



# Karna AI

AI Solutions for Market Research



## Automated Open Ended Text Survey Processing

AI breaks researchers from the shackles of structured questionnaires.

### Traditional Structured Surveys have many limitations

Surveys are an extremely important tool used by brands to understand how consumers perceive them and what can be improved. With the advent of technology, brands are going for larger surveys that cover a wide range of consumer demographics and locations.

However, when surveying a large audience, brands end up settling for “structured surveys” where consumers are given options of pre-defined responses to choose from. This restricts the research to assessing certain predefined hypothesis v/s the ideal case of investigating the key unknown answer.

For the true investigation, we need an open text response about what consumers feel from “unstructured surveys”. But this rarely happens in practice as intelligent analysis of thousands of unstructured open text responses is a laborious job. There is an answer to this, text analysis using Artificial Intelligence. This whitepaper from Karna-AI gives a vision of what the surveys will look like in future and how we are contributing to the change.

### Pros and Cons of Structured Survey

#### PROS:

- Simpler and faster for respondents.
- Easier to analyse.
- Numerical ratings can be used for quant analysis.

#### CONS:

- Given options influence the response.
- Not useful for finding unknown.
- Ability to dig deeper is very limited

# Conceptual Case Study

## Analyzing reasons for sales decline at Mcdonald's

A conceptual overview of how AI driven automated survey processing works

Suppose Mcdonald's observes that its overall sales have declined over the past few months. Puzzled with the situation, the executives at McDonald's wonder what is causing this decline. They hire a market research agency to figure out what is the underlying reason.

The agency starts its investigation and notes that the home delivery sales have remained on the expected growth trajectory while the decline in sales has primarily occurred in physical restaurants. This is a startling revelation and it helps the agency in narrowing down the possible cause. Given that the problem is only with sales in physical restaurants, the agency rules out price, offerings and brand image as possible causes and instead decides to do further analysis on **Ambience** and **Service** at physical restaurants.

As the sales decline is prominent only at the physical restaurants, the agency circles down to in store aspect like Ambience and Service.

Price

Offerings

Brand Image

Ambience

Service

The agency decides to undertake a survey of 10,000 customers across the USA who had reduced their frequency of visits to McDonald's over the last 6 months. The objective is to do an in depth investigation of people's perception towards Ambience and Service and identify the underlying reason for the decline. The agency decided to do an open ended text survey as shown below:

Gender:

Male

Age:

33

Occupation:

Senior Manager,  
Galaxy Retail

1. When do you typically visit McDonald's?

*I generally come down at McDonald's for lunch breaks from my office and sometimes for a quick snack in the evenings.*

2. What do you expect from Ambience and Service at a McDonald's outlet?

*I like the big macs here and they have a fast service. I expect it to be quiet so I can relax during my break hours from work.*

3. What did not meet your expectations?

*At times it is noisy during rush hours and nowadays there is a funny smell in the restaurant. The restaurant does not feel relaxing anymore.*

4. Any suggestions on how we can make the experience better?

*You guys got to do something with the overall cleanliness. The ventilation and the air conditioning could be better. Keep up the fast service though.*

## Analysing the open ended-text survey responses

Karna-AI's deep learning powered text analysis algorithms allow you to identify key topics of interest in a string of text. For example, look at one of the responses to the survey question **"What did not meet your expectations?"**

