CLOSING THE GAP

Search engines and Mathematics that bring humans and information closer.

RSME 2019 SANTANDER

UC UNIVERSIDAD DE CANTABRIA

8th February 2019

GAUSS&NEUMANN

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AT THE HARDWARE STORE

Giving a good marketing answer:

A customer gets into the hardware store and makes the following request to the shopkeeper:

"Excuse me, have you got a ***large flat head screwdriver***?"

A great answer from the marketing point of view could be:

"Yes sir, we have got large flat head screwdrivers. They are 10% off. Do you want one?"

Giving a good "mathematical" answer:

If we make some abstraction on the marketing answer, we see that we get the following structure:

Same words in the same order + Extra information + Call to action

Such an answer is **precise**, **ordered** and **structured**. Such adjectives are often linked to the mathematical mind.

THE DIGITAL VERSION: SEARCH ENGINE MARKETING

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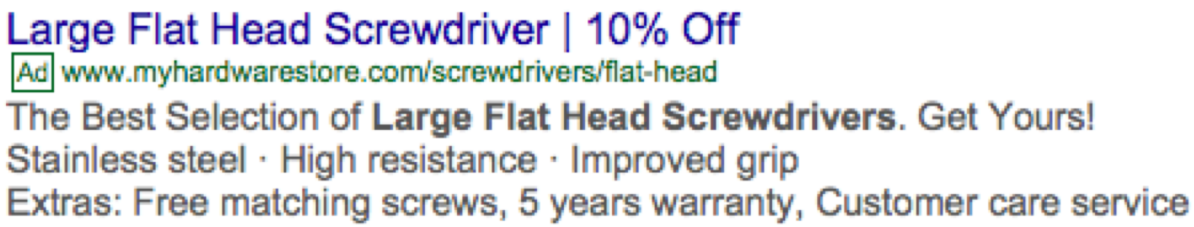
Typing a query

The digital version of the situation from the hardware store is just to type a query in the search box of a search engine:

Getting a meaningful ad in return

In return we may get an ad printed on the search result page that responds to our needs:



THE SEM AUCTION

What information do we provide?

As advertisers, we provide three pieces of information: the **keyword**, the **ad** and a **bid**. Ideally, one someone makes a query that matches our keyword we want to show our ad and if the ad is clicked we are willing to pay (at most) the amount that we bid.

What advertiser goes first?

Other advertisers also provide their information. Is the one bidding the most getting the first position? No, there's another relevant factor: **quality score** (QS). QS is a modifier on the bid that depends on three factors:

- **Expected click-trough rate**: how often it is expected to get a click if an ad shows up (based on historical data).
- **Landing page:** how relevant is the content of the webpage where the user will be sent. Also, how good is this web in terms of performance (e.g. loading times).
- **Ad rank:** how relevant is your ad (remember: same words in the same order!).

Once the bids are modified, the order of the ads is stablished. If the user clicks one of them, then the corresponding advertiser pays as much as the bid of the advertiser right below it.

Note that setting the right bid is a **quantitative optimisation problem**.

HOW BIG CAN IT GET?

At a company like ours we handle:

- 1.77 million ad impressions a day (only on keyword-based search)
- 67 M€ of spending on digital advertising a year

