



Technical Information

MetaCause™ incorporates three powerful concepts:

Receiver Operator Characteristics (ROC)

A powerful concept borrowed from the medical diagnosis field, allows characterisation of results from an imperfect test (or process).

If a test is performed, the results can either be positive or negative. From this, we accept that there is some variability in the test (or process) and the result is either true or false. The “False Positives” and “False Negatives” represent the occasions where there is noise/error present in the result.

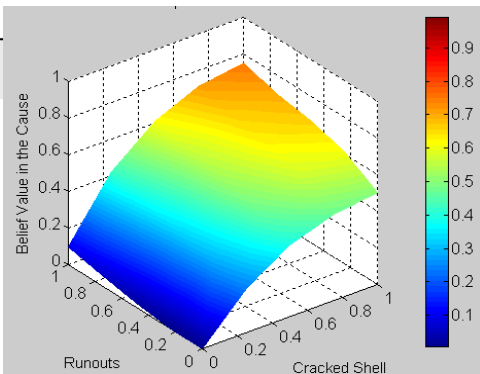
This variation is often disregarded by other methods, but is an important part of accurately capturing patterns, and more importantly, the significance of patterns, in noisy data.

Noise in a complex process data is inevitable, that is why it is complex! What makes MetaCause stand out, its ability to deal with noise effectively. By combining powerful techniques such as ROC with common sense philosophy, true patterns can be captured accurately.

A result can either be positive or negative, but is the result true or false?

True Positive	False Positive
False Negative	True Negative

It is the characterisation of the noise which is important in the optimisation of complex processes



Relationship Hyper-Surface

One of the most important parts of MetaCause is the novel way it calculates and stores information about relationships. Optimisation process in MetaCause uses this hyper-surface along with constraints developed using the ROC and Impossible Probability theory. MetaCause technology has two pending patent applications across many countries in the world.

Interactions and Impossible Probability

Probability represents frequency of occurrences and is used to calculating the likelihood of a desired output.

MetaCause employs an evidence based approach in its optimisation engine. So it looks for the probability given certain evidence.

In these problems, we have a lot of evidence about all responses for all observations. Constructing these phrases mathematically to incorporate all possible occurrences of responses for all observations very quickly becomes impossible.

MetaCause makes this possible by bringing together many techniques to represent the relationships, interactions and patterns which make up the roots of probability.

- Probability of a hypothesis
E.g. “Factor A, High, has a positive effect on the process”

$$P(H)$$

- Probability of hypothesis given evidence
evidence “defect 1 occurs”

$$P(H | e_1)$$

- Probability of hypothesis given evidence
defect1 occurs,
defect2 does not occur,
defect3 sometimes occur, etc.

$$P(H | e_1, \neg e_2, e_3@40\%, etc)$$