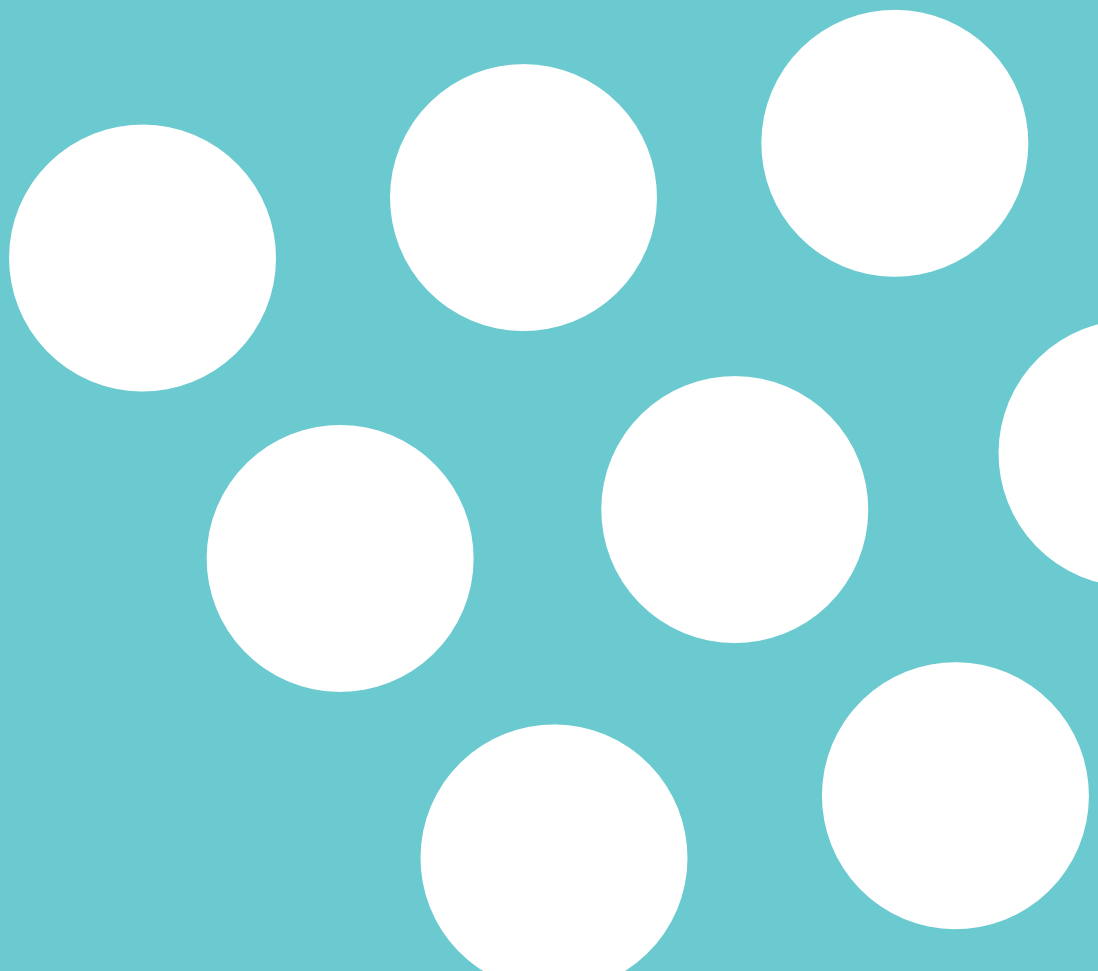




Managing consumer anxiety in the age of Machine Learning.

Education, Transparency and Choice.



Introduction

If you've been following the buzz around Machine Learning you'll know the economy is faced with a rapidly emerging technology that's literally bursting with potential benefits for virtually every sector of industry. Despite Machine Learning's complexity and years of negative connotations from the film and television industry, our latest research shows that the benefits of this new technology haven't been lost on the general public.

Ignore the 'robots are taking over the world' headlines for a moment and consider that our survey discovered more than half of the public (52%) value the increased productivity and efficiency that Machine Learning delivers.

