Research Abstract: "A Self-Organising Awareness System for Distributed Software Engineering"

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Software engineers and other collaborative disciplines rely on informal "out-of-band" communication for effective coordination of their activities, especially in agile methods. This type of communication is lost when development is distributed, with consequent deleterious effects on engineer effectiveness. In order to effectively support distributed software engineering, a replacement for this informal communication must be found.

Much previous research focussed on either synchronous awareness such as radar views and shared editors, where participants were distributed in space not time, or asynchronous awareness such as change notification, which did not explicitly support concurrent activities. A unified approach is necessary to support software engineering. Furthermore, requiring co-location of engineering teams is not possible in today's marketplace where development is often outsourced, consequently a definite requirement for awareness tools to replace informal communication exists.

To implement an awareness tool capable of providing awareness of activities distributed both in time (asynchronous awareness) and space (synchronous awareness). The tool will not rely on a centralised reflector; instead information will be distributed over a peer-to-peer network arranged using a self-organisation algorithm.

Consequently awareness information need not travel more than a few hops from its originating peer, reducing network load and increasing relevance of information received. Unlike reflector-based CSCW systems, the network will scale and will not have a single point of failure in the reflector. Furthermore, without the need to setup a reflector, there is the capability for ad-hoc awareness, using low-complexity peer discovery by local broadcast for example.

The tool will be integrated with the Eclipse development environment. The files a user is currently editing will determine the data they are interested in and fuzzy similarity metrics will be used to compare the collections of each peer in the network in order to drive the self-organisation process. To evaluate the success of self-organisation, a simulation approach will be used before deploying the algorithms in the wild. To evaluate the effectiveness of the awareness provision, initial deployment and controlled experiments will be conducted within the Distributed Software Engineering group at the University of Lincoln and a later version of the tool will be trialled with existing Eclipse users.