Adaptive business process management
On-the-fly, large-scale reconfiguration of workflow

Overview
The complexity governing companies' business processes is increasing, and companies need to adapt to survive. Whilst setting up a formal business process management (BPM) system is very beneficial, it is often difficult to continuously adapt this system, given the rate of change in the requirements and market conditions. Leading researchers from Imperial College's Computer Science department have extensive experience in adaptive software systems; capable of recognising changes in the environment or objectives, and adapting on-the-line, whilst running. This can potentially be applied to business process modelling with dynamic reconfiguration of workflow management. The aim is to adapt to new initiatives (such as 'open innovation'), or other major changes in the organisation.

According to a Gartner report, 80% of organisations conducting BPM projects will experience an internal rate of return better than 15%, with several surveyed companies achieving returns in the $100,000 to $500,000 range per BPM project. Clearly, such benefits would be retained and compound in a system that can adapt over time, given changes in the environment or objectives. Even without a formal BPM in place, it is generally a very useful exercise to start with a set of use-cases, codify one process, and use that as a starting point. We are seeking partners looking to exploit our capabilities and set up co-development projects, to experiment, validate and tailor the technology to your business needs.

Technology
At a high-level, the technology is grounded in a form of artificial intelligence, called logic-based inductive learning. This is separate and distinct from statistics-based machine learning (e.g. neural networks), in that it relies on logical rules rather than a statistically-generated 'black box'. The rules, or logic-based descriptions, relate to a company’s ‘business rules’ which form a core part of their business process management (BPM) system.

The foundation of our technology lies in verification & synthesis, forming two sides of the same coin. Given an environment and a set of goals and rules, you can ‘synthesise’ a workflow, which in turn is ‘verified’ against the rules / goals when the environment changes. By iterating round this loop (see Fig 1), the system is able to adapt the business model on-the-fly, given changes in the environment, the rules or the goals. It ensures that all business rules / goals are met at any one time. As such, it is not software optimisation per se, but rather a framework which makes it possible to support and execute organisational change at a rapid rate.

This framework can be applied to any set of software modules that need to co-ordinate as part of the business model; i.e. it acts as the ‘glue’ between the modules and orchestrates the various parts of software, through dynamic evolution.

Benefits
• Automatic reconfiguration
• Guaranteed alignment of goals
• Rapid large-scale change

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