The Guide to Artificial Intelligence for Research & Analytics

Mike Stevens

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About this ebook

This guide aims to demystify AI, show how it is used today, and suggest tangible steps for insight teams to make the most of it.

It is broad, and not particularly deep. It focuses on practical applications, not theory.

Part 1 is a bluffers guide to some basics of AI.

Remember when you were in your teens, and people started talking about new music you hadn't heard? You didn't feel right until you had listened to the track everyone was talking about.

Reading this section will be like listening to that track: you're not going to be an instant superfan, but you'll be able to hold your own next time it comes up in conversation.

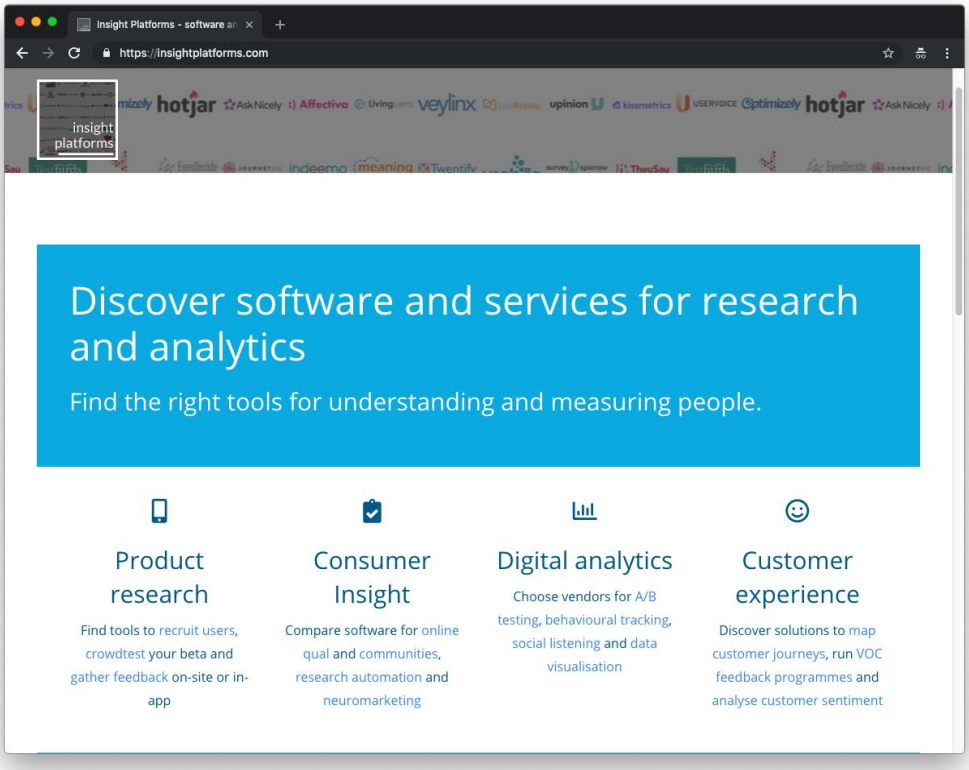
Part 2 is the longest section.

It covers 23 different applications of AI in research & analytics. These are all things that are happening today, some of which you will be familiar with. This section also includes examples of technology platforms and links for you to find out more.

Part 3 is a short roadmap for maximising the AI opportunity.

If you work in research & analytics – for a brand or an agency – this section has 5 action items to help you prepare for the changes AI will bring.

About Insight Platforms



Insight Platforms is a learning resource for buyers in product research, consumer insight, social intelligence, customer experience and digital analytics roles.

It is the only site dedicated to software and data solutions for research, with comprehensive directory and expert content help users learn about and choose the right platforms.

In the Platforms Directory, users can search or browse to find software providers, data sources and managed services. They are able to find and compare more than 700 suppliers in 30 categories, from A/B testing to Visual Analytics.

The Blog includes how-to guides, independent reviews and strategy articles written by agency, consultancy and enterprise experts.

The Resources section includes exclusive content and learning materials for registered users: e-books, mini-courses and webinars.

About the Author

Mike Stevens is a leading advisor, writer and speaker on the intersection of technology and research.

He has over 20 years' international experience with research, software and consulting firms including Vision Critical, where he led the EMEA region, and Kantar, where he managed regional business units and global accounts.

His consultancy firm, What Next Strategy & Planning, provides insight expertise, transformation help and training to corporate insight teams, agencies and software companies.

He is also the Founder and Editor of insightplatforms.com.

You can contact him by email, follow him on Twitter or connect with him on LinkedIn.

Part 1:
What is Artificial Intelligence Anyway?

Lighting the Way

In the last 24 hours, how many times have you benefited from artificial light? How many light switches have you flicked?

How much have you achieved that wouldn't have been possible without those glowing filaments, tubes and LEDs?

No idea? Me neither. It's not something you think about very often.

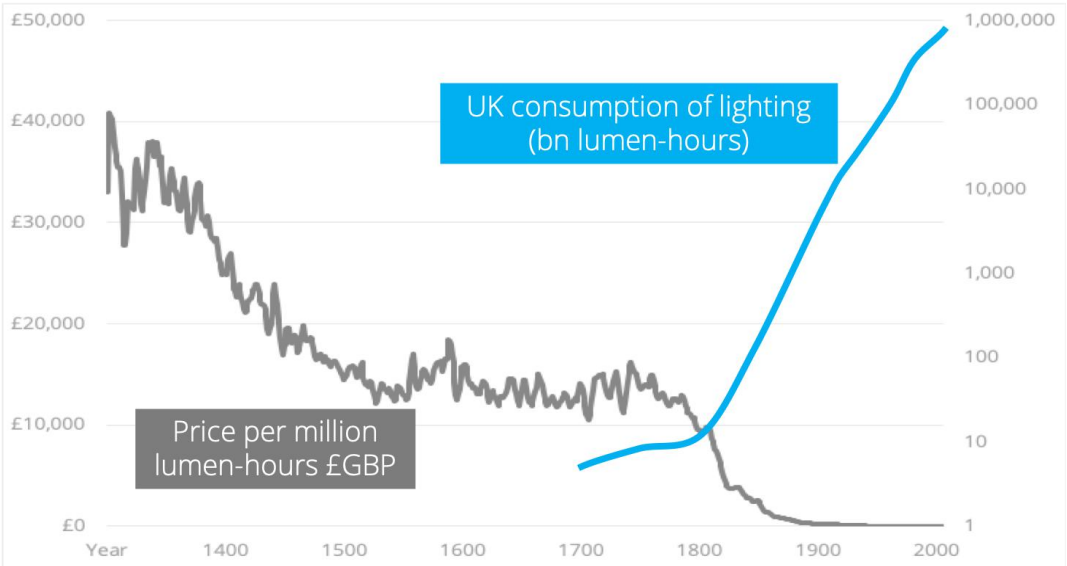
Artificial light is just there. It's part of the fabric of our existence. It's so embedded in our lives that it has become invisible.

We're only truly aware of it when it's absent: a bulb blows, the power goes down or we're in the countryside at midnight.

But it wasn't always like this.

Abundant, cheap artificial light is a comparatively recent phenomenon, and its economic impacts rarely get much attention.

If you lived in mediaeval England, seeing after dark was the preserve of the extremely wealthy. One million lumen-hours of candlelight - that's roughly a year of lighting a single room for a few hours each day - would have cost nearly £40,000 (USD $50,000) in today's money:



Source: Seven Centuries of Energy Services: The Price and Use of Light in the United Kingdom (1300-2000), Fouquet & Pearson, Jan 2006

As candle-making became more efficient, this dropped to £15,000 by around 1450 - where it stayed for the next 350 years.

And then came the 19th century: gas lighting was introduced in the early 1800s and electric lighting came in after 1870. The unit cost of artificial light plummeted, and adoption grew exponentially. By the dawn of the 20th century, the light bulb was in factories and homes throughout the country.

Today, a million lumen-hours of a typical 10W LED bulb will cost between £1 and £2 in England.

So what does all this have to do with artificial intelligence, market research and analytics?

Stay with me.

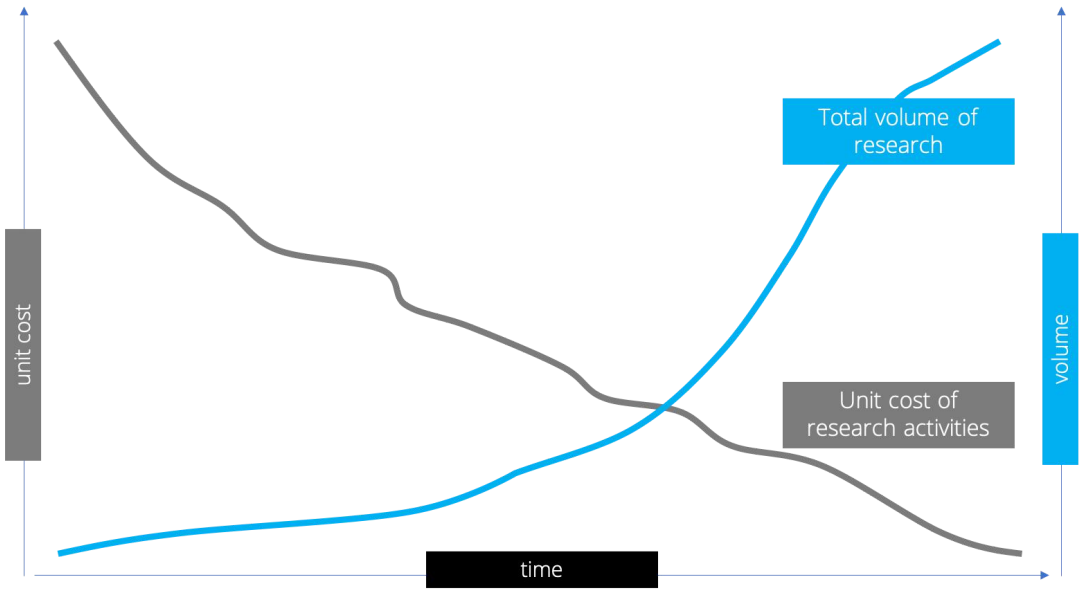
Look again at the chart above.

Around 1800, there is a critical inflection point - after which, there is exponential growth in the use of artificial light.

Being able to lengthen the day triggered massive economic, technological and social innovation. Factories could run for longer and be more productive. Workers could educate themselves by reading after their shifts.

Today, we are at a similar inflection point in the application of AI to consumer insight, user research and customer experience management.

Over the next few years, the adoption of artificial intelligence will drive massive growth in volumes of feedback, research and analytics:



Today, we are at the point where the lines cross.

This is research's light bulb moment.

AI will transform the research & analytics ecosystem by:

- **embedding research** capabilities in software tools throughout organisations
- **helping non-specialists** interpret feedback to make better, user-centric decisions
- **turbocharging researchers** by giving them more data, enabling smarter analysis and speeding up work
- **creating new roles** in research, technology and customer strategy
- **fundamentally changing** what we think of as 'research'.

It's an exciting time to be part of this industry.

A (Very) Brief History of AI

Artificial Intelligence generates hype and fear in equal measure. We're either heading for a techno-utopian future or one in which humanity is enslaved by Skynet. More prosaically, many researchers fear their own redundancy within the next decade.

But what is it, really?

AI has actually been around since the late 1950s. GOFAI (*Good Old Fashioned AI*, or *Symbolic AI*) comprised a series of pre-programmed production rules ('if-then-else' statements) that led to some useful real world applications.

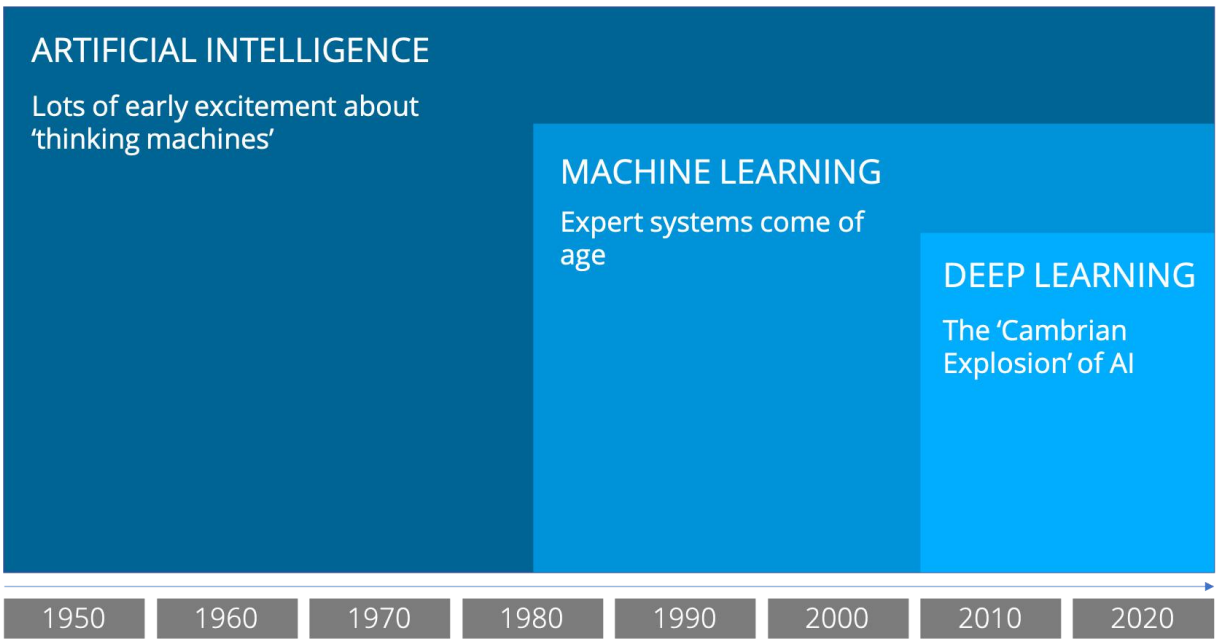
Many Expert Systems use this form of rules-based AI for medical diagnoses or controlling manufacturing processes.

But these *narrow AI* tools require exhaustive programming and are not really 'intelligent': they just apply a set of rules much faster than a human can.

Then - starting in the mid-eighties - computers were designed that could adapt their own if-then logic based on inputs and feedback. They were able to *learn*.

These *machine learning* approaches underpin a lot of today's 'AI' software.

Since the early 2000s - thanks to massive growth in computing power and volumes of data - AI has evolved to bring us *deep learning*: new forms of advanced machine learning that use *artificial neural networks* to more closely model how human brains learn.



The evolution of Artificial Intelligence

Machine Learning

This is about as technical as this guide will get. Don't be put off.

So what is machine learning?

It's when an algorithm takes input data, finds patterns, learns from them and then applies that learning to make a decision.

Simple.

Most machine learning is used for classification, regression or clustering, and there are four main categories of algorithm:

- Supervised Learning
- Unsupervised Learning
- Semi-supervised Learning
- Reinforcement Learning

Still here? Good. Let's look at some examples.

Supervised Learning is the process of feeding large volumes of *training* data to a software program so that it can run its own *classification* or *regression* models more accurately.

Imagine you want to train a computer to recognise a tumour from a brain scan. You might give it some basic rules, show it thousands of existing scans and give it feedback each time it correctly or incorrectly flags an image as cancerous.

This would be a *classification-based* machine learning model.

Or imagine you want to predict the change in value of a given stock market equity. You would feed the model lots of historical information about the company's own performance, data from competitors, consumer confidence, external factors such as the weather … and train it to predict the historical value.

Once it is sufficiently accurate at predicting the past, you might be confident enough in its predictions about the future.

This would be a *regression-based* supervised learning model.

If you hear people talking about *Nearest Neighbour, Naive Bayes, Decision Trees, Linear Regression* or *Support Vector Machines (SVM)* – they are probably referring to supervised machine learning.

Unsupervised Learning is where there is no human guiding the computer. The algorithm finds patterns in data by itself. There is no outcome variable on which to try to model relationships. Common uses including detecting unseen patterns in data, summarize data and describing it.

Imagine taking customer-level data from CRM records (spend levels, contact centre enquiries, products purchased, locations, demographics), pouring it into the computer and getting output that shows groups of customers with a high propensity to buy certain product types.

That would be a *clustering-based* unsupervised learning model; segmentation and basket analysis are common marketing applications for this.

K-means and *hierarchical clustering* are common algorithms.

Semi-Supervised Learning is a combination of the previous two approaches. Sometimes it can be costly to have a human label data and supervise the machine; semi-supervised approaches help to limit that cost.

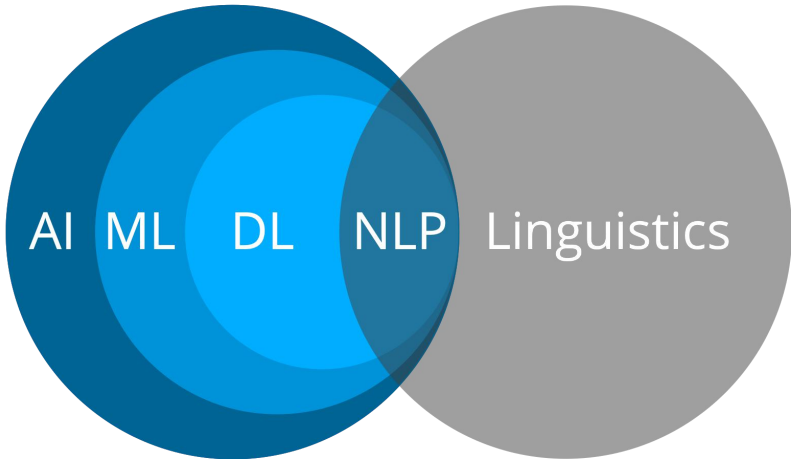
Reinforcement Learning is a way of training algorithms to respond to their environment using a system of rewards and punishment. These are set in advance, and there is no human involvement in the learning process. Driverless cars and some marketing optimisation tools use this approach.

