Interoperability for Extreme Events Research Group

THE UNIVERSITY OF SYDNEY
Business School

Communication in Disaster Metamodelling

Promise of disaster metamodels

Recently, we have become all too aware of the role that absent or ineffective communication plays during emergencies. For example, people facing a fire, tempest or flood need to know whether to 'stay or go' and the information that assists them in making that decision needs to be provided to them in a timely manner and presented to them in a comprehensible form. The research being reported here is part of a University Research Council Grant at the University of Wollongong, Australia, highlighting the importance of the role that communication plays in the development of disaster models. Computer-based disaster models are becoming very sophisticated and use advanced technologies to attempt to advise, predict, learn lessons and generalise from emergencies and hazards of various kinds.

One of the most promising approaches to the computer modelling of disasters is referred to as metamodelling. The purpose of **disaster metamodelling** (DM) is to consolidate information and support the multiple stakeholders and issues about migration, preparedness, response and recovery from disasters. Metamodel development involves separating information into layers of increasing abstraction. The first two of these are very familiar to emergency services. The first layer is referred to as M0, and its responsibility is to account for real-world data. We could think about M0 as all the data about the actions and activities that comprise for example an actual rescue. The M1 layer abstracts this real world user data in a specific information domain. We can think of this as a description of the practices and procedures for evacuation in the general case. M0 is about actual lived experiences and their traces in data while, M1 is about generalising and abstracting these experiences into plans and models of use to some stakeholder/s.

Communication during disasters

The 2009 Black Saturday Victorian bushfires revealed the inadequacy of the communication that was provided to alert communities to possible dangers. This fact was especially evident in the works of Don Watson who reviewed the warnings that were delivered to the communities (see Watson 2010). He argued that these warnings would have been largely unintelligible to citizens to whom they were directed. He identified that these messages were heavily nominalised making them difficult to unpack under the dangerous conditions faced by citizens.

The process of **nominalisation** turns verbs that describe actions or events into nouns that describe things, concepts or people. The resulting completed acts of communication no longer describe actions but instead focus on objects, concepts or states. For example, when we might normally talk about a fire we might say that "The fire was increasing in severity and the fire fighters were getting concerned." A nominalised form of this sentence might be "The rapid *increase* in fire severity was causing *concern* among the fire fighters." We see that actions are becoming things.

Now it is important to point out that this is not just a matter of improper language use. Nominalisation is a feature of writing more generally and is a necessary feature of academic, professional and administrative communication in particular. Nominalisation is an important aspect of technical knowledge and specialisation. The jargon it produces is necessary because it enables us to compress complicated processes and domain specific meanings into the shortest number of words. It is a productive feature for emergency decision making because in turning verbs into things, we are able to then think about and treat these newly formed nouns in many useful ways. In English, nouns and the groups in which they occur- nominal groups- can be counted, specified, described, classified and qualified. In contrast we really can only mean a limited range of things with verbal groups. Verbs can only be expanded by number, tense and voice, for instance, but none of these uses add to the content of the resulting communication (Eggins 2004, 96). So while the use of nominalisation is productive of new content for emergency agencies, administrators and decision makers, it is inappropriate for audiences that need to be updated about hazards and provided with useful information about the severity of the risk so that they can take action.

Communication effects metamodels

Not only does nominalisation effect the communication between hazard agencies and citizens during emergencies, it can have a profound effect on the **disaster meta-model quality** and calls into question the adequacy of some of the development practices that are used to produce them. If we consider flooding for example, the direct experience of flood professionals is distilled into flood information cards (FIC) that are produced for key stream gauges along rivers in NSW. The formation of FICs is itself a process of technicalisation and abstraction from observations, discussions and professional practices, and will involve varying degrees of nominalisation. FICs assist flood operations, controllers and planners and supplement the information contained in Local Flood Plans (LFP) regarding the flood hazard and the potential effects on at-risk communities. The crafting of LFPs and other policy documents is, by necessity, the consequence of numerous meetings and ongoing revisions and therefore also involves nominalisation. However, in order to expedite the development of meta-models, software engineers construct the details of their computer models directly from written policy documents that include many levels of nominalisation. Disaster meta-models are particularly sensitive to nominalisation because it confuses the M0 and M1 layers and interferes with the process of abstracting from one to the other.

Significance

An understanding of the communication that takes place during information collection and representation means that it is possible to identify nominalisation as it is occurring. By understanding the processes by which various data products are produced by emergency and hazard professionals, it is possible to know where nominalisation is occurring and enable software engineers to develop models that do not suffer adversely from it. Even if it is not possible to monitor the development of these emergency data products directly, it is certainly possible to identify where nominalisation is occurring in the policy documents that developers are using to create their models. The implication is that we can develop tools to warn developers of potential problems with parts of the source policy documents and their related system components and to seek clarification from domain experts in order to model these relations appropriately.

References

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