Nearly a third (32%) are confident about businesses using Machine Learning and 30% thought that despite being in its relative infancy, Machine Learning is already having a positive impact on society.

However, with a sizeable section of the public (40%) saying they found Machine Learning 'scary' and 'confusing' there is clearly still work to be done before the technology is universally accepted. For example, Machine Learning has a slightly different definition depending on the person you ask, so it is understandable the wider public can be confused.

At Black Pepper, our definition of Machine Learning is: "The science of getting computers to act and make decisions without being explicitly programmed by a human, instead letting them come to their own conclusions from knowledge the system has gained through statistical methods applied to data."

The findings contained in this report come from our study of 2,000 UK adults, conducted in October 2018 by OnePoll on behalf of Black Pepper Software, which was designed to shine a light on the public's attitudes, theories and general understanding of Machine Learning. We have analysed the key findings and interpreted what they mean for technology leaders and organisations looking to build customer acceptance of Machine Learning and embed it within their operations.

Our recommendation is that businesses building strategies in this space would be well advised to focus on maximising **education, transparency and choice** as they move forward using Machine Learning capabilities.

The benefits of Machine Learning and Artificial Intelligence (AI) to the UK economy.

Recent research by PWC found that:

UK GDP will be up to 10.3% higher in 2030 as a result of Machine Learning and AI – the equivalent of an additional £232bn – making it one of the biggest commercial opportunities in today's fast-changing economy.

The impact over the period will come from productivity gains (1.9%) and consumption side product enhancement and new firm entry stimulating demand (8.4%).

There will be significant gains across all UK regions, with England, Scotland, Wales and Northern Ireland all seeing benefits in 2030 at least as large as 5% of GDP, and extra spending power per household of up to £1,800-£2,300 a year by 2030.

Education to fill the Machine Learning vacuum

While the majority of the public welcome Machine Learning and the potentially life-enhancing benefits it brings, a minority still have a negative view of the technology, and this outlook is almost certainly seated in Hollywood myth. For decades, Hollywood has unfairly portrayed Machine Learning as a negative force (The Terminator Franchise, 2001: A Space Odyssey etc), without showing any of the very real benefits. This makes for fantastic sci-fi movies but gives Machine Learning a very raw deal.

In the absence of accurate knowledge and information about Machine Learning, these modern Hollywood myths have filled a vacuum in a minority of the public's understanding.

For example, our research found:

40% find the term Machine Learning scary, but 44% believe it is a revolutionary innovation for business and society

40% of the public are confused by Machine Learning – with over 50% of respondents scared by the concept when given our definition

42% don't even know if the goods and services they use feature Machine Learning.

12% of the survey respondents even say they think Machine Learning could 'bring about the demise of the human race' – a clear indication of how far Hollywood myth has been accepted as a real outcome by some respondents!

What do these findings mean for technology leaders and their organisations?

At Black Pepper we recognise that businesses and technology leaders have an important role to play in raising awareness around the benefits Machine Learning has to offer consumers and service users in virtually every sphere of the economy.

Machine Learning can help you make better-informed business decisions, improve your internal processes, optimise your user experience and give you a leading edge.