And that's *most* of the complicated stuff out of the way.

Natural Language Processing

Natural Language Processing – NLP - powers hundreds of apps and services we now take for granted: speech recognition, machine translation, search engine crawling and indexing, those 'did you mean …' suggestions for mis-typed Google entries.

It connects linguistics with the different strands of AI so that computers can do useful things with language: analyse it in spoken or written forms, respond to queries from users and even generate output in coherent sentences.



Natural Language Processing

The branch of NLP known as *Natural Language Understanding* powers software for analysing the content and meaning of text data by picking out keywords, identifying entities (such as brand names) and interpreting sentiment.

But language is tricky stuff. We're rarely conscious of it, but it contains lots of sub-systems with their own internal structures and rules:

- phonology (sound patterns)
- morphology (symbols, characters, words)
- syntax (structural features like nouns, verbs, sentences, grammar)
- semantics (the meaning conveyed).

For computers, blocks of language - in books, conversations, social posts, search queries or feedback surveys - are designated as *unstructured* data until they can be converted into *structured* data that they can do something with.

Deconstructing and reconstructing language using learnable rules (for phonology, morphology, syntax and semantics) is the heart of Natural Language Understanding.

Computer Vision

Teaching computers to 'see' is critical for the development of robotics, autonomous vehicles and dozens of other applications.

But it's hard: seeing, interpreting and responding to visual stimulus takes up more of the human brain than any other distinct process.

Think about all the steps involved when someone throws a ball towards you:

- the image of the ball hits your retina, which sends the signal to your brain
- your visual cortex analyses the image and compares it to everything else it already knows
- then it classifies the image as a ball and tells your hand to catch it.

In fractions of a second.

Recreating these processes is a very tricky programming task. Certain shapes and colours in images can still bamboozle AI. One normally reliable algorithm stubbornly classifies an abstract swirl pattern as a toaster. Another can easily recognise birds and bicycles; but a bird riding a bicycle is problematic.

Despite these quirks, accuracy levels in computer vision are improving rapidly - thanks to exponential growth in training data.

For Google, that comes from all those public images harvested for Image Search and the billions of photos backed up to the cloud in the Google Photos app.

For research, these improvements open up lots of possibilities.

EmotionAI

EmotionAI is a catch-all label, but it’s being widely adopted. It covers the user of machine and deep learning techniques to classify users’ emotional states and identify their non-rational responses.

Most models use NLP and Computer Vision techniques, with models grounded in neuroscience or clinical psychology.

Cheat Sheet

GOFAI / Narrow AI	Rules-based software programmes to classify or predict something. Used in expert systems such as medical diagnostic support tools.
Machine learning	Feeding an algorithm lots of input data (training) until it produces the right output data.
Supervised learning	A human checks the output data, gives feedback to the computer and if necessary refines the model to improve its accuracy.
Unsupervised learning	Letting the computer find its own patterns in the data.
Deep learning	A sub-set of machine learning, with more complex network algorithms that try to mimic the human brain.
AGI (Artificial General Intelligence)	Computers with 'broad' human-like intelligence that can think and reason like us.
NLP	Computers interpreting language.
Computer Vision	Computers interpreting images.
The Singularity	The point at which AGI is achieved: machines surpass human-level intelligence, teach themselves to be ever smarter and either make the world wonderful or turn us all into paperclips. By 2045, apparently - according to Ray Kurzweil.

Part 2:
23 Practical Uses for AI in Research & Analytics

1. Converting Speech to Text

AKA automatic transcription

In May 2017, Google's voice recognition algorithm hit 95% accuracy - roughly on a par with humans.

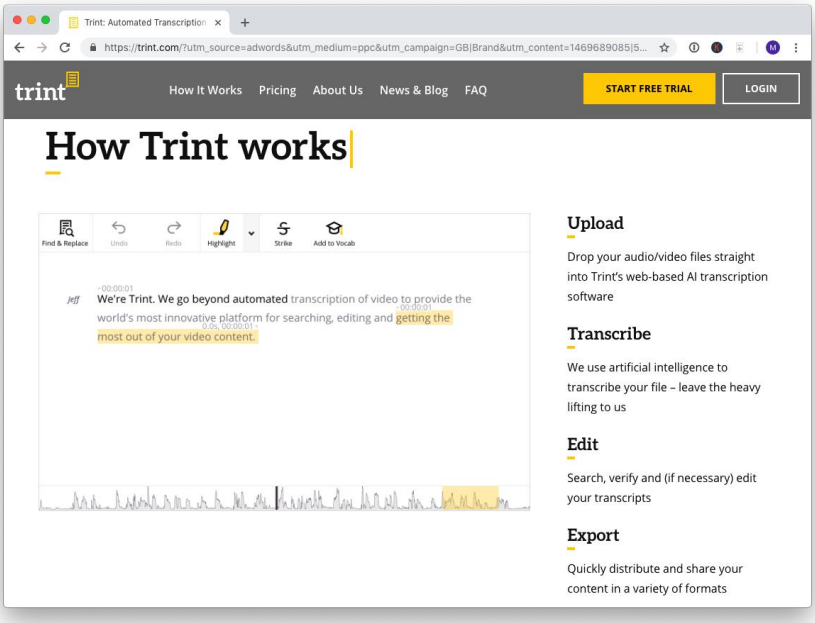
Who knew that we mis-hear roughly 1 in every 20 words?

But voice technology is still in its infancy: Amazon Alexa, Google Home and Apple Siri are all just getting started.

Today, there are several useful applications in research & analytics for automatic transcription:

- documenting user interviews or group discussions
- transcribing customer service or helpdesk calls for CX analytics
- making large volumes of video content searchable.

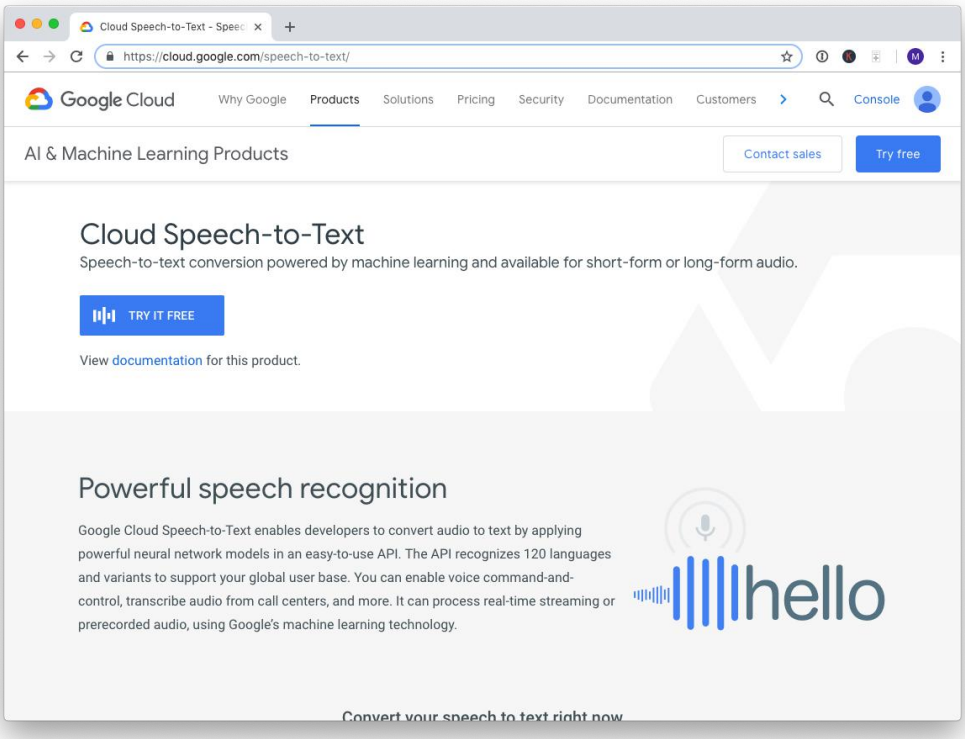
Tools such as Trint, Otter and Zpoken Transcribe are easy-to-use commercial platforms for transcription. Just upload your audio files and off you go. Pay by the minute, or subscribe monthly if you have enough volume.



Trint: an example of SaaS Transcription platform

Many of these user-friendly transcription platforms actually rely on AI tools from the big cloud providers - Google Cloud, Microsoft Azure and Amazon Web Services. They all have AI solutions that developers can tap into. Their speech-to-text algorithms are trained on the huge volumes of data processed by their voice assistants (Google Home, Cortana and Alexa). Any developer can access these tools via API.

(API - for those too embarrassed to ask - Application Programming Interface. These are tools that allow different pieces of software to work together and exchange data. They are fundamental building blocks of the internet and the way that all software connects today.)

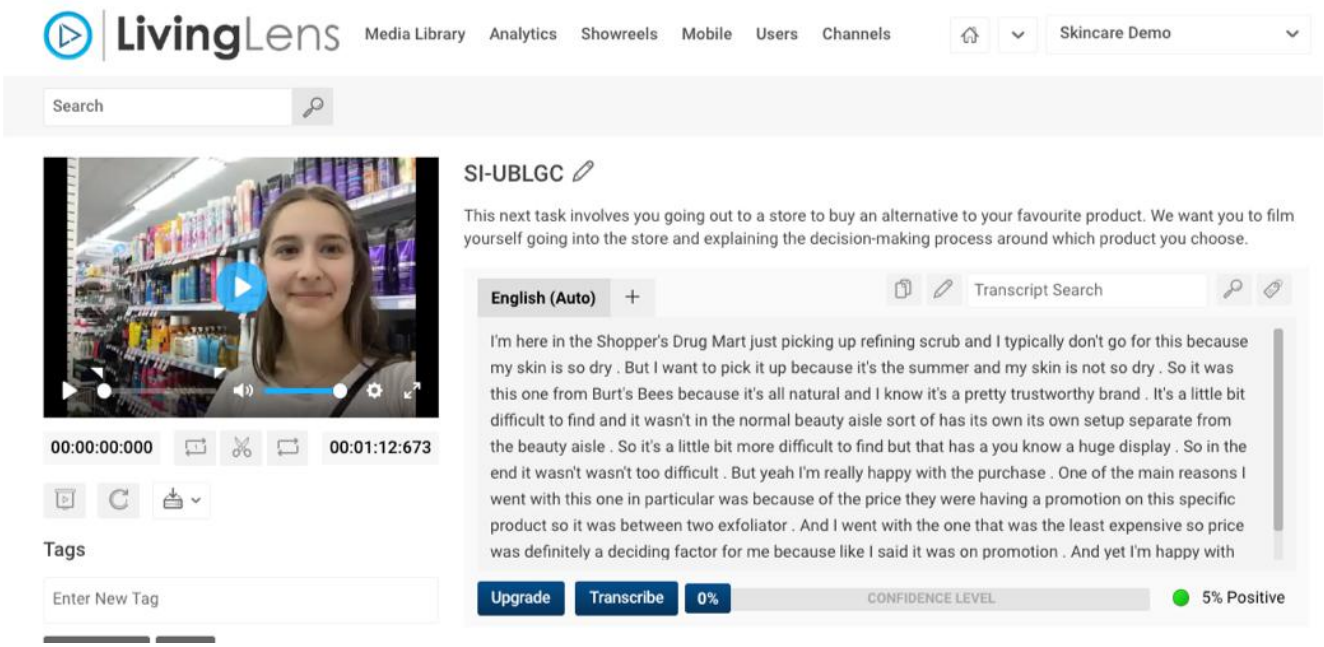


Google Cloud Speech-to-Text service: an example of a machine learning API

By the way, if the thought of developers and APIs sounds a bit too technical, it's worth persevering: the cost difference between the APIs and the polished commercial products can be significant.

As of January 2019, 60 minutes of audio transcribed costs around $15 with Trint or $1.44 using with the Google API. If you have more than an occasional need, it’s worth it.

The video management and analytics platforms (Voxpopme, Living Lens, Big Sofa, Plotto) also get a mention here. These tools include options for auto-transcription of video content - in up to 74 languages in the case of Living Lens.



Living Lens: an example video management platform with automated transcription

2. Automatic Translation

Now that you have perfectly transcribed content in 74 languages, how do you make sense of it?

Unless you're an extreme sort of polyglot, you'll need some help to translate those interview transcripts, open-end survey responses and comments from review sites.

Here again, the big cloud players have good options.

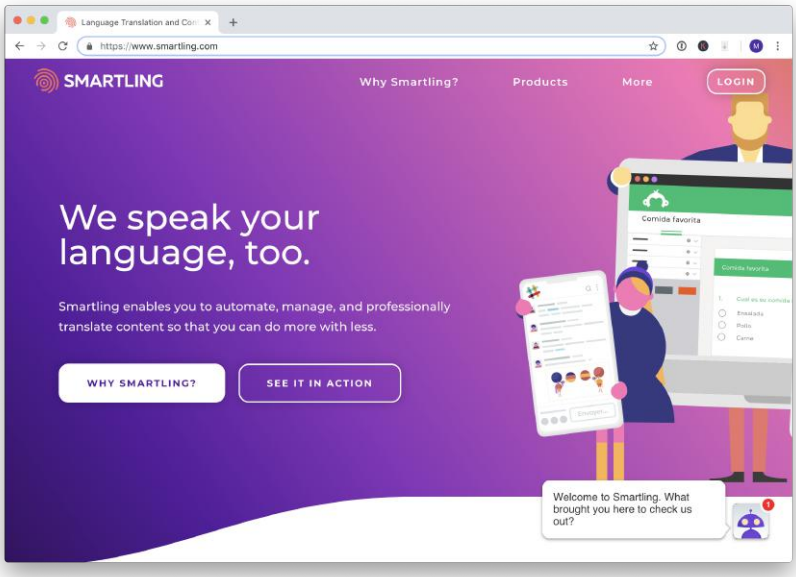
Google Translate used to be hilarious: it was fun to convert a simple sentence into Chinese, then turn the translation back into English as something utterly mangled.

But that happens less and less these days, and it stems from 2 key factors that drive all AI advances:

- huge amounts of data, the rocket fuel of AI: with nearly half a billion daily users, Google Translate has gathered masses of feedback for its learning model
- smarter algorithms: in late 2016, the Google Neural Machine Translation system launched, and the quality of output improved measurably for all languages.

We're not laughing any more.

Google has lots of data and smart AI engineers, but it's not your only choice. Microsoft Azure and AWS offer translation APIs, but there are also specialist translation platforms provided by Smartling, DeepL and others.



Smartling: an example automatic translation platform

3. Analysing Text

Natural Language Understanding - text analytics - is fundamentally changing how research gets done:

- Surveys get shorter: if we can analyse open-end response better, why force people to answer an exhaustive set of pointless rating scales? Let them say what matters to them, in their own words, in much less time.
- Data sources expand: researchers used to be confined to asking questions; now we can listen meaningfully to what they say in social media, online reviews and call centres.
- Qual gets bigger: this sounds oxymoronic, but text analytics means we can now manage and interpret online discussions between hundreds of participants rather than just a handful.

Boiling it down to basics, text analytics software includes two core features for research purposes:

- keyword or entity extraction
- sentiment analysis.

Keyword (or topic) extraction is relatively straightforward: even basic software can pick out items from a body of text and track changes in volume over time.

Entity extraction (AKA Named-Entity Recognition) is a little more complex. This classifies named entities into pre-defined categories such as the names of persons, companies, places etc. This is particularly important if, say, you want to analyse reviews to understand how people talk about yours or your competitor's products.

There are existing models for entity extraction (eg classifying automotive brands and models); but if you work in a niche category you will need to train a custom model to get sensible results.

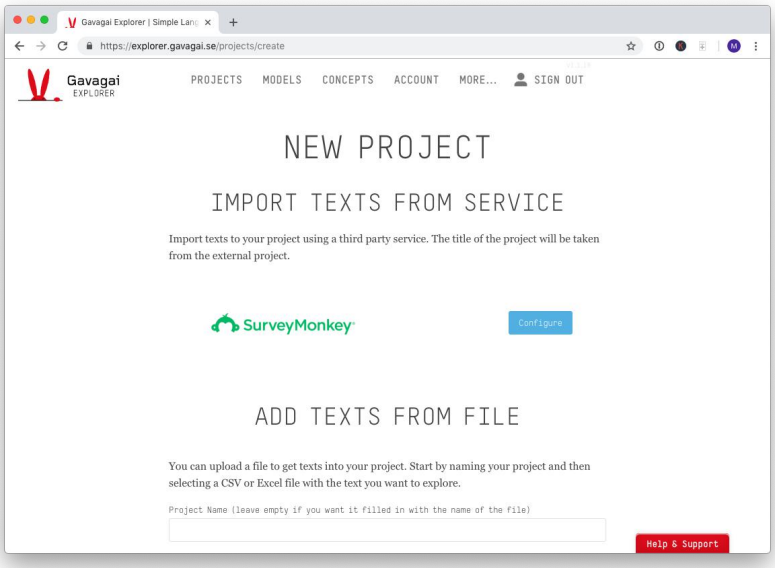
Sentiment analysis tries to work out opinions expressed in text, with output expressed in terms of *polarity* (whether the opinion is positive or negative).

There are dozens of tools for general purpose text analytics, and you can find a long list of solutions in the Insight Platforms directory including Lexalytics, Odin Text, Decooda and others.

