USING **CONFIDENCE SCORES** TO AID DECISION MAKING

OUTRA
MAKING DATA WORK

OUTRA.CO.UK

USING **CONFIDENCE SCORES** TO AID DECISION MAKING

PREDICTING WITH CONFIDENCE

It is true big data and models can help overcome biases that cloud judgment, but what happens if these models are flawed?

Think about the last time you and your colleagues last made a significant marketing decision with the help of some data. Were you 100% confident that the decision you were making was fully supported by the modelled data? Did you even know the architecture of the model or the data contained within it, or bother to find out? Were you slightly anxious?

The majority of people we speak to agree that modelled data can be worrying. In fact, research from KPMG reveals that few decision makers trust the way their organisation uses different types of analytics and the trust gap is not reducing with experience or time.

65%

of respondents do not trust their organisation's use of analytics.

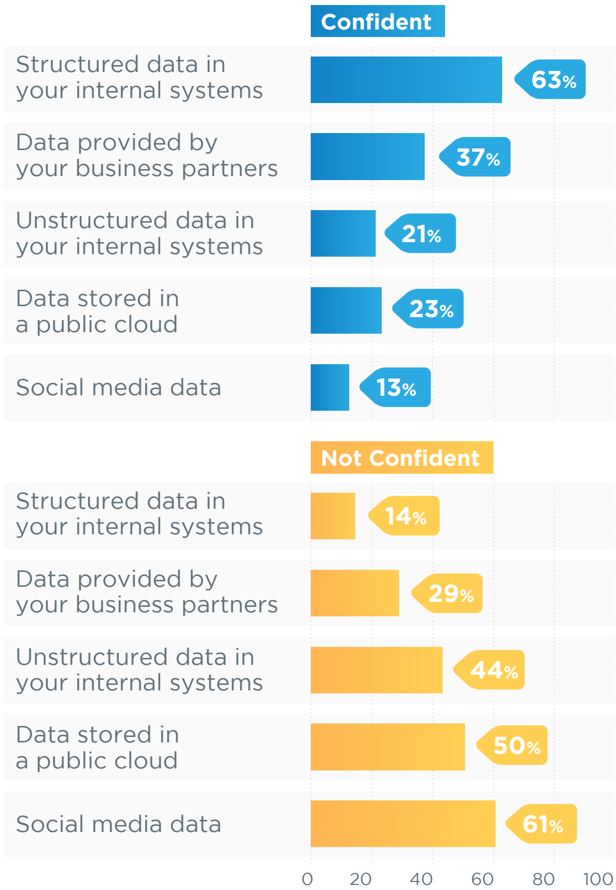
Source: KPMG

DATA CONFIDENCE

It's a double-edged sword, as the growing power of models has meant they are increasingly being used for decision making. Combining vast amounts of data and increasingly sophisticated algorithms, modelling has opened up new pathways for improving corporate performance. This too creates problems and degrades data confidence. As growing numbers of disparate data sets are combined the level of confidence diminishes.

As research from IBM shows, different types of data engender different levels of trust. For example, social media data inspires only 13% confidence, whilst structured data from an internal system generates five times that at 63%.

What is your confidence level in data from each of these sources?



NOTE: The remaining respondents for each data type had neutral responses - neither *confident* nor *not confident*.

Source: IBM

USING **CONFIDENCE SCORES** TO AID DECISION MAKING

Models can be immensely useful, often making very accurate predictions or guiding knotty optimisation choices, but if confidence in the data is low, the likelihood of befitting decision making is also low.

Avinash Kaushik, Google's digital marketing evangelist, advises that when it comes to predictive models the majority of a business' focus and resources should be on data analysis. He suggests a ratio of 15% data capture, 20% data reporting and 65% data analysis. Yet research shows that reality doesn't match up. 80% of time is spent finding, fixing and integrating data and 12% of the time is spent defending data and re-validating it. Leaving only 8% of time for the analysis. No wonder therefore that most analytics programmes fail.

86%

of executives say their organisation's analytics are not effective. With a quarter of them going further and saying that modelled data hasn't been worth the time money or effort.

Source: McKinsey

So, what's the solution? Clearly there is an appetite for predictive models, but trust levels need to increase, whilst time spent validating models needs to decrease. If every piece of data came with a confidence score it would expedite the process and free up more time for the nitty gritty - or in technical terms – the science bit!

WHAT IS A CONFIDENCE SCORE?

A confidence score is simply a figure that indicates the confidence level of that piece of data i.e. how accurate is it? Traditionally confidence scores described the provenance of the data - if it is known where the data came from and if it is fully verified. For instance, using a very simplistic example, home movers data from Royal Mail would have a high confidence score because the data has a legitimate source and it is validated because the data subject themselves has filled out a postal redirections form. By comparison, home mover data compiled from redirects or 'not known at this address' notifications would be considered low confidence as it hasn't been verified. If an address was flagged by both methods the confidence score would be even higher as both systems are in agreement.

