand each of

	these views and how they improve risk managers' capability to make better decisions. In the outcome view pane of Figure 2, only two small pie charts are presented. This is inconsistent with the authors statement in section II.B that DV is an improvement over "boring tables, charts or graphs". Also, while data visualization can certainly aid improved understanding of complex data it can also result in distorted and misleading depictions. The authors should explain how their system avoids such errors. The paper also has multiple instances of poor grammar. For example, the end of the second paragraph "Therefore, there is no doubt that insurance company make a loss, …. "

Review 2	
Overall evaluation:	**1**: (weak accept) 1. In this paper, a system named explainable visual decision support system (ExVis) is implemented to visualize the relevant information for risk management. It combines interactive visualizations with the Bayesian network model. The paper has the following contribution: presenting an observational study aimed to focus that insurance data are potentially useful for understanding business risk, developing an explainable visual decision support system named ExVis which allows decision makers to justify policyholders claim benefits, and providing some key insights into the underwriting of policy holders for insurance managers to help in decision making. 2. The method is divided into five parts, and the description of each part in the methodology framework is easy to understand. However, some details should be provided in each section. For example, what does the data look like after data cleaning and preprocessing? 3. It would be great if the authors could present a possible proposed solution of this system to explain how this system works. 4. There are still some typos and grammar errors in the paper. Please check the article and polish the writing again. 5. There are only five users joining the study. It is hard to demonstrate the validation or usability of the proposed approach in this paper. If it is possible, please try to invite more people or experts to participate in the user study. 6. The authors use the Bayesian network model to decide the risk factors. It needs large amounts of data to show the effectiveness of the approach. But as mentioned in point 5, the data is small. It will effect the practicability of the system.

Review 3	
Overall evaluation:	**2**: (accept) This paper present a novel and useful system to present all the relevant information in a concise way and provide a visual recommendation for risk management. The system leverage many the state-of-the-art interactive visualizations blending with Bayesian network (BN) model. Strong I like the idea of this system, it is useful and meaningful. their system works, and the interface is beautiful and professional. their paper is well organized and I can easily follow their idea the background theory is solid and well introduced. weakness some layout issues, for example, fig 3 it too big. there need more detailed introduction of the case study or the demo presentation of the system the system should be open public.