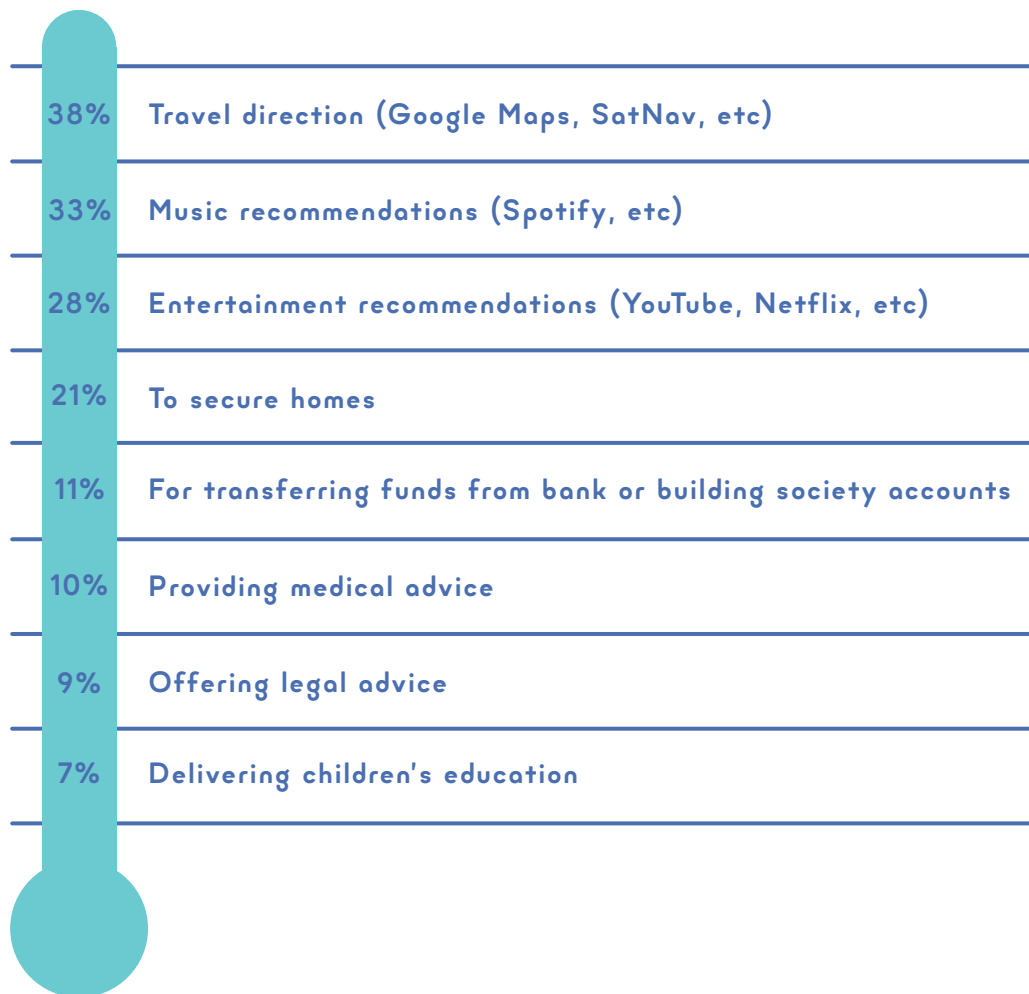
With the ability to learn from data, identify unseen patterns and make predictions, Machine Learning can be applied to lots of use cases across every industry.

Action Points

Education. For Machine Learning to achieve acceptance across society, technology leaders must explain its benefits and limits, and focus primarily on positive outcomes before attempting to explain complex mechanics. Increased exposure to Machine Learning will also ensure the technology becomes more familiar, so companies should subtly let consumers know Machine Learning is being used wherever possible.

A question of trust

Multiple factors combine to create a scale of trust, as displayed in the infographic below. Some everyday tools and products leverage Machine Learning capability, and these are seemingly more trusted by consumers questioned in our survey.



What does this mean for technology leaders and their organisations?

Technology leaders and their organisations will need to devote varying levels of resources aimed at winning the hearts and minds of their customers, depending where they sit on this sliding scale of trust. Throughout this report we recommend a three-stage plan to promote Machine Learning using education, transparency and choice. Organisations will need to devote considerably more resources in these three areas if they wish to offer legal advice and children's education services compared to music recommendations and travel directions.