As data has become more complex and unstructured (80% of data is now unstructured) confidence scores have also become more sophisticated, incorporating a number of factors that help establish the reliability of the data.

These factors might include:

- **System integrity** - how many systems have the same data value?
- **Governance** - is the data compliant?
- **Correctness** - is the data correct?
- **Completeness** - is the data complete or incomplete?
- **Security** - is the data safe from breach and loss?
- **Timely** - how old is the data?

These factors help paint a more detailed picture about the data subject and there are many more factors that can be applied. Additionally each can be weighted in terms of their relative importance to the overall score.

92%

of C-suite executives are worried about the reputational risk of modelled data on their business.

Source: KPMG

USING **CONFIDENCE SCORES** TO AID DECISION MAKING

CONFIDENCE SCORES IN THE REAL WORLD

This is why confidence scores are crucial to today's modelled data attributes. For many businesses, to be able to trust and use data science and modelled data, transparency and explainability are key. Examples of successful decision models are on the increase. For instance retailers are using them to gather real-time information about customer behaviour by monitoring preferences and spending patterns. This means they can run scenarios to test the impact of changes in pricing or packaging.

With confidence scores appended to each attribute executives can measure the likelihood of that impact and make more informed choices.

Banks approve loans and insurance companies extend coverage, basing their decisions on models that are continually updated, factoring in the most information to make the best decisions. This data changes constantly as the information that feeds the system is updated in near-time. Confidence scores can therefore be used as a determinant. If the confidence score dips below a set measure the loan or extended coverage is refused. Credit issuing organisations use models to detect card fraud with a confidence level, indicating the likelihood that the card is being used fraudulently, and agricultural companies use models to run simulations helping them to optimise yield with a confidence scores providing the assurance of different crop rotations.

These are just a handful of examples but in real life there are hundreds of thousands of applications of modelled data. If brands are to make important decisions pertaining to pricing, qualification, risk and more using data science, they have to be able to understand how models came to the scores they have and how accurate the models themselves are. It is vital for communicating with customers and regulators alike.

THE PROBLEM WITH CONFIDENCE SCORES

So far the ability to create a confidence score sounds pretty easy – right? Why then aren't more companies doing it? Quite simply because there are two major problems in creating accurate confidence scores on modelled data. The first is when there isn't very much training data available. The second is when there is an abundance of training data available, but it is skewed or not representative of the data to be predicted. If this is the case there is a significant risk that the model will produce high confidence scores for inaccurate predictions. This is because the scoring population is inconsistent with the training population.

It's like creating a model to identify oranges and using it to predict apples. That the model has good confidence in its ability to predict oranges simply isn't applicable.

To mitigate the risk of unavailable training data, a good knowledge of the mathematics that informs selecting the right statistical approach to select upper and lower confidences reflective of volatile data is key. The solution to the second issue is more complex than it might seem at first. To combat it, it is crucial to create a process that is calibrated to the test data. In recent times the flood of data has removed the need to be strict with confidence scores and boundaries, however when modelling on skewed data this discipline is still imperative. Training and test data must be collaborated to remove bias.

WHY CONFIDENCE SCORES ARE VITAL

With models becoming ever more widely used in business it is crucial for executives to have confidence in the data they are using to ground their decisions. Yet, given the challenges outlined above creating confidence scores can often be just as complex as creating your predictive model. But they are just as important – if not more so. It requires judgment, statistics and experience. Moreover, accurate confidence scores are vital when providing data that will underpin business process and an important part of building trust both with consumers and regulators.

ABOUT THE AUTHOR:

Emma Duckworth, Client Data Science Lead

Emma is responsible for delivering the data science and analytics at Outra. She previously held the position of Data Science Consultant at IBM in the advanced analytics team, responsible for bringing Watson to the UK. She has also delivered a UK wide mission and behavioural customer segmentation for Marks & Spencer and many predictive models for brands such as Investec.

emma@outra.co.uk

ABOUT OUTRA

Outra is a customer data science business that helps companies drive performance.

We unify and refine large scale unstructured and structured data sets, from multiple sources at speed. We apply AI to build insights about your customers to understand why they behave as they do, and what motivates them to act. We analyse this data over time to interpret trends and predict change, applying confidence scores to all modelled attributes to aid decision making. We then deliver actionable insight with speed and agility through Velocita, our customer data platform.

OUTRA
MAKING DATA WORK

020 3880 8485

5TH FLOOR, ONE NEW CHANGE, LONDON EC4M 9AF

OUTRA.CO.UK