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Business Rules vs. Machine Learning

There are different ways one can think about a business process. One can think of it as a series of activities, linked together to accomplish a goal. Or, you think of it as a series of decisions that result in a desired outcome – a loan being granted or declined for example.

In the 1970s, it was common to show process activities linked by diamonds and arrows, picturing decisions that occurred between specific activities. One might show a box labeled "Analyze Application" leading to a diamond and arrows to two subsequent boxes, one labeled "Grant Loan" and one labeled "Decline Loan."

In the 80s and 90s, following the interest in expert systems, it became common to dig deeper into decisions and list the specific business rules that workers used to make decisions. A typical business rule (in the abstract) might look like this:

If A is the case, and B > x, and C is > y, Then client is creditworthy.

Using this approach, one might *attach* a set of business rules to the "Analyze Application" activity box. Anywhere from 50 to 5000 business rules might be used to analyze a loan application, depending on the nature of the loan.

The analysis of business rules, like the development of an expert system, could be quite labor intensive. One sat with a human expert and studied cases and asked questions to determine just what rules the expert used in his or her analysis effort.

Ron Ross and others have written books describing procedures for developing business rules. The problem with business rule approaches, as with expert systems that were also based on rules, is that they are expensive to develop, and then need to constantly updated as rules change. Most expert systems proved to expensive to justify the continued maintenance effort.

Today, businesses are more focused on using new Artificial Intelligence (AI) techniques to develop business decision systems. These *machine learning* or *neural network* based approaches are proving earlier to develop and much easier to maintain. In essence, one teaches the AI system by showing it examples of successful cases, and then lets it analyze other cases on its own to improve. The automated learning feature gets around the costs previously associated with business rules.

The problem with the latest AI systems is that they depend on sophisticated statistical algorithms and do not make the knowledge used explicit. Thus, one can create a system to analyze a loan, but one can't necessarily explain why it turned down a loan in a specific case. Sometimes this is acceptable and sometimes it isn't.

Consider a recent self-driving car application. The application depended on being given a goal, having a map of the area in which it had to maneuver, and having real time visual (camera) inputs. The application had two parts. One part used explicit business rules to interpret traffic signs and lights. It's easy to specify: If the light is red, then stop. If the light turns green, then proceed. The other part was developed using a neural network that took pixel inputs from the cameras, used visual recognition to turn sets of pixels into objects (cars, people, roads, walls) and applied its own rules for maneuvering among the objects while following the map to a designated endpoint. It would be hard to specify all the rules involved in interpreting pixels and deciding on how to maneuver among objects, but the neural network was able to determine a workable set of rules and can accomplish the task.

In effect, the last frontier in automation is fine manipulation and human decision making – especially decision making that needs to take place in real time – as for example during brain surgery on a human being. The latest AI applications are beginning to be used to tackle these types of processes.

Process practitioners are going to find some of the new processes incorporating AI a challenge to understand, but with time, they are going to improve productivity just as surly as earlier computer applications did. Meanwhile, business rules aren't going to disappear, but their role is going to become increasingly limited to simpler decision tasks.

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