Generally, there are three ways you can use these tools:

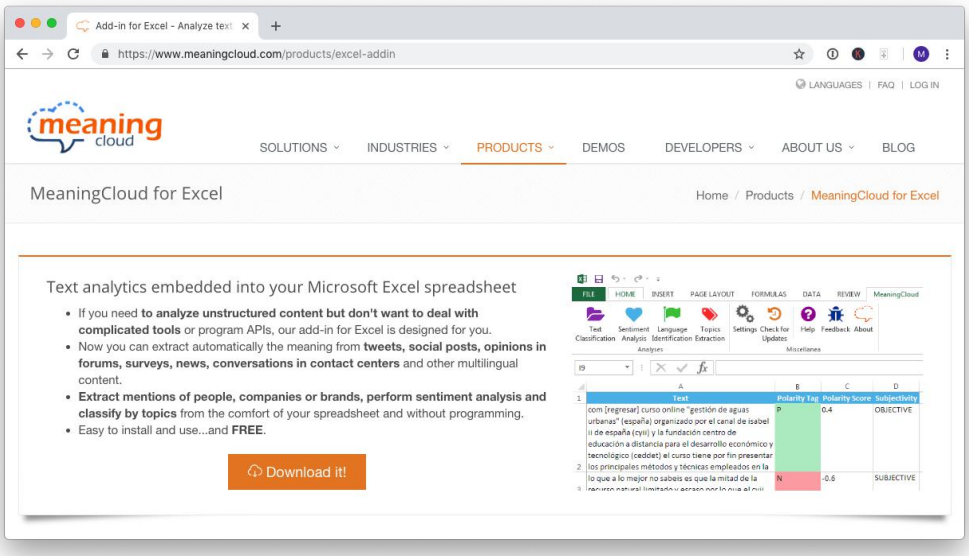
- through a web interface
- with an Excel plug-in
- via API.

Gavagai Explorer is one tool that works through a **web interface**. You can upload CSV files of text or link directly to a SurveyMonkey project.



Gavagai Explorer: an example of web interface for text analytics

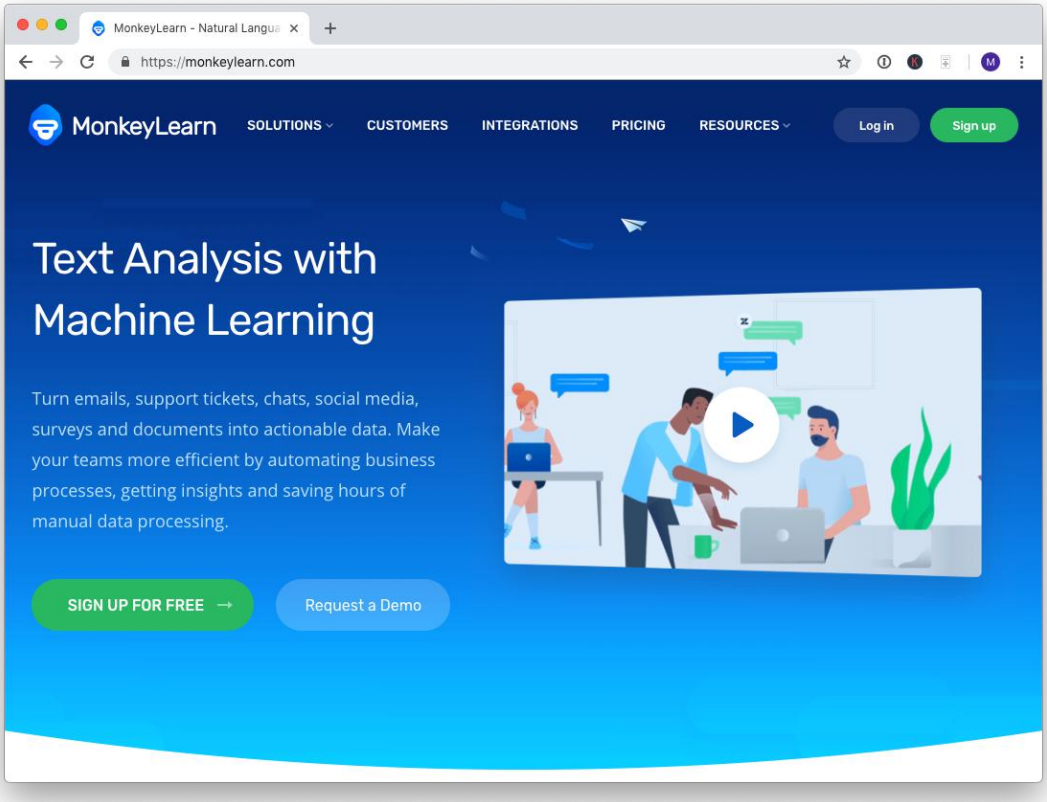
MeaningCloud has features for sentiment analysis, topic extraction and text classification, and can be used in any of the three ways outlined above.



MeaningCloud: an example of an Excel plugin with text analytics features

Finally, a large number of **API solutions** can plumb text analytics directly into other workflows.

MonkeyLearn is a solution accessed mainly through dedicated APIs and Zapier. It includes standard models for sentiment, emotion and product classification, as well as a full range of custom models.



MonkeyLearn: an example of API-based text analytics

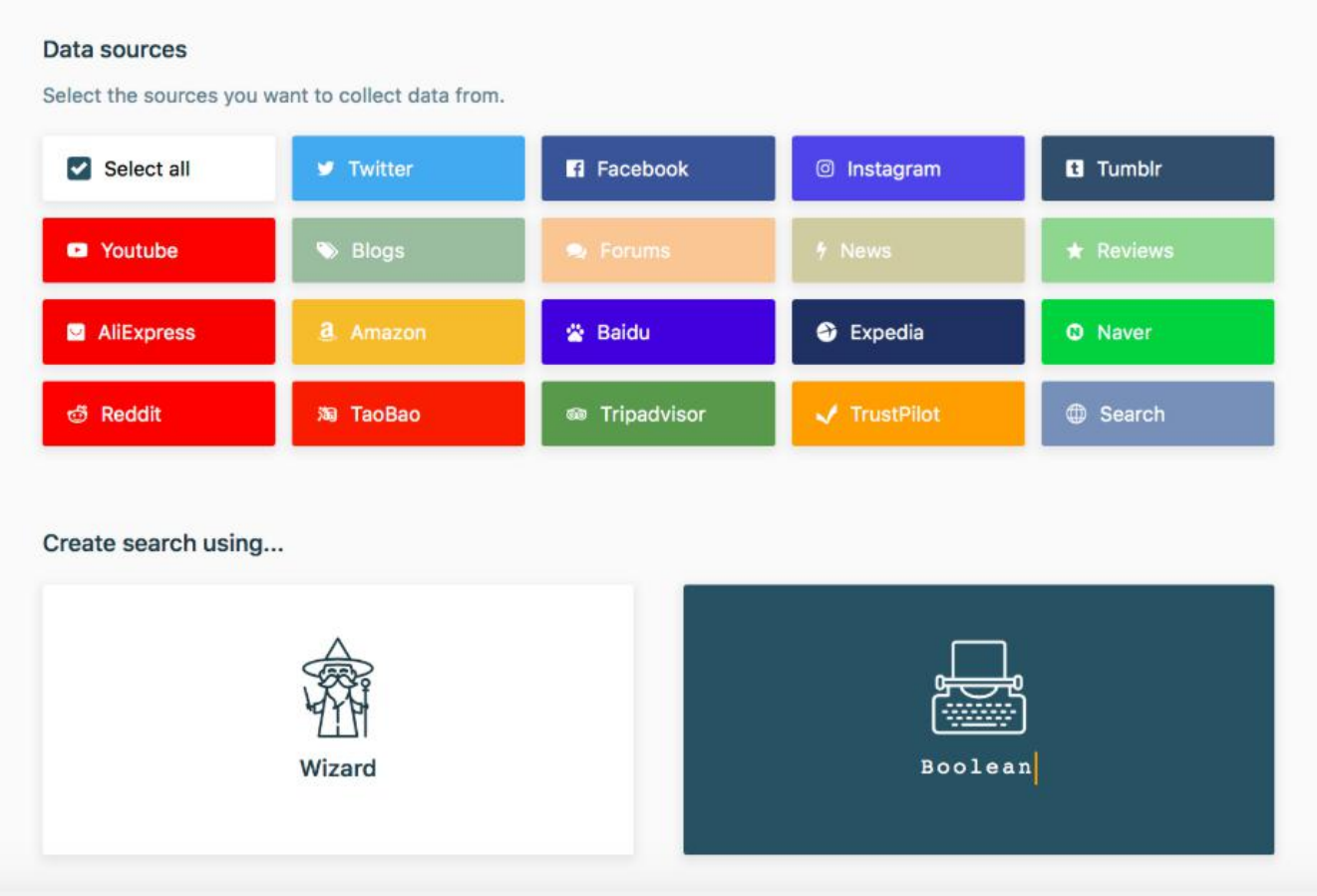
4. Social Media Listening

Spoiler alert: this application and the two that follow (CX analytics, emotion analytics) are variants of text analytics. But they are large and specific enough to be called out separately.

Social listening is the process of analysing content in social platforms to understand topics, identify keywords, track mentions and measure sentiment.

Data can be *scraped* (ie extracted from online sources) for one-off projects using tools like Dexi or the skills of a programmer; or most listening platforms have continuous feeds of data from a range of different sources.

Those sources are no longer purely social. Data can come from review sites like TrustPilot, e-commerce, news, blogs, forums, YouTube comments and Reddit - as well as Twitter, Facebook and Tumblr:



List of data sources available in the Pulsar platform

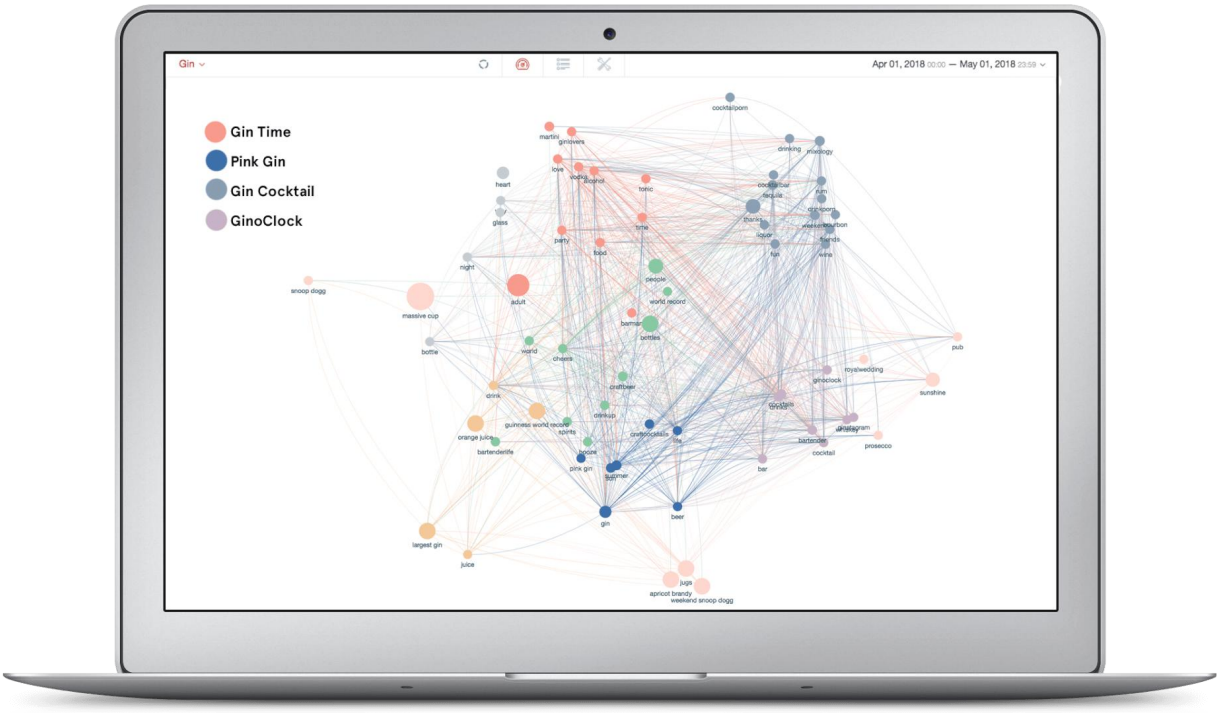
Once the data is in the listening tool, it can be processed using the same NLP techniques used in text analytics to ...

- identify trends in a category
- measure brand mentions
- understand sentiment about specific topics or brands.

Many listening tools are also tightly integrated with content publishing tools, and this is important to highlight: AI is helping to embed research and analytics functions inside marketing platforms.

Social management tools like Sprinklr, for example, are as much *insight-and-action* tools for marketers as they are analysis tools for researchers.

The Insight Platforms directory contains more than 50 social listening tools including Crimson Hexagon / Brandwatch, Social Bakers, Meltwater and Pulsar.



Pulsar: an example social listening platform

5. Analysing Customer Experience Feedback

CX analytics uses NLP techniques to understand Voice-of-Customer feedback for optimising the customer experience.

Feedback sources were once purely survey-based, but can now include comments posted in social media, forums and blogs; support tickets and transcripts of conversations with customer service teams; as well as more structured input from ratings & reviews, feedback forms and the good old CSAT or NPS survey.

The data has three main components

1. A rating or score
2. Explanatory comments
3. Contextual data about the customer and their purchase / behaviour / support request.

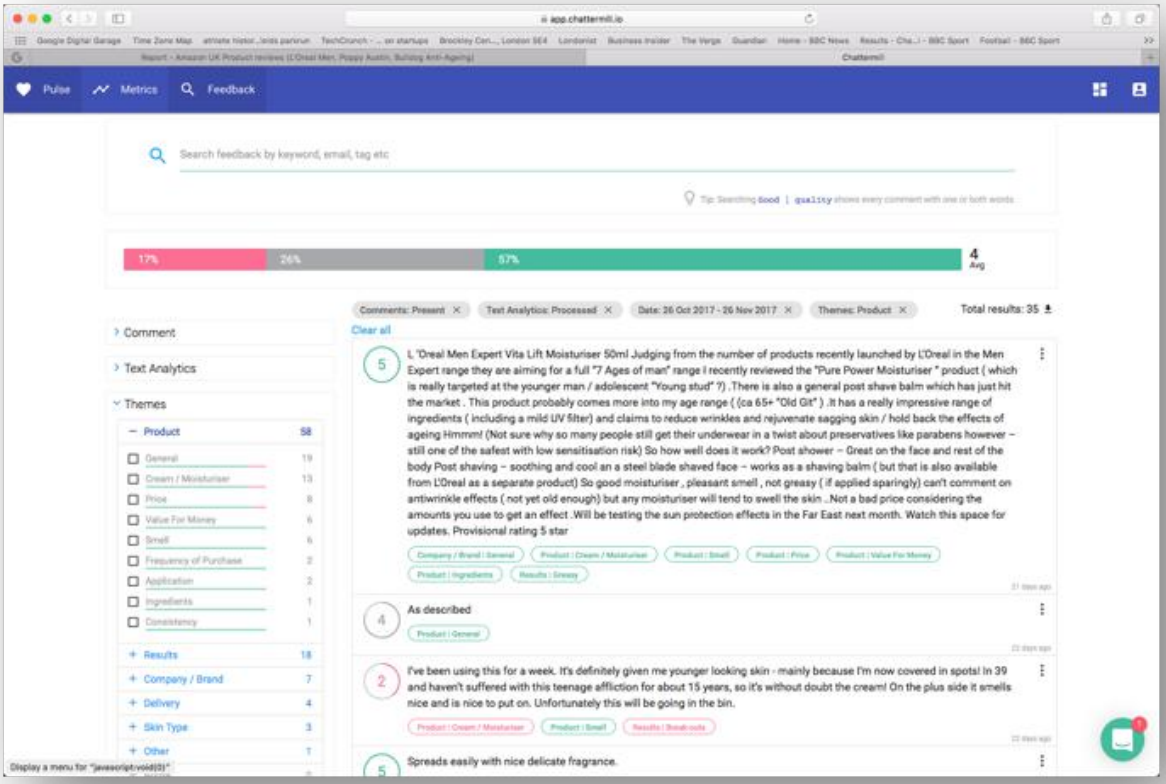
Most CX analytics tools now have ready-built models for text classification and sentiment analysis in big categories (eg air travel, hotels, restaurants). But in most cases, these models will need to be adapted to the nuances of sub-categories or geographies; and for niche markets, custom models will need to be built from scratch.

There are two broad types of CX analytics tools for processing VoC content:

- Integrated collection and analytics platforms like Qualtrics, Medallia, Clarabridge, InMoment and MaritzCX.
- Standalone analytics platforms like Chattermill, Thematic, Wonderflow, ipiphany and Sentisum.

This second group of tools don't have built-in survey capabilities; instead, they integrate data from different sources; analyse and combine it; and visualise it in dashboards for analysis and action planning.

Chattermill uses NLP to analyse customer feedback from surveys, CRM systems, support platforms and product reviews. Themes and sentiment are visualised in dashboard reports.