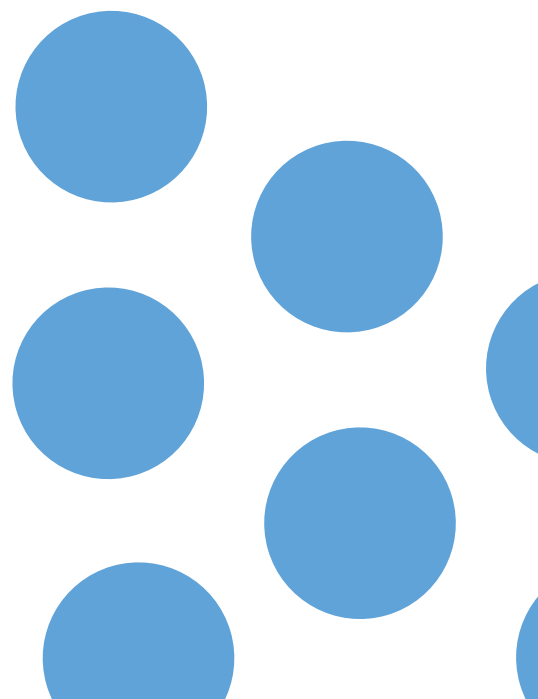
Exposure to existing well-performing tech comes out at the top, while understandably high-value, life-influencing interactions are at the bottom of the trust scale. However, the very fact there are pockets of consumers saying they would trust Machine Learning for crucial life decisions underlines its transformational potential.

Retail, security and manufacturing are currently the industries perceived to be benefiting most from Machine Learning, but in five years' time medicine, healthcare and automotive are expected to join them as the industries that will benefit the most, according to our survey.

It could be argued that trust in Machine Learning across the board will grow with greater exposure to the technology. It is, of course, difficult to trust a process you don't fully understand, and this is especially the case with neural networks.

Winning hearts and minds

Machine Learning can seem incredibly complex to the general public, especially cutting-edge neural networks that base single decisions on billions of steps.



Despite the complex nature of the subject, the greatest effort should be taken to explain the process while avoiding problems that might arise from 'blinding with science'. It's a tough balance to find but our research shows it can be solved by offering Education, Transparency and Choice.

Consumer trust in Machine Learning will also grow if expectations are realistic, but the benefits of Machine Learning must be qualified and put in context while hype needs be avoided. The below checklist should provide a useful aid when explaining Machine Learning to consumers.

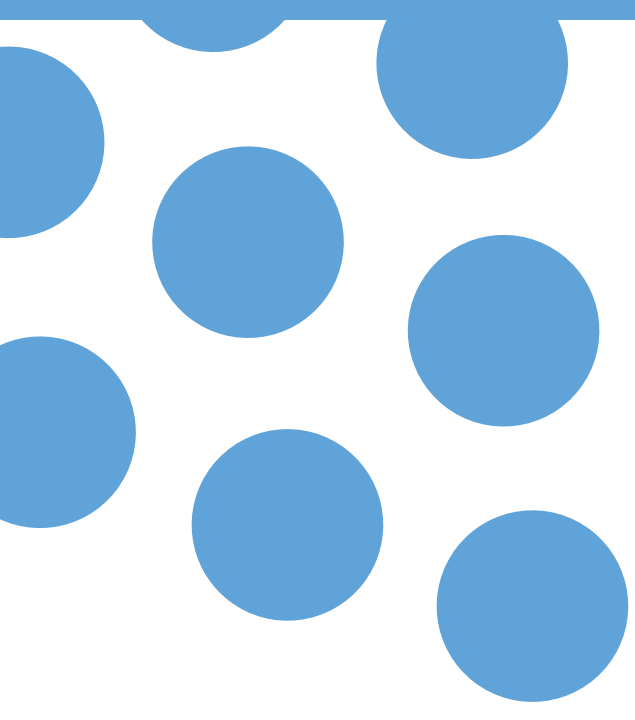
However, they must be conveyed sensitively and with recognition that consumers typically view Machine Learning as 'a whole new world'. **The rise of Machine Learning is, after all, an emotional subject, with 27% of survey respondents concerned about the erosion of human values, and the same percentage wanting greater reassurances on the security of machine learning.**

Myth busting brings clarity

- Machine Learning isn't foolproof, just as the humans who design it aren't foolproof. It is possible to bake-in bias and inaccuracy at the coding stage
- Machine Learning is only as good as the available data
- Humans are physically incapable of making sense of the huge datasets Machine Learning can analyse and act upon
- Machine Learning will make mistakes but significantly fewer than humans and with a much lower cost
- Machine Learning mistakes will receive a disproportionately high level of media interest compared to human mistakes i.e. 1,700 people are killed on UK roads annually with the majority unreported. If one person is killed in an accident involving an autonomous vehicle it will receive front-page coverage
- The benefits of Machine Learning significantly outweigh the risks.

