Automated support for adaptive incident management (extended abstract) [1]

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Disasters are unforeseen events that cause great damage, destruction and human suffering. The key element is the distinction between incidents and disasters. Incidents are disturbances in a system that can lead to an uncontrollable chain of events, a disaster, when not acted on properly.

To manage an incident usually many parties have to cooperate. This means that incident management has a distributed or multi-agent character. A specific type of errors likely to occur in such situations has to do with interaction and coordination between these parties. Organising this multi-agent cooperation in a dynamic and adaptive manner, while minimising the number of errors is one of the main challenges.

[1] In: *Proceedings of the International Workshop on Information Systems for Crisis Response and Management '04*, Brussels, Belgium. 2004.

The project CIM (which stands for Cybernetic Incident Management), started in 2003, addresses the problem of automated support for incident management. The aim of the project is to gather knowledge in order to create a constantly adapting system that encompasses both people and supporting software and that has the ability to process and assess information in an adaptive, interactive and intelligent fashion to support human decisions.

One specific part of the project (contributed in particular by the Vrije Universiteit Amsterdam) deals with development of methods to provide automated support for the analysis of what may have gone wrong in specific (simulated or empirical) traces of incident management.

In this paper an informal analysis of traces of two real life case studies (the Hercules disaster and the Dakota incident) is presented, and some first categorisation of the types of errors is made.

The following categories of errors were identified: incomplete information, contradictory information, incorrect information, exception handling, and work overload.

Informal traces of events can be formalised using the formal language TTL (Temporal Trace Language) [1]. Formalising such a trace has at least two benefits. Firstly, specific properties which should hold for a trace can be verified. Secondly, the protocol for the disaster prevention organisation can be improved.

The paper discusses a number of dynamic properties that have been formalised and automatically checked for the formalised traces.

References

[1] Jonker, C.M., and Treur, J. Compositional Verification of Multi-Agent Systems: a Formal Analysis of Pro-activeness and Reactiveness. *International, Journal of Cooperative Information Systems*, 11: 51-92, 2002.