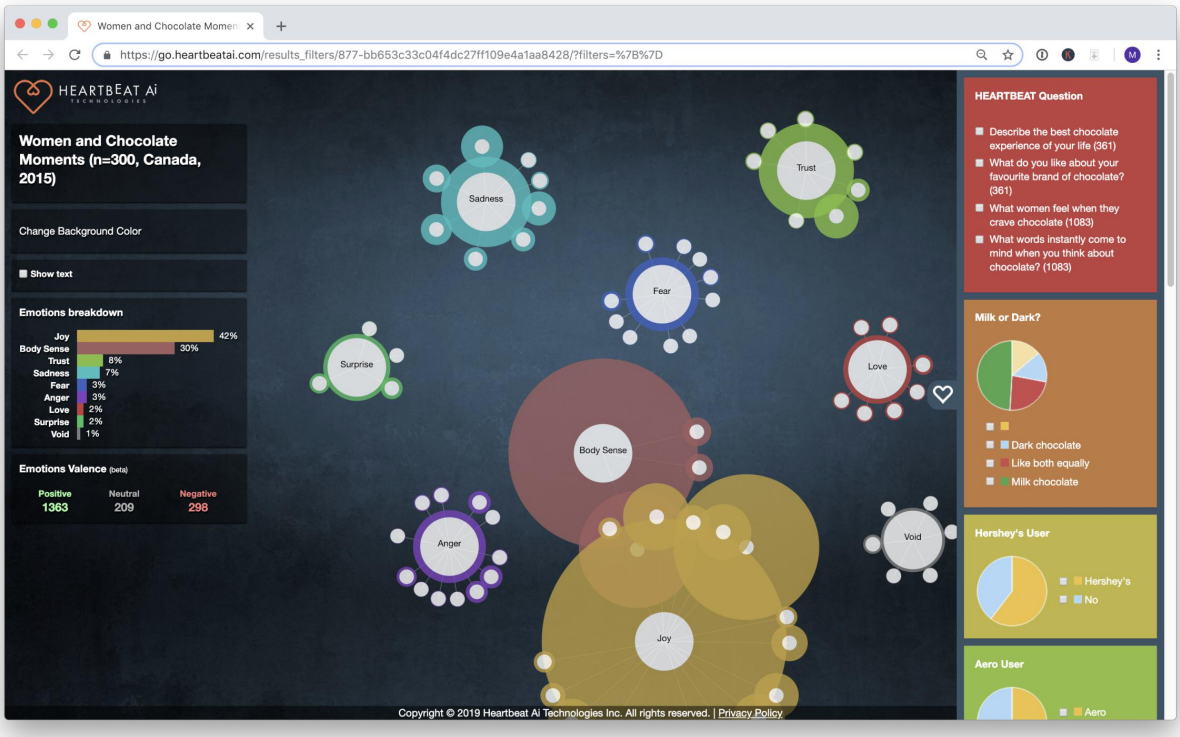


Chattermill: an example of a CX Analytics platform

6. Emotion Analytics

NLP models have been developed that focus specifically on decoding the emotional content of language. Adoreboard's Emotics platform, for example, analyses expressions of emotion to understand customer experiences.

HearbteatAI takes text input from any source - survey open-ends, qual transcripts, customer feedback, product reviews - and classifies it using universal emotion categories (10 primary and up to 100 secondary emotions).



Heartbeat AI: an example of an Emotion Analytics platform

7. Conversational Feedback (Chatbots)

Beyond *understanding*, NLP has several other branches. Conversational interfaces and Natural Language Generation are two such areas that are beginning to have a major impact on the way that research data is collected, queried and reported.

Chatbots are being adopted as web interfaces for sales, customer service and technical support. They offer cost savings and - in some cases - better speed and performance than humans can provide.

That might seem surprising: some chatbots today are frankly terrible and deliver a shocking customer experience.

But - like Google's translation algorithms - they are improving fast and will continue to do so: the more questions they are asked, the more data they have to train and refine their model, the more functional they become.

One of the main chatbot uses in research is gathering feedback data. In this, they offer several benefits over traditional online survey methods:

- chatbots can be embedded in other applications (sales, service etc) so the feedback process is more connected to the actual user / customer experience
- the same interface can capture both structured (quant) and unstructured (qualitative) responses, with the potential for a more natural flow of questions and answers
- as well as websites, Facebook Messenger, Kik and other chat apps can host research chatbots, making it easier to reach certain audiences - younger consumers who don't use email or respond to pop-up website surveys
- AI can reply intelligently and encourage deeper, more considered open-ended responses from participants

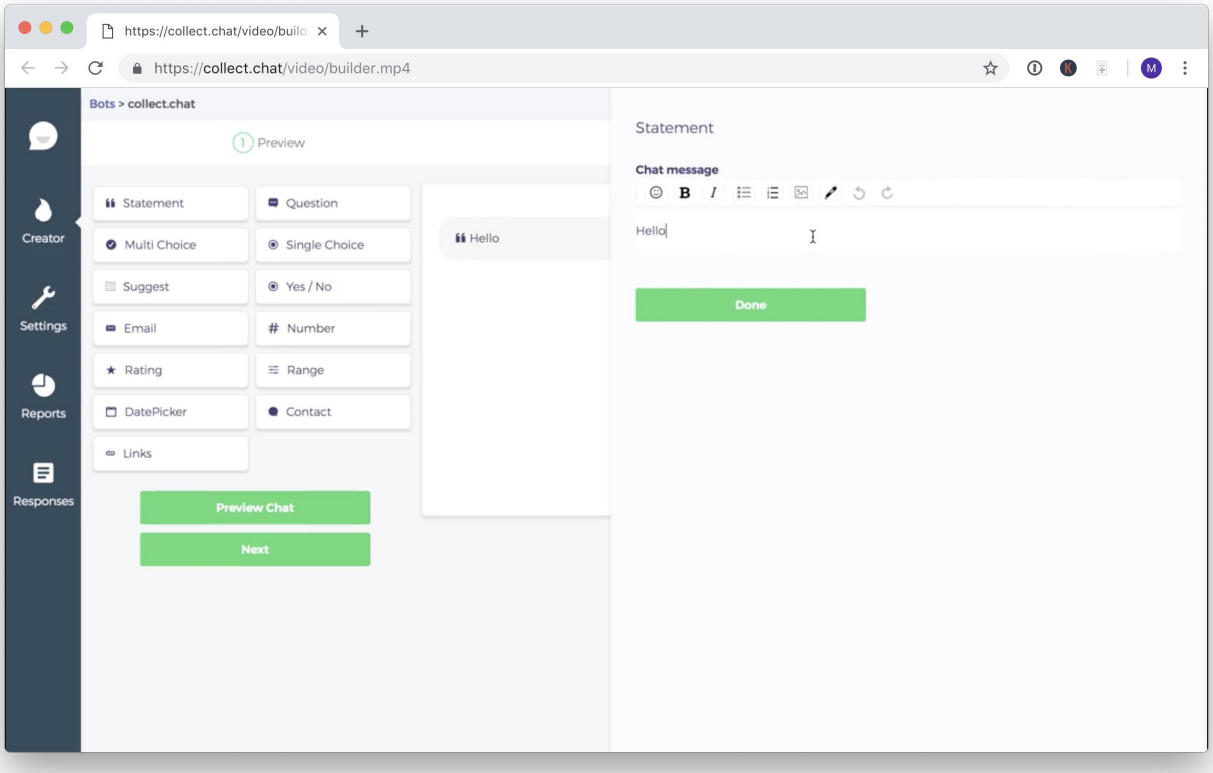
If you want to build a chatbot for research or CX feedback, you have two options:

1. Adapt or build your own chatbot
2. Use a dedicated chatbot for research or CX.

If you want to create your own chatbot, solutions aimed at sales and service use cases (eg from Drift, LivePerson and Hubspot) can be adapted to run simple surveys.

Custom bot-builder platforms such as Botsify (for website and Facebook Messenger bots), Collect.chat (for websites) or Chatfuel (for Messenger) can also be used to build more research or CX feedback bots from scratch.

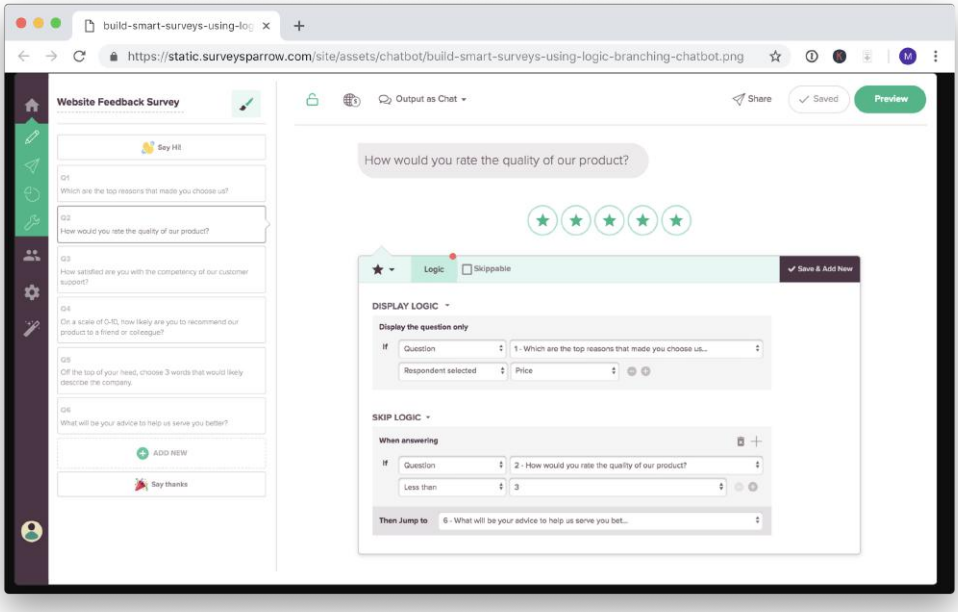
These tools are designed for marketers, not developers - and do not require coding knowledge to get started.



Collect.chat: an example chatbot builder platform

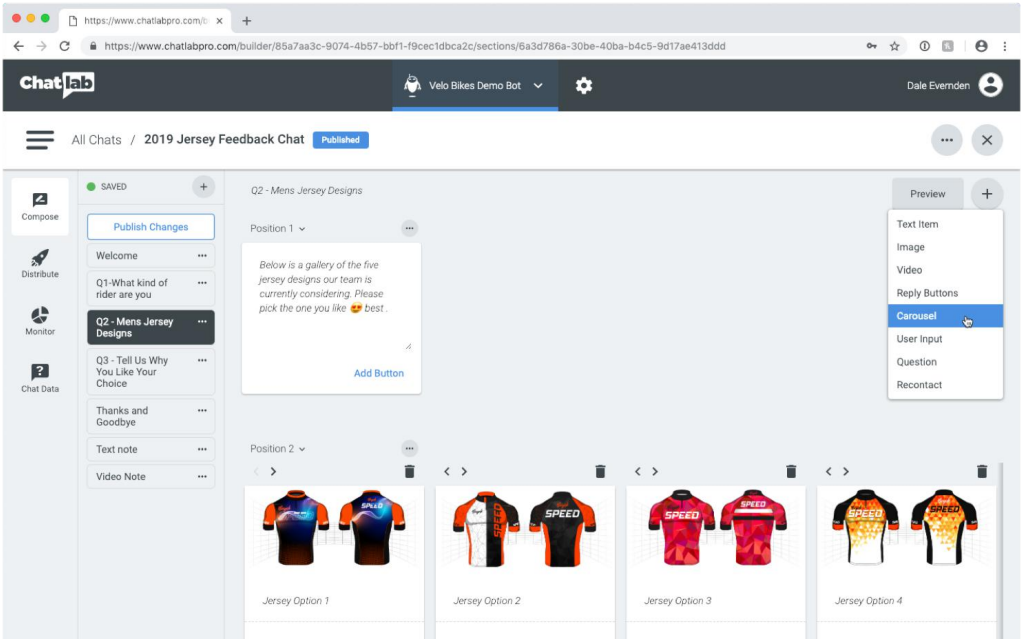
If adapting an existing tool doesn't work, there are now several dedicated chatbot platforms for research and CX.

SurveySparrow has a wide range of question types, survey templates and question logic with options to embed chatbots on websites or in other software like Slack, Intercom and Mailchimp.



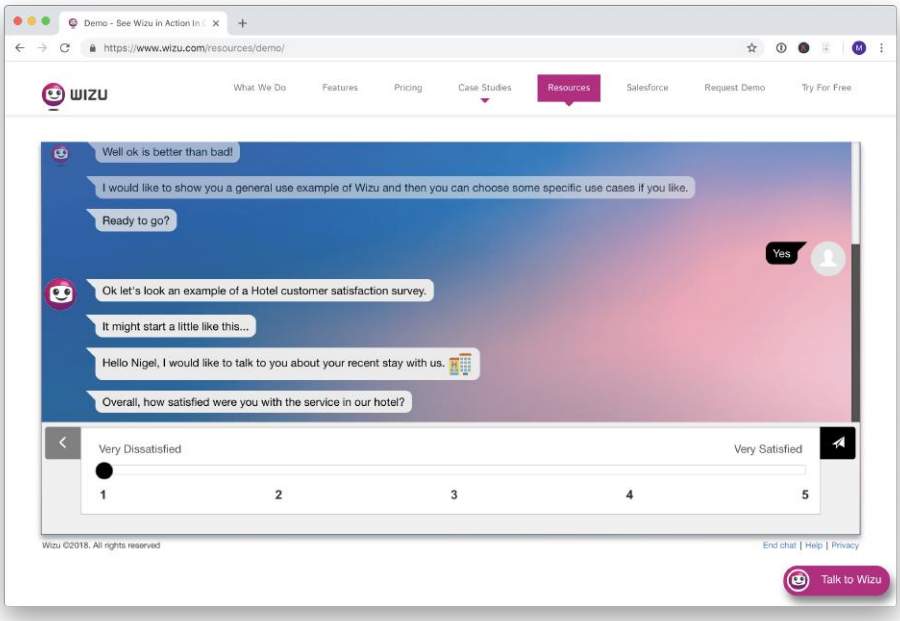
SurveySparrow: an example chatbot research platform

Rival Technologies enables chatbot surveys to run in a web browser or be embedded in messaging apps, and can be used to create both long and short term mobile-first communities.



Rival: an example chatbot research platform

Wizu focuses on customer experience feedback, with templates for NPS, CES and CSAT surveys and integrations with CRM platforms.



Wizu: an example chatbot research platform

Ultimately, these text-based chatbots are part of a broader evolution of intelligent assistants. Over time, they will be enabled through voice services such as Alexa, Google Home and Cortana.

Rival Technologies and Rant & Rave, a Voice-of-Customer platform, have both experimented with building Amazon Alexa skills for conversational surveys.

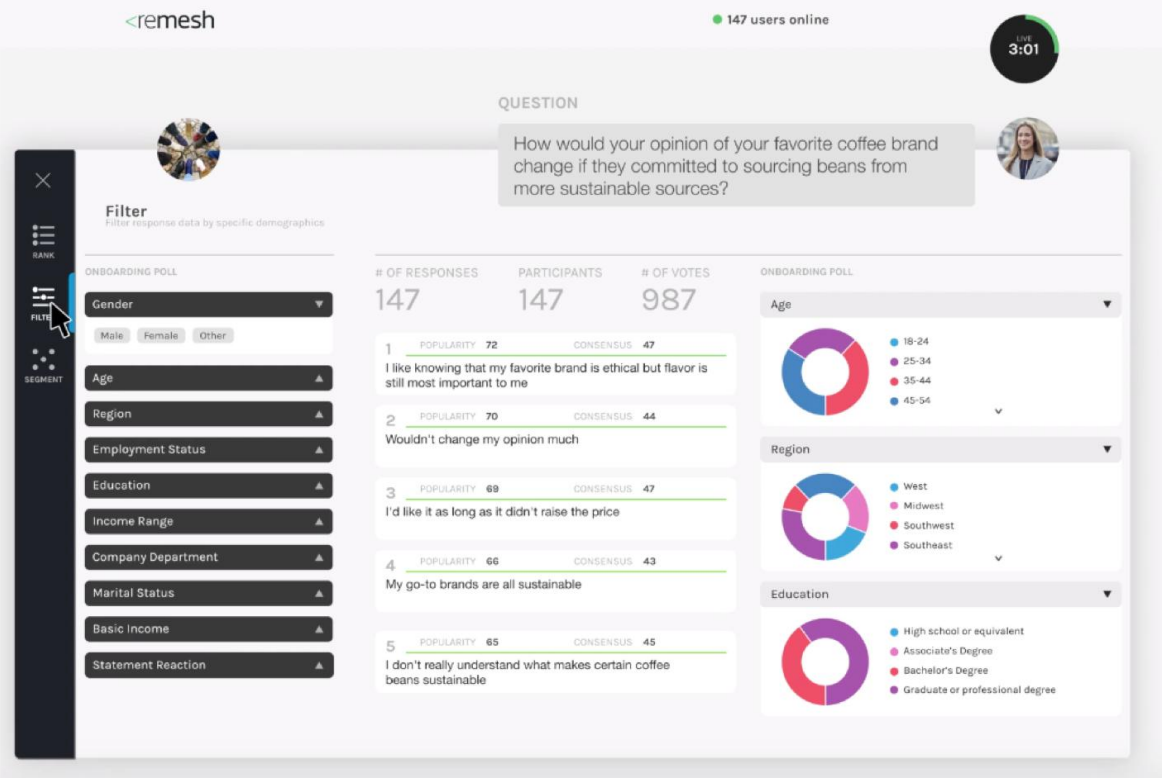
8. Big Qual

NLP tools allow us to manage, analyse and respond to large volumes of unstructured text data. These techniques can be used to manage online discussions with large groups of participants.

Compared to a human moderator, 'Big Qual' tools are much faster at summarising content and extracting keywords.

The Groupsolver and Quester platforms support semi-structured discussions with large groups of consumers for brainstorming, concept development and idea screening.

Remesh uses a range of AI techniques to gather feedback from up to 1000 participants over a sixty-minute session. Responses are analysed on-the-fly, clusters of similar opinions are visualised, and moderators can then focus on the most relevant topics or promising ideas and probe deeper in real-time.