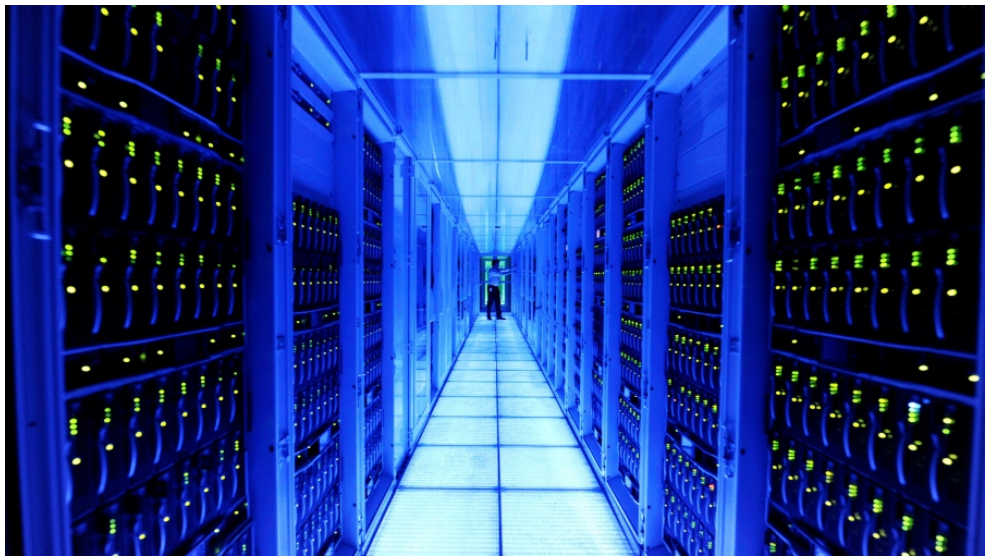
How many employees do we need to manage these quantities? A good optimisation would not be possible without the skills we mentioned in the first slide: order, precision and structure.

At Gauss & Neumann we translated such skills into a design methodology that we call MASK™ (massive array of structured keywords). It consists of a fine-grained ordered structure of keywords that provides many advantages.

BUILDING A MASK™

In our audits we often find SEM structures that look like the picture on the left. In case we get to manage such campaigns, our first task is to transform them into something more similar to the picture on the right:

Standard SEM structure



MASK™ SEM structure

WHY DOES MASK™ WORK?

MASK™ provides many advantages for day to day management:

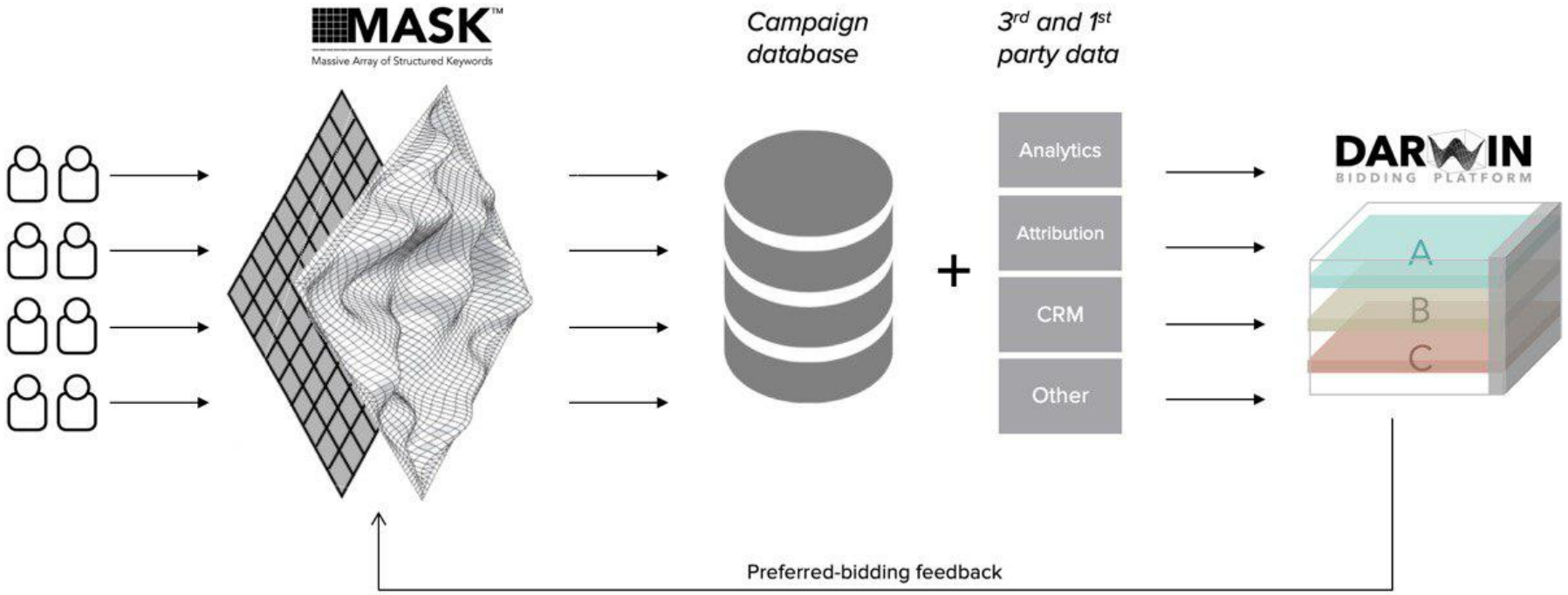
- Anything that behaves in a different way has its own compartment.
- Finding any information is much faster.
- Setting bids and optimising can be done with precision and at a large scale: no client is too large or too small.
- Since we can segment and group easily, reporting becomes easier too.
- Any automation becomes simpler.
- Collecting data is easier and it does not need to be cleaned or ordered: you get it clean and in order *by design*.
- We can set a structure of negative keywords.

