Designing search-based apps

Maish Nichani (@maish)

PebbleRoad
About me

I’m a Singaporean (the “little red dot”).

I’m a designer (problem-solver, doer, tinkerer)

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Ola Search Pte Ltd
www.olasearch.com
Agenda

- About search
- About SBA
- Practice example
  - Business objectives
  - Job stories
  - Content modelling
  - Search interfaces
  - Measurement
On search
Many shades of search

Web search
Site search
Database search
...
Expertise search
e-Discovery
Patent search
Social media search
...

Udo Kruschwitz and Charlie Hull (2017), "Searching the Enterprise"
State of search

Snake oil allegations
Lack of real-world wins
Confusing landscape
Too darn difficult
[Your experience here...]
Search-based apps, Infoapps, cognitive apps...

[2010] It uses a search engine, so it is a search-based app

[2014] But it's not just a search engine, we have text analytics as well, so it must be an Infoapp

[2018] Wait a minute...mine has AI stuff as well, so it must be a...cognitive app
New era, new hope
New era

1st: Mechanization, water power, steam power
2nd: Mass production, assembly line, electricity
3rd: Computer and automation
4th: Cyber Physical Systems
Google wanted to know why and how consumers are using their new devices, so we conducted in-home ethnographies with voice-activated speaker owners. What we found is that people are not only learning how to use the devices, they’re weaving them into their lives and daily routines. And in some instances, they’re forging a new kind of bond with technology, one that’s often much more personal than in the past.
“The hands-free process will help to improve safety, accuracy and efficiency of baggage and cargo loading, with loading time cut from 60 minutes to around 45 minutes, SATS said. It added that passengers waiting to board flights, as well as transit times for air freight shippers will see waiting times shortened by about 15 minutes.”

OCBC Bank launches Emma, the mortgage chatbot

With more than 20,000 conversations logged since its launch in January, OCBC Bank is lauding the success of its specialised home and renovation loan chatbot service, Emma.

“The bank says more than 10% of the 20,000 chat sessions conducted so far have been converted into mortgage loan sales prospects.”
What does this mean for search?

- Results-driven, not digital lipstick
- Task-specific, not just enterprise-wide
- Natural language, not just keywords
- Answers, not just pages
- Voice search
Results-driven

Be clear on what is required and how this is going to impact the business.

There are many short-term wins that go unattended. A framework for addressing them opens up many opportunities.
Task-specific

Google Assistant

General chat app that covers almost everything from weather to stock market.

Bus Uncle

Just focused on telling you bus arrival and departure timings (with a ton of humour).
**Natural language**

Ask Analytics Intelligence

**Trend of Avg. Session Duration for Metro of New York, NY**

May 1, 2017 - May 31, 2017

**Top 10 Source by Users for Default Channel Grouping of Referral**

Jun 20, 2017 - Jun 26, 2017

<table>
<thead>
<tr>
<th>Source</th>
<th>Users</th>
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<tbody>
<tr>
<td>mall.googleplex.com</td>
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<td>analytics.google.com</td>
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<tr>
<td>gdeals.googleplex.com</td>
<td>301</td>
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<tr>
<td>waze.com</td>
<td>278</td>
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<tr>
<td>sites.google.com</td>
<td>201</td>
</tr>
</tbody>
</table>

**Share of Sessions for Device Category of mobile out of all Sessions**

Jun 26, 2017

24.46%

**You asked:** What is the trend of session duration in NYC last month?

**You asked:** Which referral sources bring in the most users?

**You asked:** What share of my traffic was from mobile yesterday?
Answers

who won the golden globes this year

75th Golden Globe Awards › Winners

Three Billboards Outside Ebbing, Missouri
Best Drama Motion Picture

This Is Me
Best Original Song · Justin Paul, Benj Pasek

Elisabeth Moss
Best Actress in a Drama TV Series · The Handmaid's Tale

Oprah Winfrey
Cecil B. DeMille Award

Gary Oldman
Best Actor in a Drama Motion Picture · Darkest Hour

James Franco
Best Actor in a Musical or Comedy · The Disaster Artist

Sam Rockwell
Best Supporting Actor in a Motion Picture · Three Billboards Outside Ebbing, Missouri

Sterling K. Brown
Best Actor in a Drama TV Series · This Is Us

The Handmaid's Tale
Best Drama TV Series

Frances McDormand
Best Actress in a Drama Motion Picture · Three Billboards Outside Ebbing, Missouri

Lady Bird
Best Musical or Comedy Motion Picture

Guillermo del Toro
Best Director of a Motion Picture · The Shape of Water

Allison Janney
Best Supporting Actress in a Motion Picture · I, Tonya

Coco
Best Animated Feature Film

Saoirse Ronan
Best Actress in a Musical or Comedy Motion Picture · Lady Bird

Ewan McGregor
Best Actor in a Mini-Series or Motion Picture Made for Television · Fosse/Verdon
Voice search

eBay CEO Sees Voice Search as The Future of eCommerce

Why You Need To Prepare For A Voice Search Revolution

In anticipation of the changes that will unfold in 2018, I recently wrote an article predicting the search engine optimization (SEO) trends that will be most


https://esellercafe.com/ebay-ceo-sees-voice-search-the-future/
On search-based apps (SBAs)
SBA definition

A case-specific app that helps you query different sources of information for insights and answers.