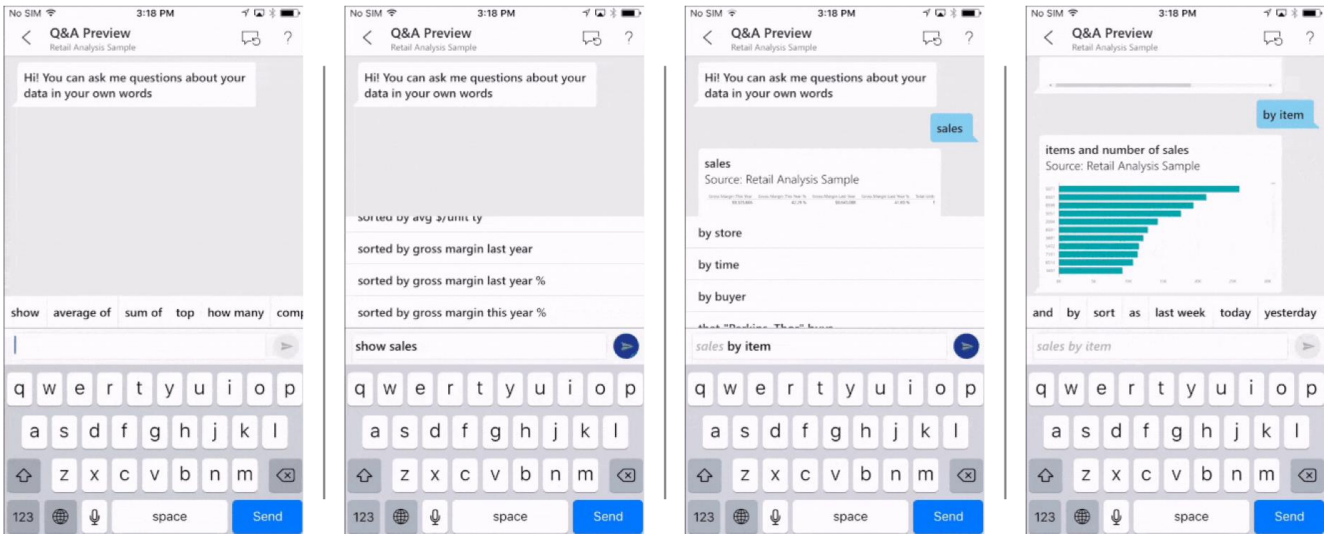


Remesh: an example 'big qual' platform

9. Natural Language Analytics

Just as chatbot interfaces are changing how data is collected, so they are starting to evolve how we conduct analysis.

Microsoft Power BI is a business intelligence platform for visualising data in dashboards and reports. Its Q&A feature allows users to question their data using natural language; suggested visualisations are then displayed in response. It even runs in the smartphone app:



Microsoft PowerBI: an example analytics and visualisation platform with natural language query interface

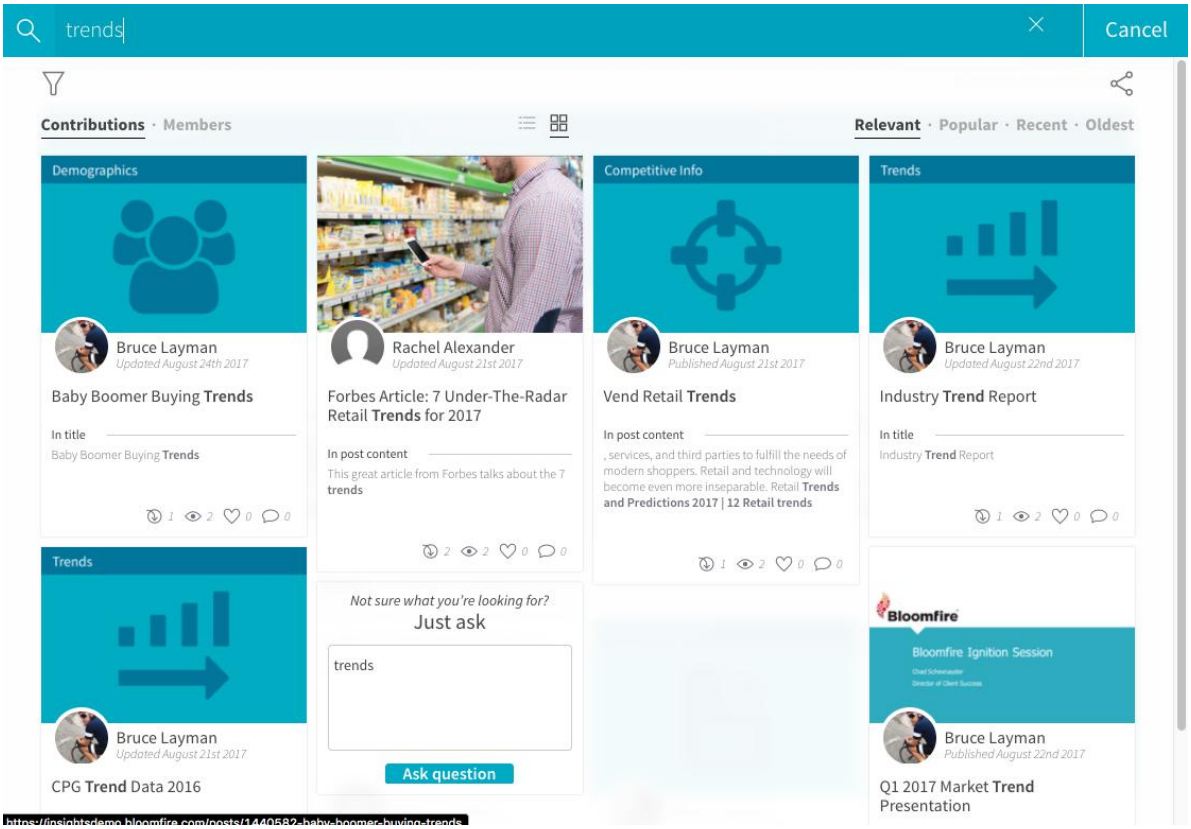
Google Analytics and other digital analytics platforms also have similar features.

These virtual assistant capabilities are becoming more widespread in research and analytics platforms. Lymbyc, Course 5 Discovery, NAVIK ResearchAI and Market Logic Software have a conversational query feature to help make their knowledge management platforms more easily searchable.

These tools combine disparate sources of insight - presentations or reports, surveys, transcripts, audience or shopper panel data, social content - with a natural language search interface.

Bloomfire's knowledge management platform also incorporates natural language query capabilities in its "Scarlet" AI engine.

In addition, it uses a variation of Google's PageRank algorithm to find content based on both context and authority relative to other data; uses autocomplete suggestions to help guide users; and recommends other content related to the user's search query.



Bloomfire, an example knowledge management platform with natural language analytics

10. Automatic Content Generation

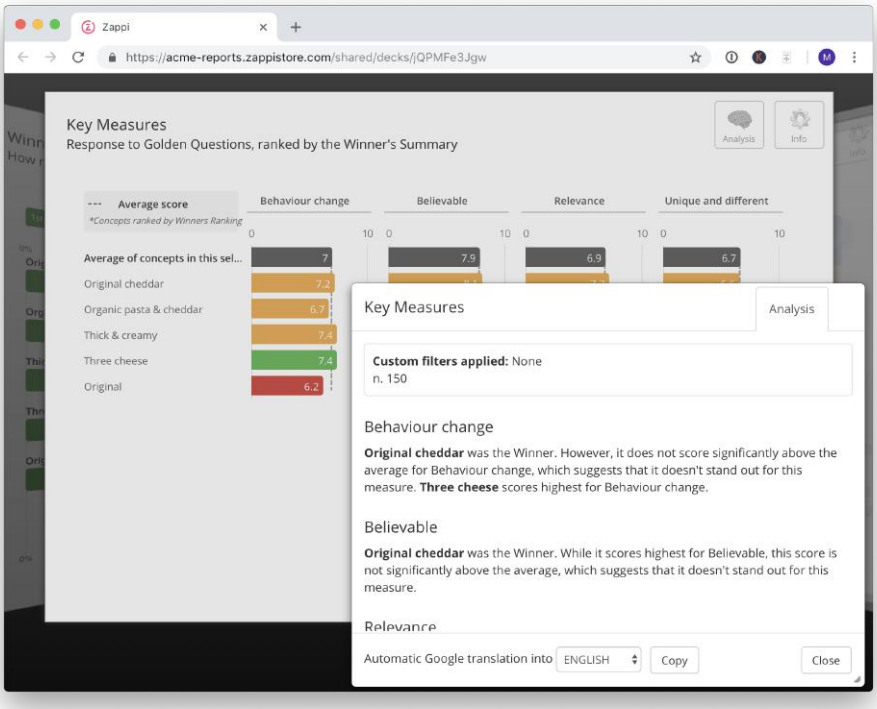
Natural Language Generation is the process by which software uses input data to create a coherent narrative. NLG models have been used to write product descriptions on websites, poems and even scripts for Hollywood movies.

The Associated Press used to employ writers to summarise the quarterly financial reports of public companies. Today, NLG software creates those stories automatically, populating templates using the underlying data. The results are indistinguishable from those created by journalists.

Research agencies employ staff to synthesise data from standardised projects (like ad tests) or continuous trackers. They then spend time writing commentary for reports and presentations. Much of this work can now be automated using the same tools adopted by the Associated Press.

Narrative Science and Wordsmith by Automated Insights are software tools that generate narratives from data. They integrate with analytics and business intelligence tools like Microsoft Power BI, Tableau and Qlik to write headlines, summaries or full stories.

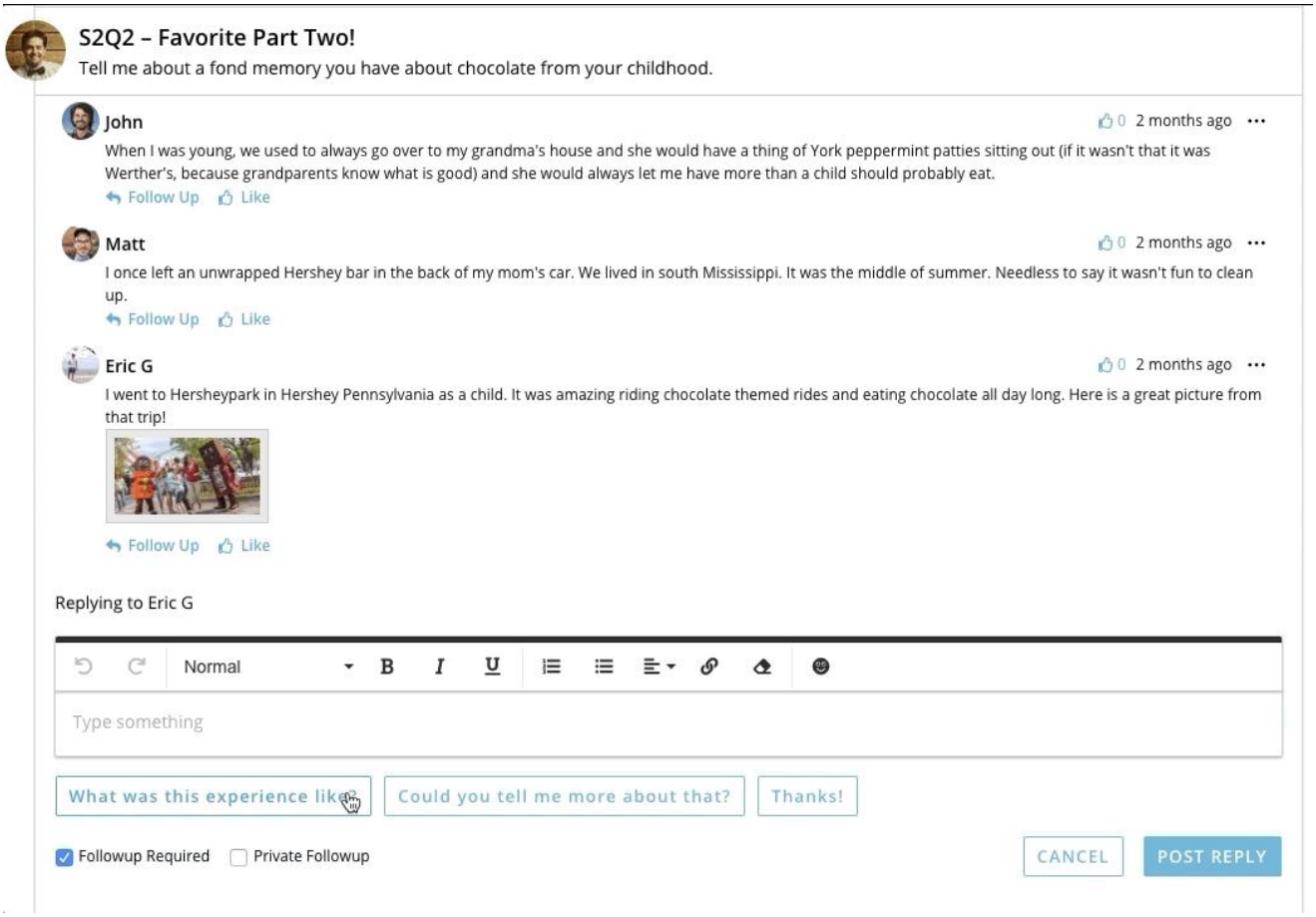
Zappi, the research automation platform, uses NLG to write commentary on its product development and communication testing tools.



Zappi: an example of Natural Language Generation for research reporting; eagle-eyed readers will also spot the automatic Google translation feature.

Natural Language Generation features are also being applied in qualitative research.

2020 Research's Qualboard 4.0 platform now includes a Smart Reply feature for qualitative moderation, trained on a million moderator-respondent interactions collected over 10 years. Like messaging apps, it interprets the content of a post and suggests follow-ups and probes to save the moderator time when replying.



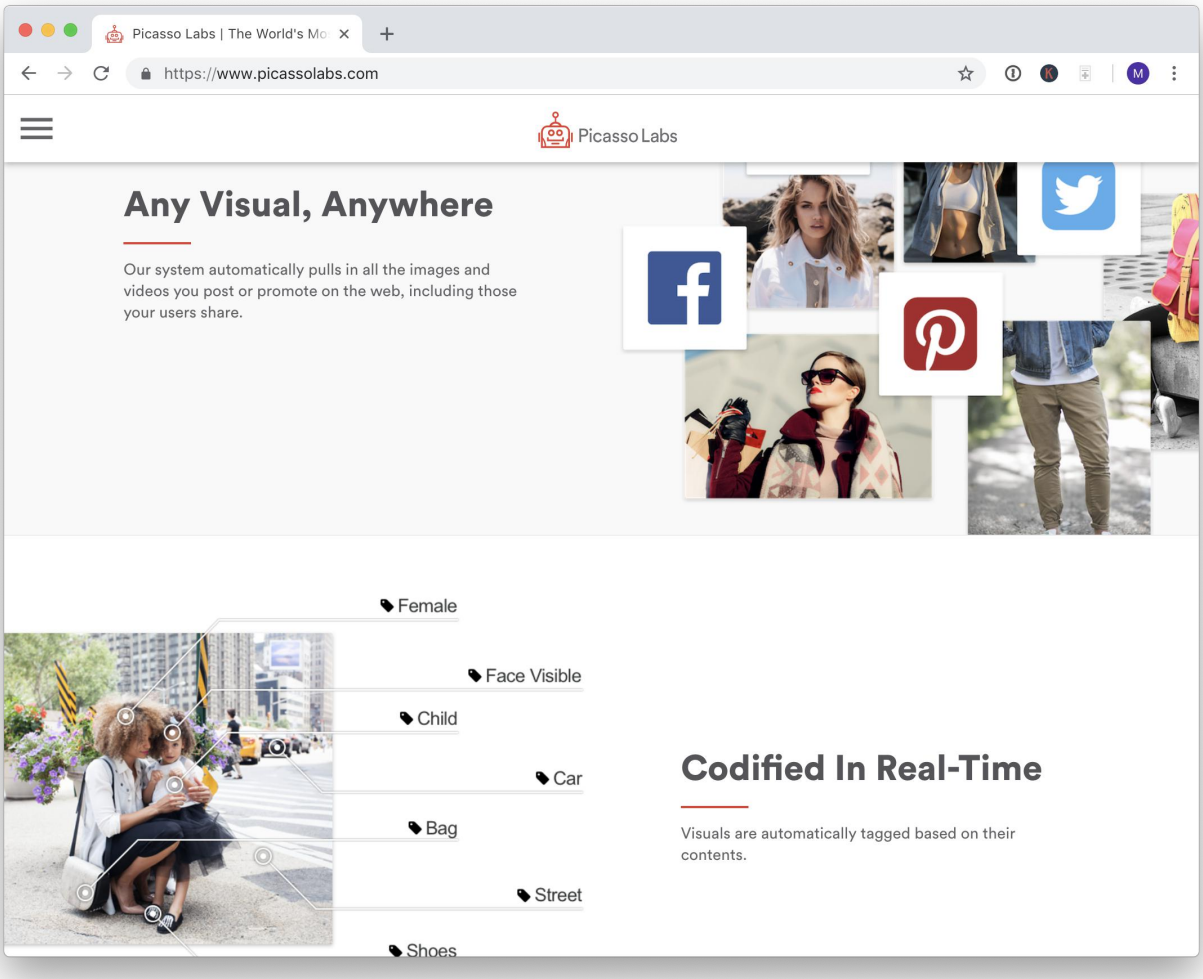
2020 Qualboard 4.0, an example online qualitative research platform with text analytics and NLG features

11. Recognising Content in Images and Video

Finding and identifying objects in images has several uses in research.

Images posted to social media can be decoded to understand how often and in what context individual brands are used.