MASK™ works because it follows two very simple principles:

- It provides meaningful good quality ads consistently and at large scale.
- It avoids showing ads to customers that are not searching the advertiser's products.

THE CURRENT PICTURE

MASK™ generates data and at the same time it allows to be informed by external data, giving place to a cycle that makes bids to be re-evaluated and optimised regularly:



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JUST ANOTHER BRICK IN THE WALL

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Further challenges in SEM:

What we have seen in the first part of the talk is just how one particular company solves one particular problem, which is answering a user query with the maximum quality, but there are many more challenges. Some examples:

- **Voice searches:** Voice assistants are already integrated in our mobile phones and home devices. Voice searches are often much longer and less structured than written ones and giving good answers to them becomes a new challenge. Moreover, one expects these answers to use a much more natural language.
- **Audiences:** If we know not just the query but *who* is making the query, a whole new world of possibilities opens up. Any information about the person behind the query can be valuable to set the right bid or chose the correct ad to be shown.
- **Attribution:** For some the Holy Grail of digital marketing, attribution consists into deciding how much has each interaction with a customer contributed to a sale.

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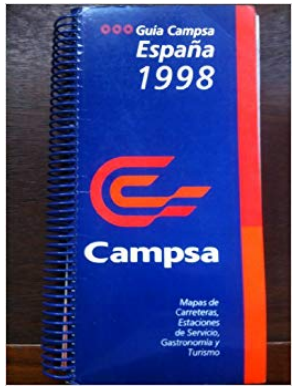
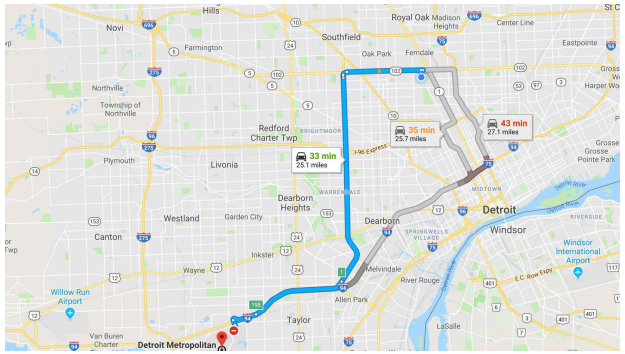
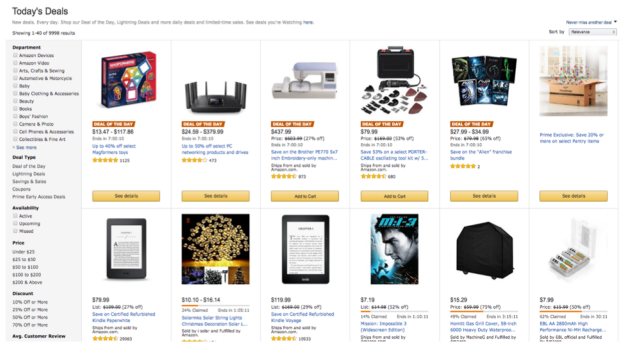
SEARCH ENGINES SHAPE OUR BEHAVIOUR

According to some authors, since the inception of search engines we have cut down the time to get any piece of information in 22 minutes on average:







Since nowadays looking for information is almost free in terms of time, we search it much more often. The answers we get to our searches do definitely have an influence on our decisions.

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