When Do Expert Systems Really Become Expert?

In previous blogs I have explored issues such as connectivity between systems (The Babel fish Question), and explored Return on Investment in some detail.

As a non-geek who has spent a long period around automotive systems and databases, one of the other conundrums I occasionally ponder (yes...it's that sad!!) is our natural reluctance to let technology enter the role and domain of the "expert".

I once heard a great definition of an expert by a chap who described them as follows:- "The ex refers to something in the past, and the spurt refers to a drip under pressure!" In the human context expert refers in my mind to someone who can display either significant experience of the subject matter, or an intrinsic skill, or more probably both.

In the computer world, expert systems are actually something quite different. Rather than being systems that plot, file or calculate on a robotic basis, expert systems use logical processes or algorithms to optimise the best solutions from almost infinite combinations of outcomes.

Talking to students of this area is fascinating and frightening at the same time as it certainly made me realise that I didn't concentrate enough at school! The basic mathematical complexity is quite immense, but the concept isn't.

Our human expert will rely on his experience. Give him a relatively simple conundrum to solve, assuming it is within his realm of expertise, and no doubt he will suggest a solution that is pretty good. Will it be the best – probably not? Take for example a structural engineer being asked to design a roof truss system to be inserted in an historic building.

The factors he will need to consider are complex and varied. Cost, aesthetics, load bearing capacity, and general architectural fit. Some of these are numerically precise – cost, load etc, and others are more subjective. You can weight the scoring of all these factors so that the most important areas carry the greatest importance.

Now, our expert should really list all the options available to him, which could be a huge variation, and calculate the weighted optimum for each...and then pick the highest score. He won't though, because mathematically the potential range of options for a relatively simple task with few variables is huge. Put together a relatively complex conundrum and the possibilities will range into numbers we don't even recognise.

Our expert will have chosen a decent solution, and be honest, as long as the roof does not collapse...everybody is happy.   But say the conundrum our expert advises upon is a recurring one – traffic routing, prioritising the order of repairing vehicles in a major body centre, the pricing of a large stock of competitively priced commodities for example. Here, choosing an ok solution rather than the optimum solution is costing you money......every day!

Years ago, I suggested an algorithm to colleagues designed to score a high volume used car stock based on stock age, volume in stock, and expected future volume in stock.   This wasn't a full auto

pricing solution, just a way of highlighting problem vehicles. The reaction received was somewhat akin to requesting intimate relations with their loved ones!!

Why. The simple answer I guess is fear. There is still a Luddite gene that lurks in us all. Today its chips, artificial intelligence, fuzzy logic etc that brings out the worst in us rather than water powered looms or whatever sparked those riots.

Would as an automotive semi geek I countenance fully automatic pricing of a large used vehicle stock.....no, I wouldn't. Think back the stock market crashes in the early 90's – black Monday – here auto sell instruction for stocks added to the herd mentality and served to wipe billions off stock values. Would though I subscribe expert systems suggesting optimums to genuine expert people? You bet I would. The combination of mathematical optimisation of multi variables and a street wise intuitive expert will deliver the best results.

To answer the original question, when do expert systems become truly expert, the answer is probably never. Mathematical optimisation is a highly limited form of expertise and it is only this that expert systems can truly cater for. No doubt I'll be corrected by computer science aficionados who will quote developments in artificial intelligence – computers that learn as they go etc. – but I think it will be a while before this filters to our automotive world. Systems though that can help solve high volume multi facetted conundrums are here now, today, and our failure to really embrace and adopt these is probably costing us money.

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