Machine Learning and transparency

Significant sections of the public often have a distrust of the unknown, and that needs to be recognised by technology leaders and their organisations developing strategies and business cases supported by Machine Learning. Despite respected research that suggests otherwise, our survey found that 69% of respondents are concerned that machine learning will cut jobs and deskill humans if we over rely on it.



To give wider context, recent research carried out by **PWC suggests that up to 7.2 million new jobs will be created by Machine Learning in the UK over the next 20 years.** PWC says the technology will also make people richer, 'reducing prices and increasing real income and spending levels'.

There's clearly a gap in perception here. According to our research revealing the UK public's opinions:

52% of consumers are worried about Machine Learning making choices that impact them without their prior knowledge

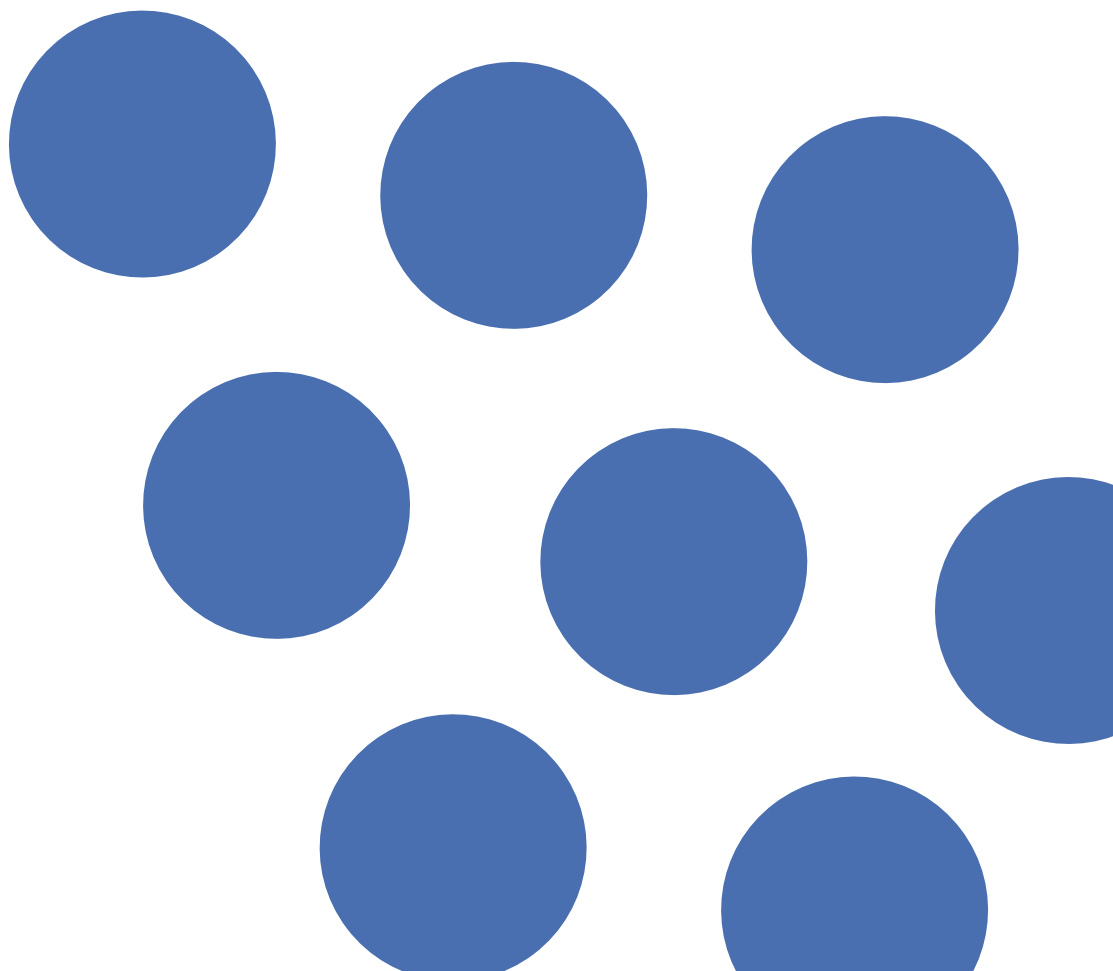
21% don't realise Machine Learning could make choices without them knowing