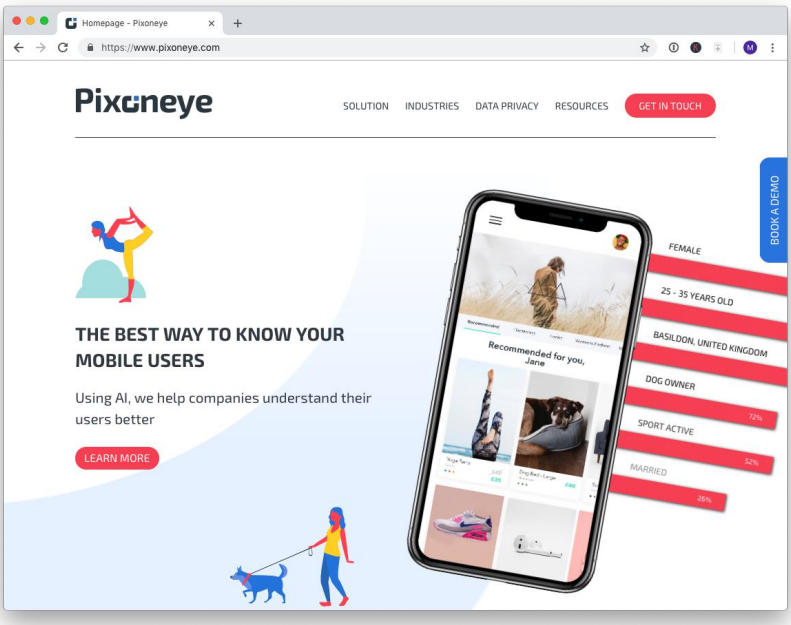
Picasso Labs can identify objects in images from any public source to understand how consumers and influencers post about brands, categories or topics.



Picasso Labs: an example of computer vision applied to social media research

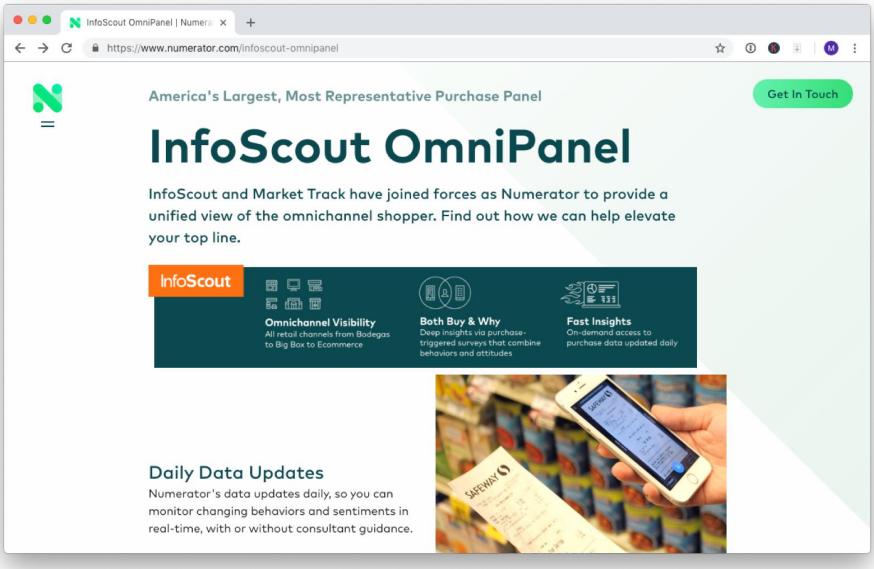
Some **social listening** platforms such as Pulsar and Crimson Hexagon have also added this capability.

Our own photos can reveal a lot about our lives, behaviours and values. Pixoneye is a recent startup whose opt-in smartphone app can analyse the content of a user's photo library to add richer profiling to segments.



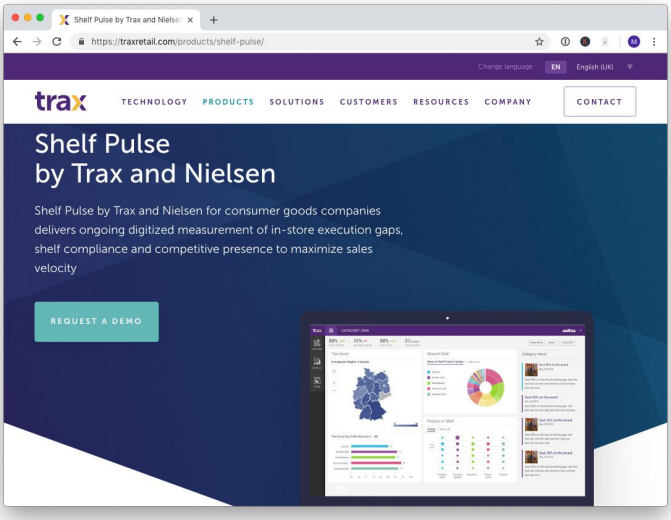
Pixoneye: an example visual analytics platform

Shopper diaries have been transformed in recent years through the use of smartphone apps. These tools can recognise photos of packaging and classify the product or brand; and long-term shopper panels such as Infoscout use visual analytics to decode the content of scanned purchase receipts:



Infoscout Omnipanel: an example shopper panel using computer vision for receipt scanning

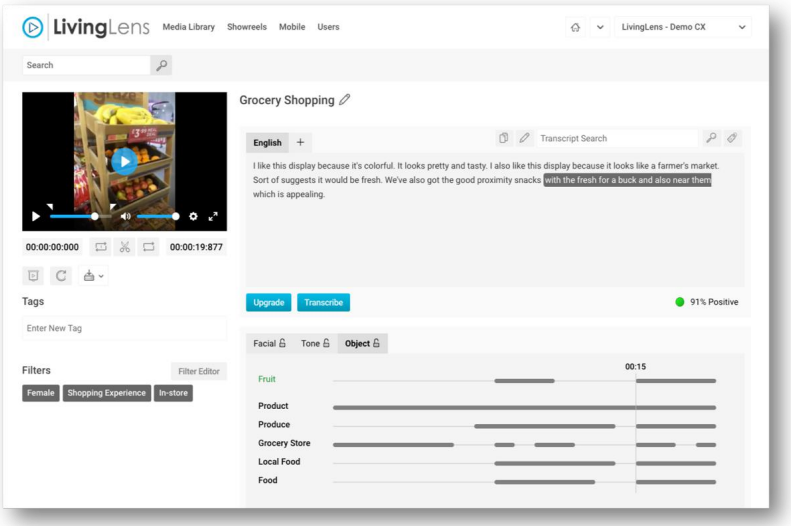
And computer vision is transforming **category management**. Trax Retail uses millions of images of POS and shelf displays from fixed in-store cameras and a crowdsourced panel of smartphone users. The AI recognises which products are being replenished, and combines this with Nielsen shopper panel data to build a fuller picture of category performance.



Trax Retail: an example of computer vision applied in-store for category management

The same technology that recognises objects in static images can be applied to video. Fixed camera and smartphone auto-ethnography projects can generate enormous quantities of video: computer vision AI helps to focus and speed up researchers' analysis work.

Living Lens, the video management and analytics platform, uses object recognition software to identify and classify items within videos; researchers can then search for specific objects to find the clips in which they appear.



Living Lens: an example of computer vision applied to video analytics

12. Recognising Faces

Research applications for facial recognition are emerging slowly, as there are serious privacy and compliance issues - especially under GDPR in Europe and similar regimes in development.

Some current applications include:

- using AI to identify shoppers' age and gender from in-store cameras and combining that data with people-counting software (Ipsos Retail Performance)
- identifying repeat respondents in qualitative research to minimize fraud (Ipsos India).

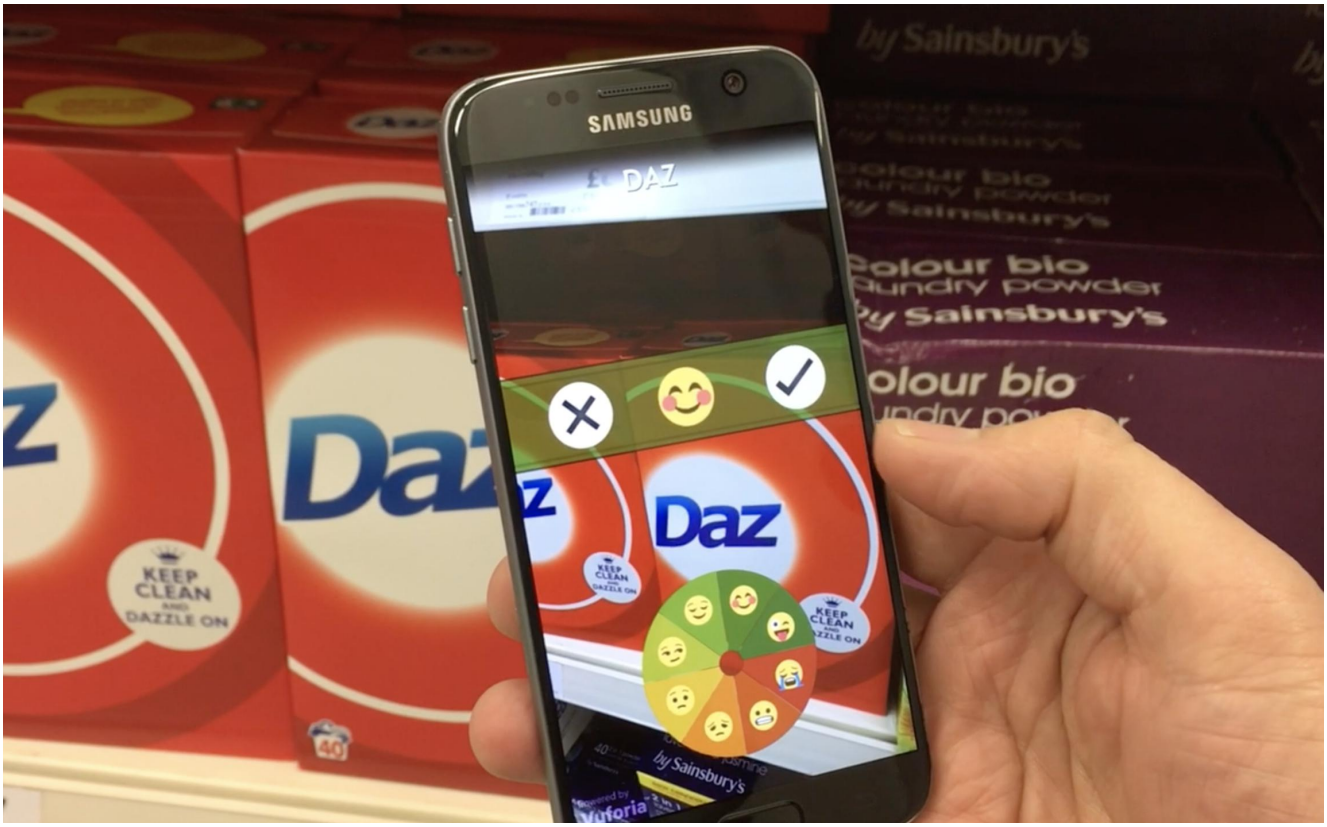
13. Virtual / Mixed / Augmented Reality

Research has used digital simulations of products, fixtures and even whole stores for some time. Advances in VR headset design have brought more immersive software like InContext Solutions for ‘mixed reality’ simulations.

Augmented Reality technology has massive potential for researchers as it offers the scope to ask specific questions in context at the point of experience / purchase.

Gorilla in the Room is an early innovator in this space, and a specialist provider of Augmented and Virtual Reality research tools.

Its software can be trained to recognise specific products, brands or ads using a smartphone camera. For consumer panels or diary studies, these 'real world triggers' can launch a digital survey to capture feedback in situ.

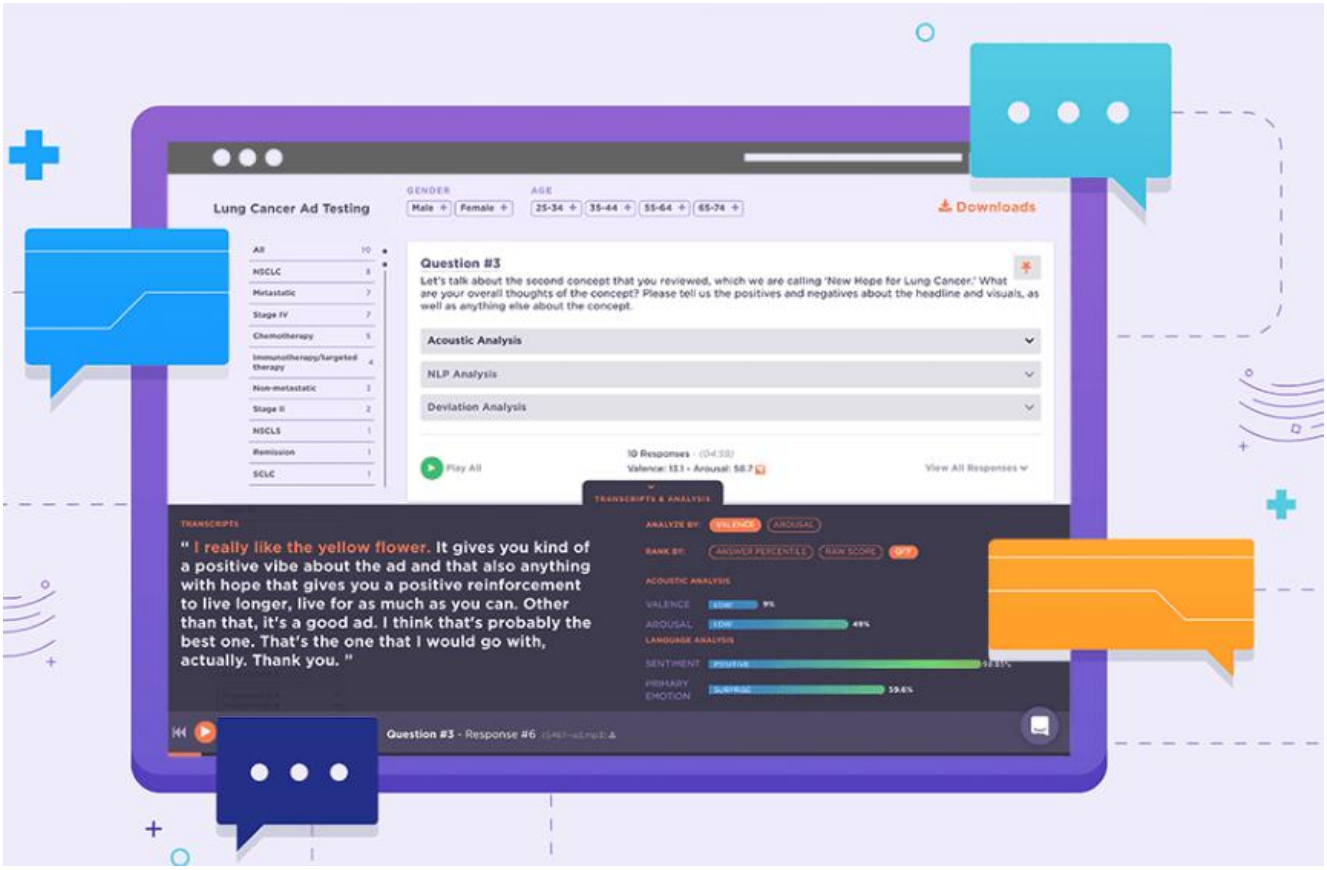


Gorilla in the Room: an example of an augmented reality research platform

14. Analysing Vocal Tone

Recordings of conversations – sales discussions, customer support calls or even research interviews – can be analysed using AI to identify emotions from both intonation and breathing patterns.

Beyond Verbal analyses this data for emotional valence, arousal and temper. inVibe combines *acoustic analytics* (classifying valence and arousal in a speaker's tone of voice) with *language analytics* (using NLP to decode the sentiment of transcribed conversations).



inVibe: an example of vocal tone analytics

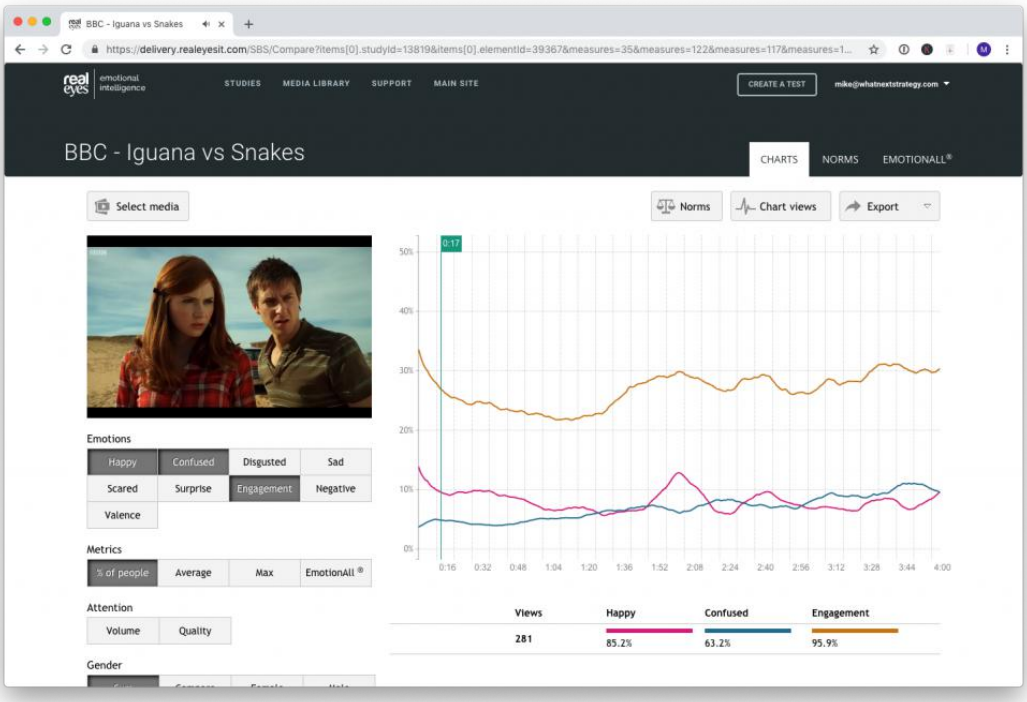
15. Analysing Eye Movement and Facial Expressions

Eye tracking with glasses (such as Tobii) has long been used by retailers and brands for POS planning, and more recently for UX design and testing media with hi-res under-screen cameras such as Gazepoint.

Online eye tracking solutions using webcams include Sticky, Eyes Decide, Emotion Research Lab, Crowd Emotion and Affect Lab.