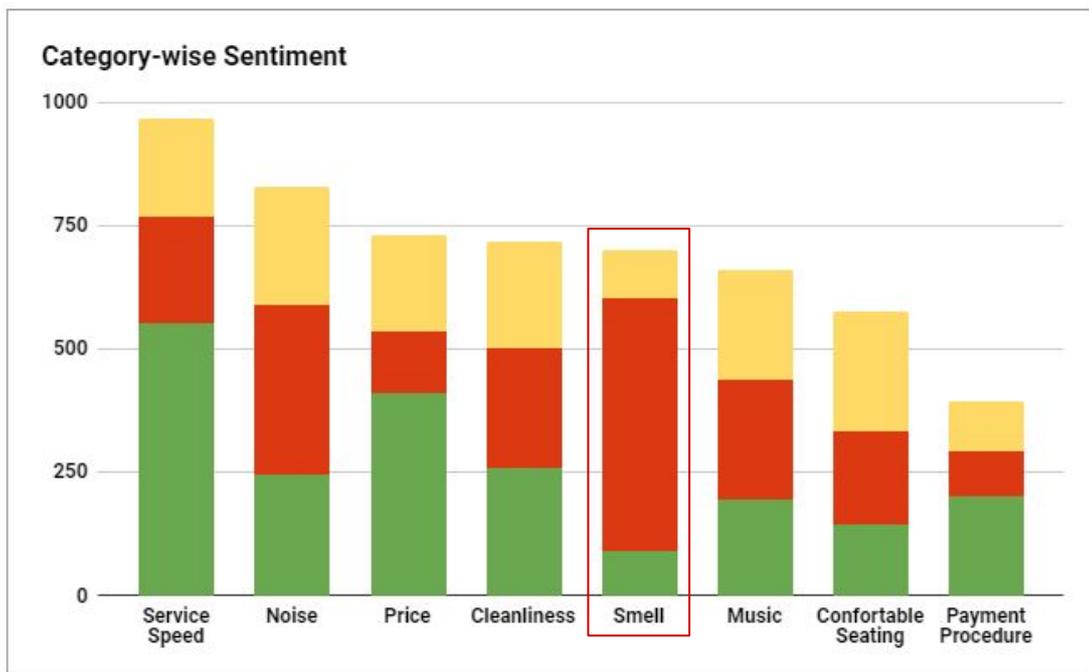
*"I usually visit McDonald's during lunch breaks at work and it's a time for me to unwind and relax. I love the burgers, but I don't find the place relaxing anymore. The music is loud and also the place has started smelling funny recently. I prefer going to Burger King instead."*

Karna-AI's algorithms can identify all the messages that are contextually related to key research themes and the underlying sentiment of the users for these themes. Note that identifying theme related messages is based on AI and not the simple keyword search.

For the above example, Karna-AI identified following topics and sentiment:

Key Research Themes	Sentiment
Food	Positive
Music	Negative
Smell	Negative
Competition	Positive

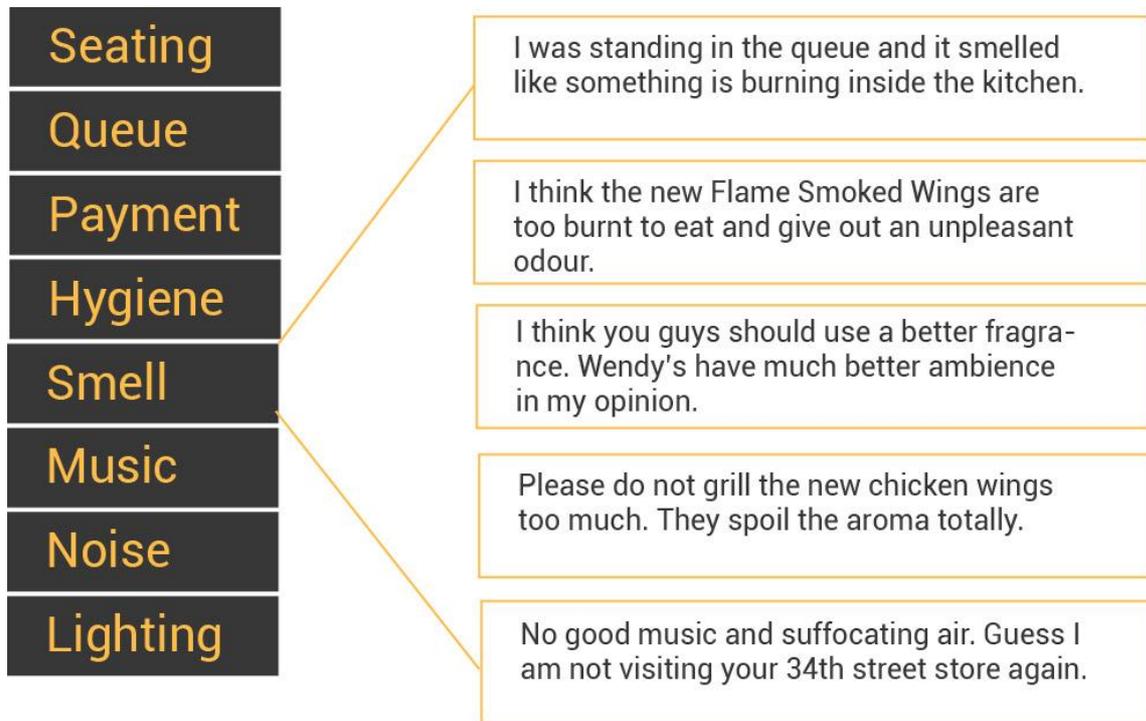
For better analysis, we can analyze the sentiment attached to the responses mentioning key aspects related to Ambience and Service. The graph below breaks down the distribution of sentiment for those aspects:



For the researchers, the fact that **'smell'** appeared in the top 5 most mentioned topics was a surprise. The fact that it had overwhelmingly negative sentiment was also a revelation. The next task was to identify **'what'** is causing a lot of respondents to mention about 'smell' at McDonald's with a strongly negative sentiment. This will be done by looking at key responses and examining smart word clouds.