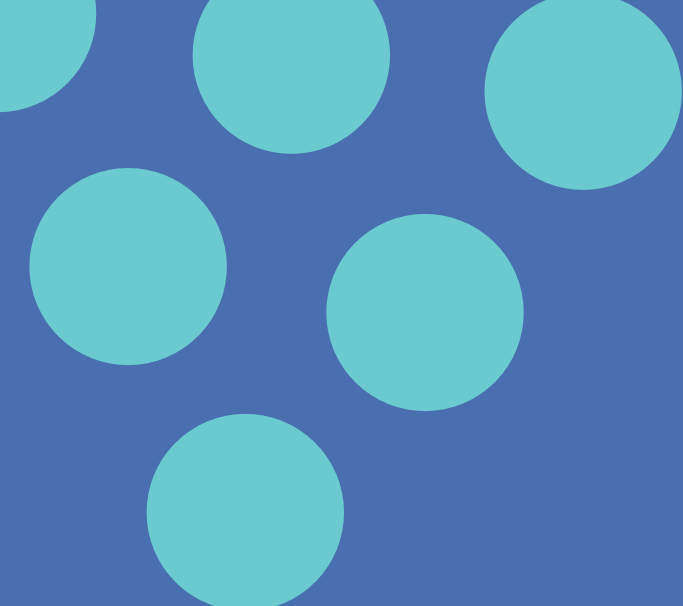
32% want greater transparency about when Machine Learning is being used by the business they interact with

33% want the right to choose to opt in to services that use Machine Learning

This latter statistic is arguably a case of consumers becoming a product of their environment, influenced by the wider marketing landscape.

2018 was the year of GDPR compliance and a shift towards consumers taking more control of how their personal data is used by the companies they interact with digitally and physically. A third of consumers wanting opt-in and opt-out services around Machine Learning suggests the new online cookie permission landscape dictated by these new regulations has influenced their thinking.





What do these findings mean for technology leaders and their organisations?

Practitioners need to acknowledge the public's concerns and act upon them, however mis-informed public opinion may be. Otherwise, there is a risk that consumers may completely opt out of goods and services powered by Machine Learning. This could prove to be a real barrier to widespread adoption and would lead to organisations and sectors missing out on the transformative benefits of the technology. Our two key recommendations here are to maximise transparency around Machine Learning and offer choice, when possible, so that consumers don't feel as though they are being forced to accept the technology.

Action Points

Be transparent. Depending on the context, efforts should be made to be transparent about the use of Machine Learning i.e. job applications, important financial decisions, etc.

Offer choice. There are benefits of providing varying options, including opt-in schemes and cookie pop-ups. Efforts must also be made to provide 'prediction explanation' functionality, even with 'black box' neural networks, to ensure Machine Learning is not just accurate but understandable as well.