Facial coding captures a viewer's face as they watch an ad, a trailer or even longer-form video. Changes in 'micro-expressions' are mapped using machine learning models to classify these expressions into one of a handful of 'core' emotions (anger, disgust, fear, happiness, sadness, surprise … or some variant of these).

The outputs are usually a series of trace lines that show peaks or troughs of emotions mapped against time-stamps in the video:



Realeyes: an example facial coding platform

Emotion Research Lab, Realeyes, AffectLab and Affectiva all have facial coding solutions that can run over the internet using webcams.

Advances in AI have helped to link eye tracking results and facial expression analysis with other data sources to build composite models of emotional engagement.

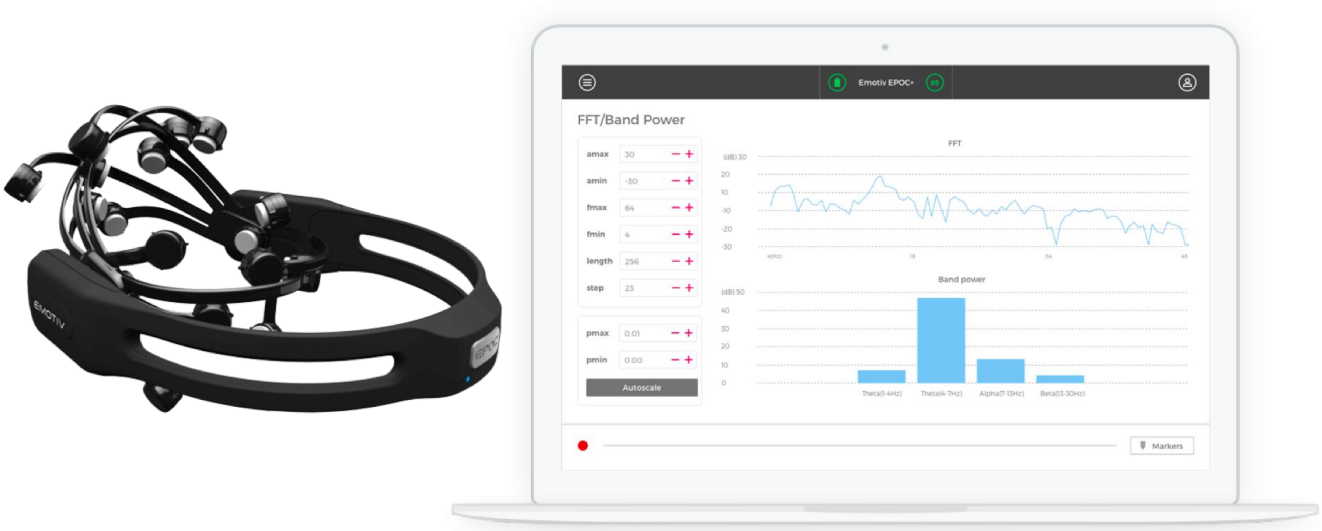
Crowd Emotion links eyes, face and reaction times (via implicit response tests) to build a combined model of media engagement for advertisers and video content creators.

CoolTool combines eye tracking, facial coding and click tracking behaviour to build a composite picture of mobile user experience. Its UX Reality tool can be used to test smartphone apps or mobile web experiences.

16. Biometric Feedback

Devices cans be used to measure pulse rate, brain activity or electrodermal activity to build models of emotional states. Where these methods used to be the preserve of wealthy marketing teams or university departments, they are now much more accessible.

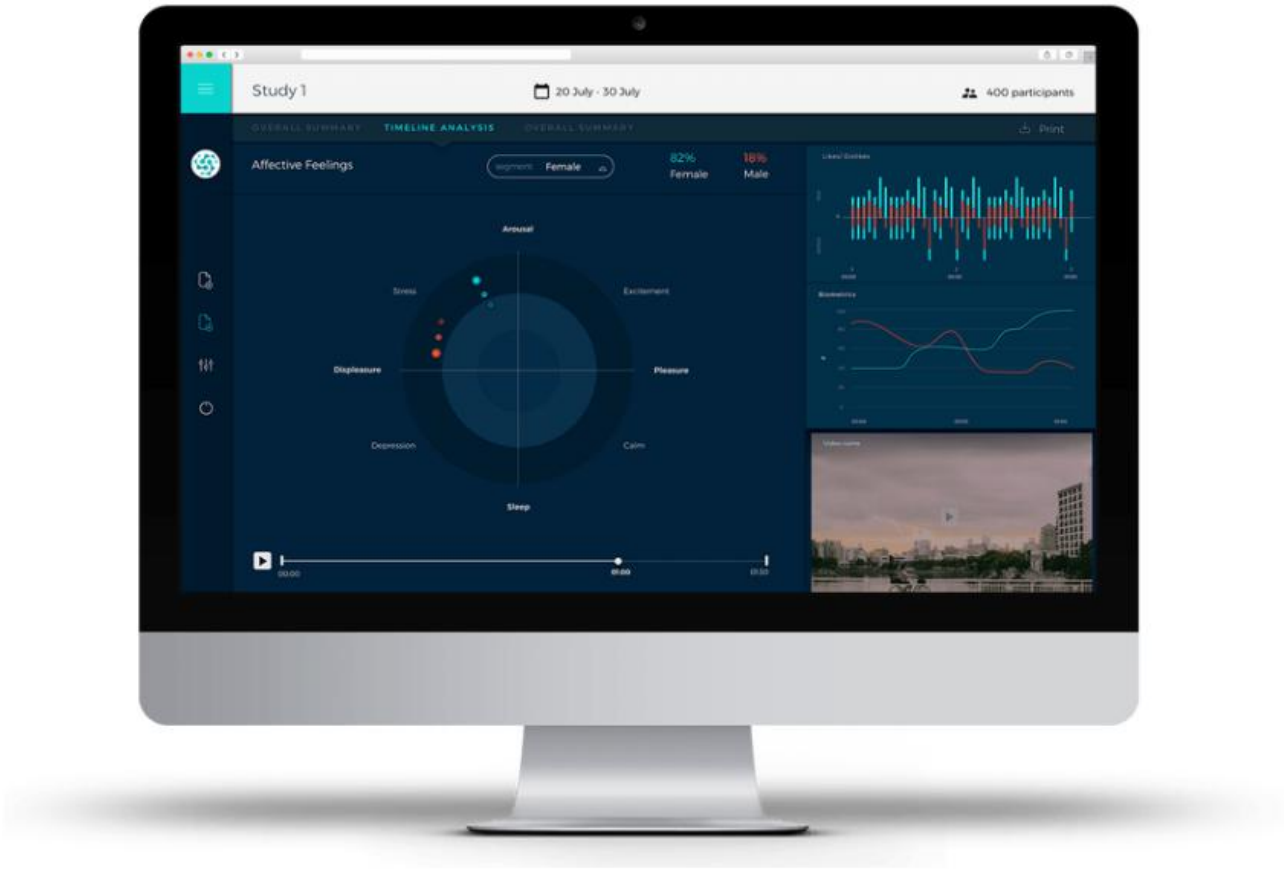
EEG (electroencephalogram) measures of brain activity typically capture cognitive state (asleep > drowsy > low engagement > high engagement) and workload (boredom > optimal > information overload). Emotiv provides both EEG headsets and software for analysing results:



Emotiv: an example biometric hardware and software platform

GSR (Galvanic Skin Response) measures changes in sweat gland activity that are telltale signs of emotional arousal. Sensors like Shimmer can detect this, and software such as iMotions can integrate biometric feeds from a range of different sources.

Mindprober has taken this online with its panel of biometric sensor-equipped respondents and self-service tools for project management and analysis. It can be used for testing ads, video or even live broadcasts.



Mindprober: an example of an online biometric research platform

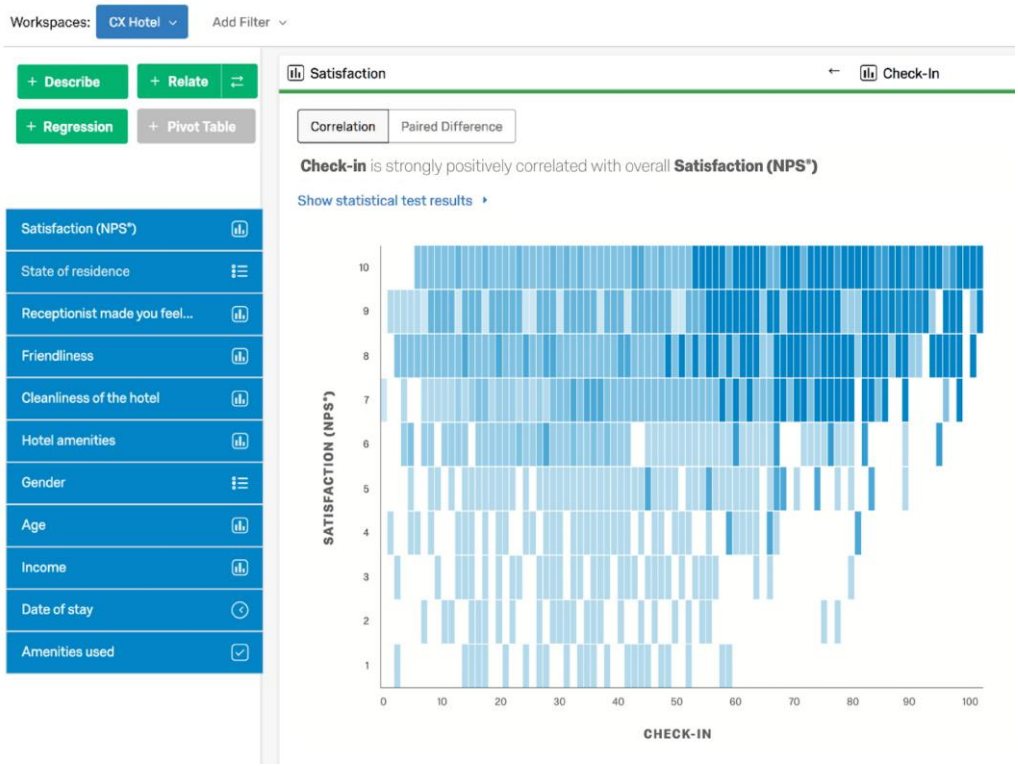
The way we touch our smartphone screens can also be modelled to infer our emotional state: are we stabbing the screen aggressively or stroking it affectionately?

Emawww and Chromo both have solutions that do this and can be embedded into smartphone apps to provide developers with additional user feedback on their products.

17. Data Visualisation

Data visualisation doesn't rely on AI; but the opposite is increasingly true: AI needs creative visuals for telling complex stories to simple humans.

Many platforms now display data in ways that clearly guide the researcher - or other non-specialist user - to the most relevant findings. This visualisation from the Qualtrics platform, for example, tells the user what's happening with an automated summary ('Check-in is correlated with NPS') and reinforces the message with visual chart components:



Qualtrics: an example of guided visualisation

AI techniques will increasingly be used to find the insights; visualisations will be more and more necessary to translate those insights for busy researchers and analysts.

18. Price Optimisation

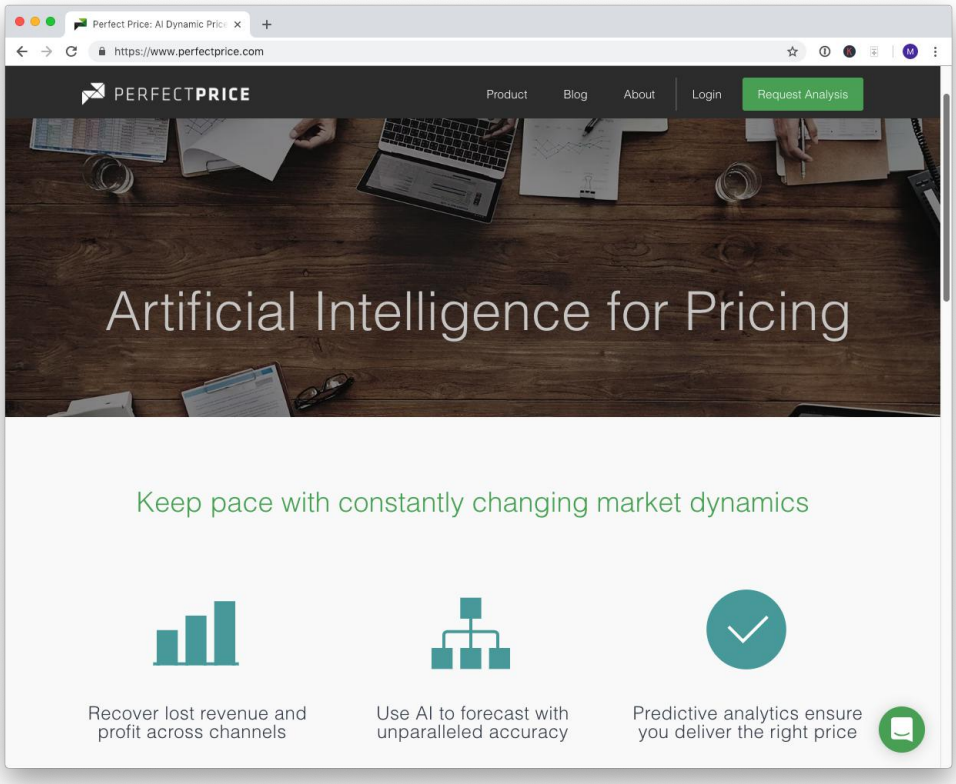
Many markets operate dynamic pricing models: they vary pricing according to a buyer's segment, their purchase history, the time of day, the scarcity of inventory … or dozens of other variables.

In one famous case, travel company Orbitz showed how Mac users were willing to pay a $20-$30 premium over PC users.

And we've all felt the pinch when Uber's dynamic pricing kicks in late on a Saturday night.

Artificial Intelligence can take hundreds or thousands of variables to model the optimal profit or revenue maximising price point.

For example, Perfect Price uses supervised machine learning and reinforcement learning to generate prices on-the-fly for categories such as air travel, hotels and car rental.



Perfect Price: an example dynamic price optimisation platform

19. Attribution Analytics

"Half the money I spend on advertising is wasted; the trouble is I don't know which half."

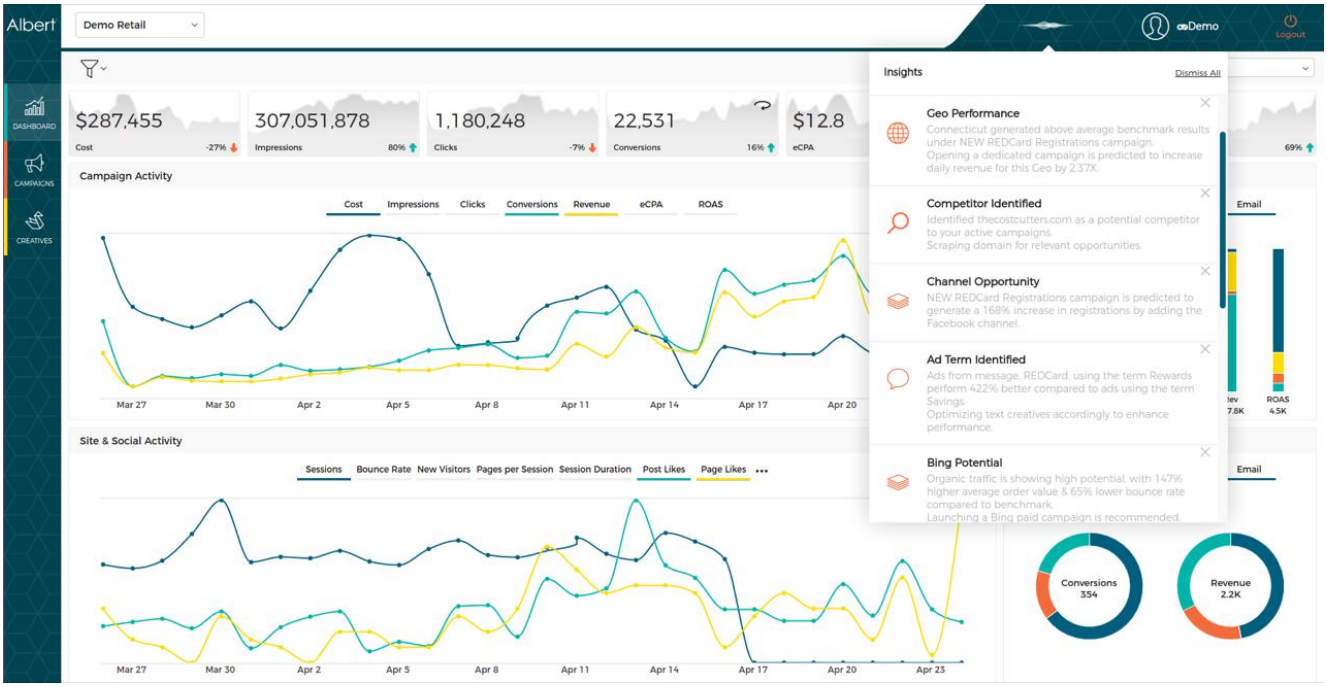
John Wanamaker's quote is more famous than the man himself, and until recently was accepted as a Marketing Fact of Life.

But AI hopes to change all that.

It can process thousands of variables and millions of data points; use machine learning and regression to understand the impact on customer behaviour; and create models to explain the relative contribution of different touchpoints, experiences and campaigns.

Many AI tools even take this learning and apply it by adjusting online campaigns in real time.

Albert.ai carries out attribution analytics autonomously and automatically tweaks targeting, media buying and digital execution on-the-fly across email, mobile, social, search and display.



Albert.ai: an example of AI-based attribution analytics

20. Customer Journey Analytics

Customer journey mapping is a well-established approach for visualising the end-to-end customer experience.

Customer journey analytics takes this a step further by filling the map with data. Every customer interaction - across channels and over time – from millions of touchpoints and events gets modelled into *journeys* to help understand, analyse and shape the customer experience.