## Digging Deeper - Examining Key Responses

On Karna-AI's survey tool, the researchers can quickly check the 20 "smell" theme related responses with the most negative sentiment. The below graphic shows how it works. Note that even sentences that don't have the word "smell" mentioned but are contextually related to the theme are identified by the algorithm.



## Smart Word Cloud

We can further analyze which words are the respondents associating with **'smell'** to understand the root cause of the problem. The Keyword Cloud not only gives the descriptor words used to associate a particular aspect, but also the sentiment attached to them. It employs a smart approach where a researcher also has the options to just look at nouns, adjectives and verbs associated with smell.



## Digging Deeper into the smart word clouds

Researchers can further dig into the wordcloud by analyzing responses mentioning the particular keyword. For example, one can analyze all the responses mentioning the Keyword **Burnt**:



## Finally - Unravelling the insights

Using a combination of Karna-AI's deep learning based text analysis algorithms, the researchers deduced that the sentiment score of survey responses containing **Smell** was highly negative and the underlying key reason was the newly launched **Flame Smoked Chicken Wings**.

Respondents stated that the strong smokey flavor of the chicken wings led to a slight burning smell within the restaurant that deteriorated the whole ambience and was the most likely cause of declining in-store sales over the course of past few months. Armed with this insight, McDonald's can re-evaluate their newly launched chicken wings or devise a strategy to suppress the burning smell while keeping the taste intact.

The client we talk to say that going for open ended digital surveys where consumers give open text responses is always the ideal first choice. But the biggest limiting factor has been the challenge associated with analysing these open text responses on a large scale.

The latest advances in Deep Learning based Natural Language Understanding algorithms have created ideal tools for solving these challenges. We, at Karna-AI, believe that AI is going to be the big driving force in the future of surveys and we are here to facilitate that change.

## Karna-AI Technology Box

### *An overview of AI technologies showcased in the whitepaper*

In this section, we are listing down the AI powered technology and algorithms used by Karna-AI to analyze unstructured textual data.

### One Shot Learning (OSL)

Classifies open ended text into themes that a researcher is interested in. It takes all the survey responses and a few (~10-25) tagged examples as input. For a theme like “food”, OSL classifies responses as follows:

- General Language Understanding: It has general english language understanding that “Burger”, “Sandwich”, “Breakfast” are related to food.
- Context specific Understanding: It digests all the survey responses for McDonald's and identifies that “Happy Meal”, “Smoked Chicken Wings”, “McVeggie” are also related to food.
- Few Tagged Examples: Giving it a few examples of the kind of sentences that should be a part of the theme gives the AI system direction of what it should be looking for.

See our [blogpost](#) on a related algorithm for details on how this works.

### Smart Word Clouds

Word Clouds have been in existence for more than a decade since the web 2.0 days. However, market researchers have rarely found it to be useful for their work. At Karna-AI, we create smart word clouds that pickup up most relevant keywords, nouns, adjectives to better analyze the key themes identified by One Shot Learning classifier.

### Sentiment and Intent Analysis

At Karna-AI (a division of ParallelDots), we have created our own deep learning based technology for sentiment, intent and emotion analysis. Like Google and IBM Watson, we provide these algorithms to developers in the form of easy to integrate APIs. These are our proprietary technologies designed for market research and used by more than 1,000 developers globally.

### Quantitative Ratings for Text

Often a key reason used by researchers to opt for structured surveys is that you can ask questions like “rate the experience out of 10” and get metrics that can be used for further quantitative market research. We do this either by taking sentiment score for a theme or building an algorithm that looks at an open ended text feedback message and converts it into numerical rating.

## AI Solutions for Market Research

We believe AI will be at the core of successful market research undertakings of the future. Our vision is to help drive this shift.

[Karna-AI](#) is the Market Research AI solutions division of [ParallelDots](#), a premier applied AI research group. ParallelDots provide AI solutions and consulting to some of the largest enterprises in the world. Our APIs are used by 1,000+ developers across the globe.



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