Three steps to reduce machine learning anxiety

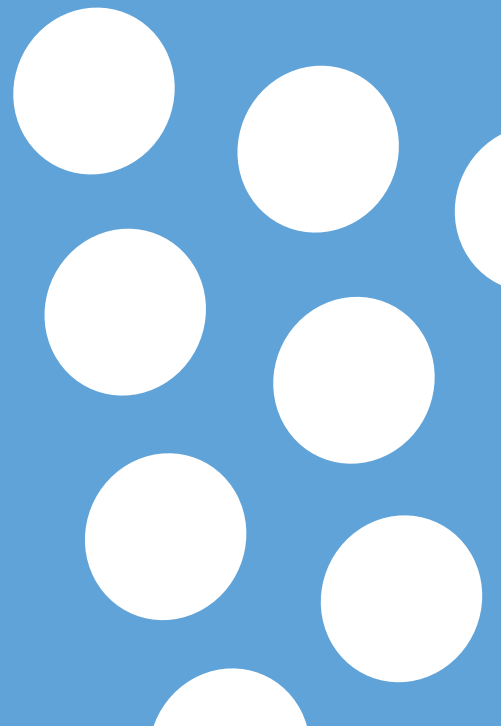
As our research shows, it is clear consumers generally accept the benefits of Machine Learning. However, a significant minority are treading more cautiously when it comes to this transformative technology and what it means for their lives. Businesses using Machine Learning, therefore, would benefit from running through the checklist below regularly to ensure they are winning the hearts and minds of their customers. Innovation and new technology is typically developed for the greater good, but the wider public often needs to be taken on that journey in incremental steps – otherwise barriers are raised.

Moving forward, businesses should consider the fundamentals at every stage:

Education, Transparency and Choice.

1. Empower the consumer

Give consumers input into how an algorithm makes a decision. This collaborative approach will empower the consumer, build trust and increase transparency. The simplest example is adjusting a product recommendation engine.



2. Flag-up Machine Learning use whenever appropriate

Tell consumers whenever you use Machine Learning to make important decisions that impact their lives. Do this in a subtle way. Increased exposure to, and hands-on experience of Machine Learning will ensure the technology becomes more familiar, therefore reducing anxiety.

3. Share information and give options

Explain how and why Machine Learning is being used in easy-to-understand language at a logical point in the consumer's journey. Giving your customer the ability to opt in to, or out of the use of Machine Learning will give them a feeling of control, and therefore greater comfort.

How Black Pepper Software can help

Black Pepper can create, train and deploy self-learning models to improve your day-to-day business decisions.

We pride ourselves on delivering bespoke, industry-leading software that generates real return on investment for your organisation. Our UK-based team is ready to work collaboratively with you to build the unique software you need; on time and on budget. With Black Pepper it's your software, your way.

Some of our recent Machine Learning projects include:

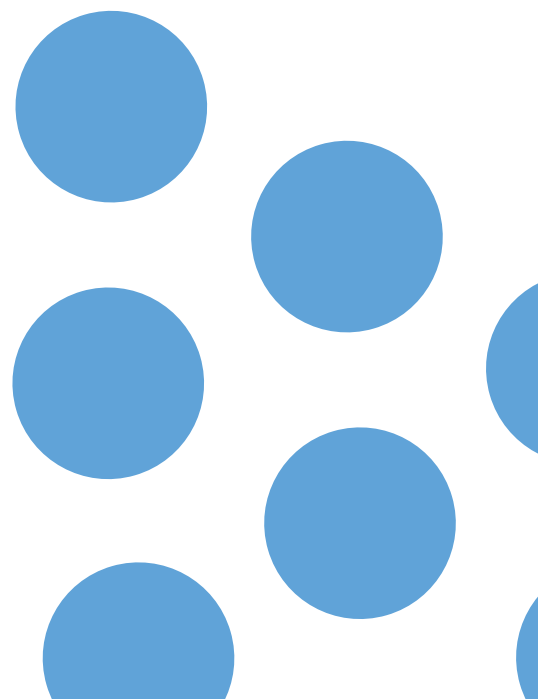
Evenlode - Fund managers Evenlode Investments partnered with us to streamline data capture processes to help them make investment choices.

Jaguar Land Rover - JLR worked with us to conduct a discovery experiment using data to assist in intelligent product quality assurance, improving the first iteration's Machine Learning System accuracy from 45.8% to 84% in a matter of days.

Global Logistics Provider - We helped them understand the structure of their current data and whether it was suitable for Machine Learning applications in future. We were able to improve data collection to ensure they could apply Machine Learning techniques.

“Black Pepper came in to our business and took the time to understand our data and business domain first in order to provide useful Machine Learning software.”

Sandeep Murthy,
Quality Systems Manager,
Jaguar Land Rover





Talk to Black Pepper about our
approach to Machine Learning today

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