

TFG “Self-Organisation in MAS” Meeting

Agenda

16th/17th September

Friday 16th of September

Part 1: Welcome 14:30– 15:00 (30 min)

- Presentation of the group objectives and the meeting agenda by chairs (15 minutes)
- Short "position" presentation (10 minutes) by participants presenting themselves, their research and their long-term views in the area (this is useful to get people to know each other)

Part 2: Case Studies 15:00- 16:00 (1 hour)

- Overview of the selected reference case studies and self-organisation solutions provided (by chairs)
- Presentations by participants (15:30 – 16:00)
 - Paul Verstraete: Manufacturing Control Case Study
This presentation will first describe the case study. It then indicates what the essential model of the factory is. It explains how it is used and why the essential model is needed as an environment for the multi-agent system. Finally, it will demonstrate the need for self-organisation when using the MAS to run a factory.
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- Discussion

16:00 16:15 *Coffee break*

Case Studies and others presentations 16:15 –18:15 (2 hours)

- Establishment of lessons learned from this experiment for software engineering
- Presentations by participants (17:15 – 18:15)
 - Luca Gardelli: A middleware to support stigmergy for cognitive agents
Stigmergy principles have often been employed as effective means to engineer indirect coordination in MASs where agents were very simple. We would like to extend this approach to systems made of cognitive agents, i.e. agents that can reason on a symbolic stigma. In this presentation we will give some insights on the on-going research about artefacts to support cognitive stigmergy. In particular we will provide some examples of a middleware based on TuCSon technology.
 - Gerald Silverberg, Bart Verspagen: Self-organization of R&D search in complex technology spaces
We extend an earlier model of innovation dynamics based on invasive percolation by adding endogenous R&D search by economically motivated firms. The {0,1} seeding of the technology lattice is now replaced by draws from a lognormal

distribution for technology ‘difficulty’. Firms are rewarded for successful innovations by increases in their R&D budget. We compare two regimes. In the first, firms are fixed in a region of technology space. In the second, they can change their location by myopically comparing progress in their local neighborhoods and probabilistically moving to the region with the highest recent progress. We call this the moving or self-organizational regime. We find that as the mean and standard deviation of the lognormal distribution are varied, the relative rates of aggregate innovation switches between the two regimes. The SO regime has higher innovation rates, other things being equal, for lower means or higher standard deviations of the lognormal distribution. This result holds for increasing size of the search radius. The clustering of firms in the SO regime grows rapidly and fluctuates in a complex way around a high value which increases with the search radius. We also investigate the size distributions of the innovations generated in each regime. In the fixed one, the distribution is approximately lognormal and certainly not fat tailed. In the SO regime, the distributions are radically different. They are much more highly right skewed and show scaling over at least two decades with a slope of almost exactly one, independently of parameter settings. Thus we argue that firm self-organization leads to self-organized criticality.

Saturday 17th of September

Case Studies and others presentations 9:15 –9:45 (30 minutes)

- Presentations by participants
 - Giuseppe Vizzari: A Situated MAS for the Detection of Emergent Links in an Adaptive Web Site
- A web site presents an intrinsic graph-like spatial structure defined by pages connected by hyperlinks. This structure may be considered as an environment on which reactive situated agents related to visitors of the web site are positioned and move in order to track their navigation. In particular, the situated agents may detect recurrent patterns of navigation, and propose them as possible emerging links. The latter are hyperlinks that are not provided by the static structure of the website but that are considered useful to customize the web site structure to better fit specific user's behaviour, or to globally optimize it for every generic visitor. The selection of those emerging links that can be exploited to adapt static web pages is delegated to a specific UI agent. The latter selects the possible emerging links according to the current context of the visitor (i.e. selects only those links starting from the currently viewed page), and other considerations (present only emergent links generated by the visiting user or also exploit those ones generated by other users). Users access thus a self-organizing web site which adapts its structure to their behaviours.

Part 3: Concept Definitions 9:45-11:15 (1:30 hours)

- Presentations by chairs of definitions of relevant concepts (10 minutes)
- Self-organisation vs emergence
- Establishment of one or more definitions of the term “emergent phenomena”.

11: 15-11:30 Coffee break

Part 4: Open Issues 11:15 – 11:30 (30 minutes)

- Identification of open issues, hot topics, additional valuable points

Part 5: Book preparation (11:30 – 12:30) (1 hour)

- Scope
- Content
- Roadmap

Part 6: Wrapping up: Synthesis and conclusion 12:30-13:00 (30 minutes)

- The TFG organisers will summarise the work done in the TFG meeting
- All participants will fill up a form to evaluate the meeting (5 minutes)
- Dissemination plan

13:00 End of TFG SO

13:00-14:30 Lunch