The aim is to give marketers and CX managers a way to prioritize the right touchpoints and experiences that will grow revenue or reduce churn.

Pointillist is one such journey analytics platform. It uses machine learning and predictive analytics to test hypotheses and model future behaviour.

Pointillist: an example customer journey analytics platform

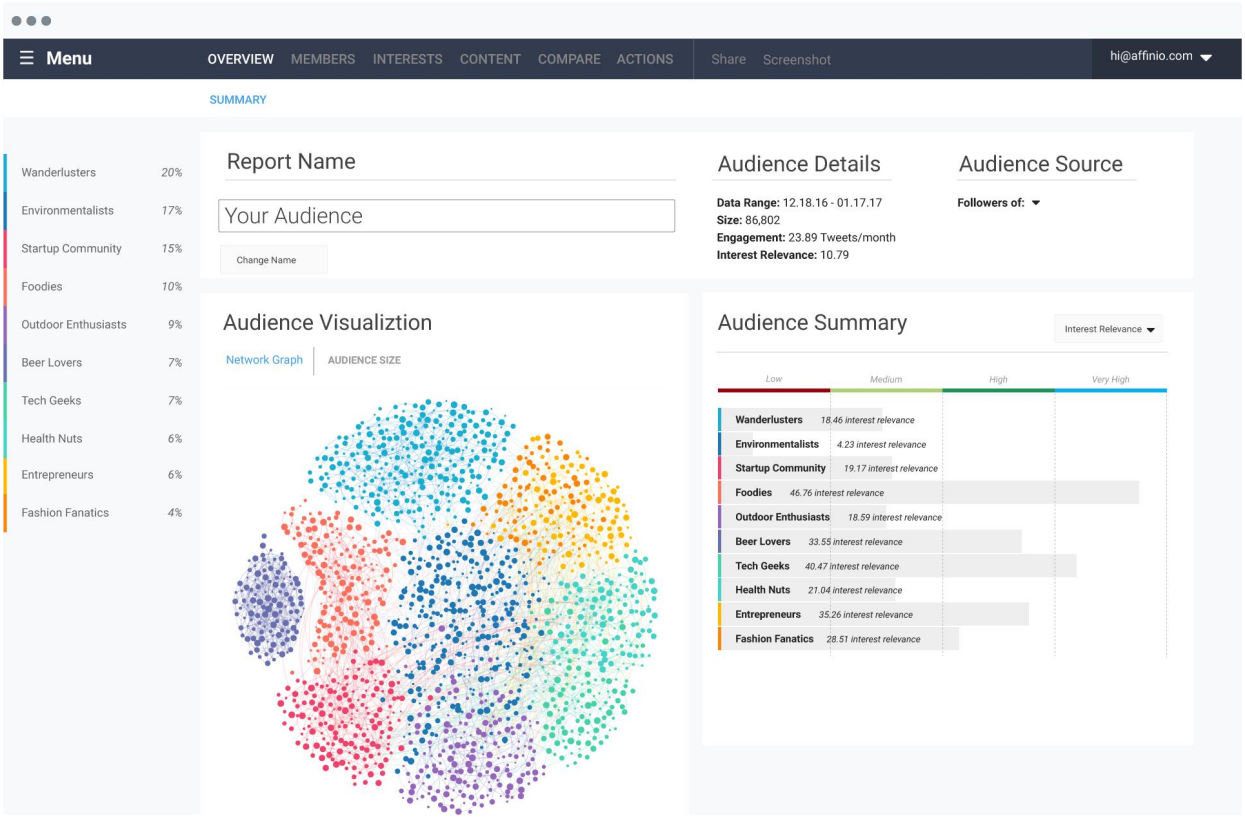
21. Segmentation

Unsupervised machine learning models can identify clusters of users in large data sets: e-commerce transactions, CRM records, location, subscription or survey data.

These models do not need to be built around *a priori* hypotheses; they can be used to analyse records of user behaviour, spending, preference, demographics or anything else – and find the commonalities that occur naturally.

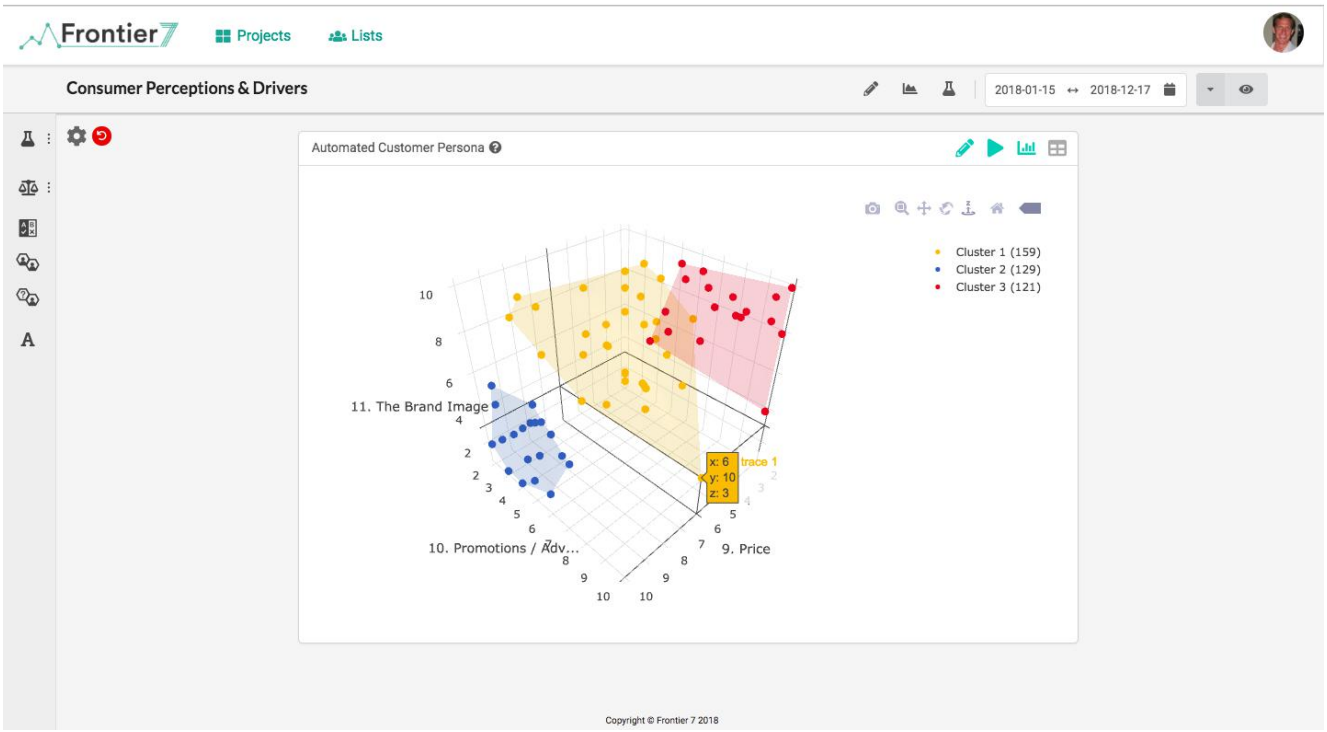
When combined with good domain knowledge, the resulting segmentations can show up new opportunities for communications and customer management,

The Affinio platform uses machine learning to build custom audience segments by combining and analysing first and third-party data.



Affinio: an example segmentation analytics platform

Frontier7 is a primary research management and analytics platform that uses unsupervised machine learning for automatic customer segmentations.



Frontier7: an example segmentation analytics platform

22. Personalisation

AI-based personalisation is a key tool for social, ecommerce and media platforms.

Complex models drive Amazon's product recommendations, Facebook's 'people you may know' suggestions and even the targeted movie posters displayed to users on the Netflix home screen.

Natural Language Generation is used to create tailored content for email communications and programmatic ad campaigns.

Platforms such as Pure Clarity help marketers to deliver these experiences; they also provide a rich source of insight and analytics for researchers and data professionals.

23. Enhanced Prediction

This last category really is a cop-out.

You can make a case for saying that ALL artificial intelligence is about prediction, and there are far too many applications and examples to do justice to here.

This is just a small selection:

- Research agency Strategir has built a proprietary AI solution that can transform 200 survey respondents into a virtual shopper panel of 2 million consumers - to support much more granular and accurate modelling of purchase behaviour. A full case study based on Strategir's model is available here.
- Retail sales data, social buzz and other indicators are combined into predictive models by tools such as Trendskout and Trendscope from Black Swan Data.
- The most visually engaging elements of a web page, campaign or POS display can be modelled using AI without the need to conduct fresh A/B tests or primary research; tools such as Eyequant and DragonflyAI provide this
- Affectlab's platform has millions of data points from historic facial coding, eye tracking and brainwave mapping research projects. This data is powering a machine learning model that will be able to predict emotional engagement with new content without needing fresh respondents.

Part 3:
A Research & Analytics Blueprint for AI Success

So what do you do about AI now?

This final section maps out 5 strategies for insight teams and agencies to maximise the AI opportunity.

These new technologies will eliminate some old roles and create some new ones; they will move certain types of work into clients and out of agencies; and they will bring new opportunities and challenges on both sides of the fence.

Navigating the world of AI won't be straightforward; but there are clear steps you can take to increase the chances of success.

1. Improve your Business-as-Usual

AI for research is evolution as well as revolution.

In the short term, one of AI's biggest impacts will be to improve current ways of working. There is much that is being disrupted in research; equally, there is much that will continue and evolve gradually.

In-depth interviews, online surveys, access panels, reports and presentations: these will all continue, and in most cases continue to grow. AI tools will enhance these methods by reducing timescales, improving data quality and cutting overheads.

Some simple examples include:

Transcribing and translating interviews: despite the scale of online research, a lot still takes place face to face (social, qualitative, usability, in-home, B2B). Text-to-speech applications will help transcribe discussions on the fly or very quickly afterwards.

This will reduce the costs and timescales of human transcription; make the content of interviews searchable and databasable; and allow text analytics to find and quantify themes, supporting the work of the core researcher.

Reducing fraud on survey panels: panel fraud is a major challenge for online surveys (bot farms, individuals with multiple accounts, dishonest respondents etc). AI tools can help mitigate these risks and improve data quality.

Panel technology firms **P2Sample** and **VIGA** have built machine learning models to recognise fraudulent behaviour. The algorithms use a combination of historic survey responses, digital behaviour data and known indicators of historic fraud to improve quality.

Improving predictive models: using surveys to forecast the uptake of new products or services has long been a staple of consumer market research. Combining these techniques with AI models can improve their predictive power, as Strategir has demonstrated.

Practical Steps

1. **Identify the lowest hanging fruit**. Go through the 23 applications above and give each one a score out of 5 on 2 measures for your team or business – scale of impact and ease of implementation. Multiply the scores together (max 25) to give you a prioritised ranking of opportunities. Start on those with the highest score.
2. **Set your goals.** You have 3 dimensions to play with – cost, return and timescale. The cost side of the equation needs to include the time you invest (dedicate at least 20% of an FTE to manage this process), the tangible software costs and the learning costs attached to rollout. The return should be both the dollar amount saved and a proxy for the value generated (stakeholder impact, new business won etc). And you need to set milestones for achievements at 3, 6 and 12 months.
3. **Hold the beauty parades.** Chances are, you're already besieged with tech vendors trying to pitch you. So make the most of it: invite the AI solution providers in, share your use cases, get them to prove their value. This is the fun part, and you will learn a lot. Enjoy it.

2. Build New Client-Agency Models

Agency engagement and remuneration models are broken. Nobody's happy: clients feel under-served and agencies don't make enough money.

And it looks set to get worse in the age of AI as client teams bring more activity in-house and agencies struggle to fill their revenue gap.

But it doesn't have to be this way. The best agencies will play essential roles even as AI matures: they bring external perspective, deep domain expertise and burst capacity – essential benefits for client teams.

Modern ways to procure and manage agency expertise include true retainers to lock in relevant expertise, customer success (technology + support) models for in-house platforms and researcher marketplaces for occasional expertise or extra bodies on short-term projects.

Practical Steps

1. **Client teams: get creative with your strategic agencies**. There are three of you in this relationship now - you, the agency, and your AI platforms. You need to bring those key partners properly inside the tent to co-create new workflows and commercial models. You need to be transparent about budget; they need to be transparent about how they make / lose money; and you need to build joint approaches to working with shared AI platforms.
2. **Agencies: focus your value proposition.** You need to deliver what AI can't (yet): contextual insight, engaging narrative, deep expertise. Ten years ago, there was plenty of money to be made collecting survey or focus group data and writing basic PowerPoint reports. Those days are over.
3. **Both: make longer term plans.** That sounds tricky when everyone parrots truisms about the extreme pace of change. But *strategic* client-agency relationships need on-going 24-36 month horizons. Without that, there is not enough joint confidence to make the investments that are needed.

3. Embrace Embedded Insights

More days that are over: those when every research project was run through an insight team or outsourced to an agency.

Software has put research tools directly in stakeholder hands, and AI will massively accelerate that trend. Every department is expected to be user-centric / consumer-driven / customer-first.

What does this mean in practice? It means that they ...

- get their own specific insights about those customers
- engage with users directly rather than through a research team
- build that customer feedback directly into their own workflows.

AI will put more insight tools in the hands of non-specialists everywhere. They won't need to be experts in research and analytics: the software will bring it to them.

This *embedded insight* model means that far more research will be done outside research teams than within them.

Here are some examples where *embedded insight* is happening today.

Customer Experience teams: many CX teams now manage their own Voice-of-Customer programmes without ever engaging their research colleagues.

Enterprise platforms like Medallia, Qualtrics and InMoment gather customer feedback at every touchpoint and include AI features for segmenting customer groups, sentiment analysis and alerts.

Startups and digital businesses can use tools like Wootric, AskNicely and Retently to capture metrics like NPS and carry out text analytics of verbatim feedback.

Product Management teams: digital product teams need a constant stream of feedback about users: how many, how often, where they click, their journey flows, whether they convert.

Users' on-site or in-app behaviour is captured through tools like Heap and Google Analytics; increasingly, this 'what' data is being augmented with 'why' data in the form of user feedback in platforms like Apptentive, Usabilla and Mopinion.

Integrated platforms like Hotjar include surveys, forms and user recruitment tools as well as in-page analytics, heatmap generation and sessioncams. AI is used to combine data sets, model preferences and trigger targeted requests for feedback based on behaviour.

UX Design teams: designers can now go straight from prototype draft to user feedback in a few clicks.

In a moderated online test, the designer can see both video of the participant and their device's screen. Recordings can be transcribed and analysed using both NLP and computer vision.

Adobe XD is design software that integrates with UserTesting; and prototyping platform Marvel integrates directly with Lookback.

Practical Steps

1. **Get over it.** The first step is acceptance. Insight teams and agencies need to stop getting annoyed when stakeholders do their own research. Stop disparaging it as 'quick and dirty' or insinuating that it's *not proper* because they didn't involve you.
2. **Support and enable.** You have the expertise in research design and analysis – so share it. Be advisory rather than executional. Hold best practice workshops, write training guides and try to influence the choice of tools.

4. Always be Learning

If you're reading this far, I'm probably preaching to the choir.

AI represents a step change in the tools and data sources available to researchers. It poses a major learning challenge for an industry that under-invests in training & development.

One recent report by Ray Poynter of NewMR suggests that 1 in 4 researchers get no training in any given year; and that only 1 in 5 get more than 2 days a year.

This is woefully insufficient if researchers want to thrive in the age of AI.

Practical Steps

1. **Dedicate time to learning.** For you personally and for your teams. Best practice guidelines vary, but plan for a minimum of 2 hours per week.
2. **Re-think how you do it.** Too much training is triple-F: face-to-face, full days and quickly forgotten. Micro-learning – like Google's *Whisper Courses* can be far more effective. Online platforms like Udemy have hundreds of self-paced courses to help with AI-related topics for researchers including machine learning, data science and conversion optimisation.

5. Do What AI Can't

Computers can't do empathy and they struggle with context. For all AI's achievements, applications remain *narrow* – models are good at one specific thing and useless at everything else.

AI will increase the volumes of data available to everyone working with insight and analytics; it will also drive a parallel increase in the need for real human insight and relatable storytelling.

The data will help to measure, diagnose and plan at speed and scale; creative insights and moments of understanding will come from individual, qualitative connections.

Specialists with research skills in these areas will be in high demand. For example:

Digital products rely on streams of performance data, but qualitative user interviews, observations and feedback are at the heart of the design process. Understanding people and translating those insights for engineers is a critical skill for **user experience researchers**.

Context is everything. Platform analytics can generate thousands of rows of data for a single customer using a single app. But it can't see what else is going on in the user's life or how it might impact their behaviour. **Ethnographers** are experts at making these connections.

Managers need to mingle with the people who pay their mortgages to avoid the idea of 'customer' becoming an abstract notion or a series of data points in a dashboard. **Qualitative researchers** will be needed to facilitate customer closeness sessions to connect executives with the humans they sell to.

Practical Steps

1. **Get out from behind the desk.** AI will put more and more data on your screen – but it risks separating researchers and analysts even more from the people they hope to understand. Spend time with users, watch them, listen to them.
2. **Use anecdote and illustration as much as data**. Insight leaders drive change by combining evidence and metaphor; let the AI deliver your evidence, but make use creative metaphor to land your story.

Final Thought

When looking at any new and potentially disruptive technology, it's always worth keeping Amara's law in mind:

"We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run."

AI will change research & analytics dramatically – even if you haven't felt its effects so far.

Embrace it and evolve; try not to fear it.

If you found this e-book useful, make sure you register for a FREE Insight Platforms account and stay in the loop.

And if you want to discuss anything in this ebook or need help figuring out AI, send me an email or message me on LinkedIn.