It can ride on existing search infrastructure but may require other tech such as text analytics and visualisation.
School picker

Ministry of Education, Singapore
https://schoolpicker.sg

The app was designed to help parents pick a school for their child. Typical criteria include:

- Primary exam results
- Location
- Subjects
<table>
<thead>
<tr>
<th>Background</th>
<th>Business objective</th>
<th>Content</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions to secondary public schools requires the parent to submit a list of 6 school choices. Depending on merit and availability, the student is allocated a school from this list (usually).</td>
<td>Help parents spend less time and be more confident in choosing the right schools for their child.</td>
<td>Currently, we have 2 collections that need to be merged: 1 school details 2 cut off points Also, we need the following enrichments: 1 Lat/long cords 2 SG regions 3 MRT stations Facets include: Cut off points CCAs Postal code</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pain points</th>
<th>Job story</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picking 1 right school is tricky; picking 6 is extremely stressful. The student can get any one of the 6 schools. Currently, the information is everywhere - blogs, MOE website, books, forums etc. Parents have to manually sift through the information and make decisions. The activity itself adds to the stress of the situation.</td>
<td>When it is time to pick the 6 secondary school choices, I want to ensure I’ve picked the right ones based on my criteria, so that I don’t spoil the chances of my child getting a good secondary school education.</td>
<td># of users who visit the app # of users who spend &gt; 5 min # of users who save/share # of people satisfied with the app</td>
</tr>
<tr>
<td>Skills</td>
<td>Natural language understanding</td>
<td>Instant answers</td>
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<td>-------------------------</td>
<td>--------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Entity extraction</td>
<td></td>
<td>Entity enrichment</td>
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</tbody>
</table>
Skills demos
### Business objective
Help parents spend less time and be more confident in choosing the right schools for their child.

### Background
Admissions to secondary public schools requires the parent to submit a list of 6 school choices. Depending on merit and availability, the student is allocated a school from this list (usually).

### Content
Currently, we have 2 collections that need to be merged:
- 1 school details
- 2 cut off points

Also, we need the following enrichments:
- 1 Lat/long cords
- 2 SG regions
- 3 MRT stations

Facets include:
- Cut off points
- CCAs
- Postal code

### Pain points
Picking 1 right school is tricky; picking 6 is extremely stressful. The student can get any one of the 6 schools. Currently, the information is everywhere - blogs, MOE website, books, forums etc. Parents have to manually sift through the information and make decisions. The activity itself adds to the stress of the situation.

### Job story
When it is time to pick the 6 secondary school choices, I want to ensure I've picked the right ones based on my criteria, so that I don't spoil the chances of my child getting a good secondary school education.

### Skills
Natural language understanding
Faceted search

### Measurements
- # of users who visit the app
- # of users who spend > 5 min
- # of users who save/share
- # of people satisfied with the app
Customer feedback

Insurance company

The app was designed to help a team to get insights into the different streams of customer data. Typical filters include:

- Source of data (call, email, web)
- Location of the feedback
- Products mentioned
- Sentiments
<table>
<thead>
<tr>
<th>Background</th>
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<tbody>
<tr>
<td>The company was collecting data from different customer feedback channels to help improve their overall NPS.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Business objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>A single place for different users to gain insights from all customer feedback data in real time.</td>
</tr>
<tr>
<td>A simple way to analyse and visualise the data to make quick inferences and decisions.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,000+ customer reviews/month</td>
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<tr>
<td>Metadata include:</td>
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<tr>
<td>Transaction type</td>
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<tr>
<td>Category</td>
</tr>
<tr>
<td>Product</td>
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<tr>
<td>Service location</td>
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<td>Transaction date</td>
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<tbody>
<tr>
<td># of decisions made using the app</td>
</tr>
<tr>
<td>% of users who report high task completion</td>
</tr>
<tr>
<td># of users who visit the app</td>
</tr>
<tr>
<td># of minutes spent on app</td>
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</table>

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Not able to pinpoint trends</td>
</tr>
<tr>
<td>Managers can’t browse through the data using a simple interface</td>
</tr>
<tr>
<td>Lot of work required to get insights from the data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Job story</th>
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</thead>
<tbody>
<tr>
<td>When making improvements to a product I want to quickly get all data related to challenges faced by current customers, so that I can get new ideas and solutions that are evidence-based.</td>
</tr>
<tr>
<td>When reporting to my boss, I want to quickly gather trend data so that I can show impact of our customer engagement programme.</td>
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</tbody>
</table>
Newssift

Financial Times Group
*Shutdown in 2009*

The app offered a single view to over 4,000 sources of news info from websites, blogs, research websites, etc.

The unified filters included

- Business topic
- Organisations
- People
- Places
- Themes
NYC crime map

New York City Government
https://maps.nyc.gov/crime/

NYCityMap is New York City’s online map portal. The application provides a wealth of information including the locations of schools, day care centers, senior centers, libraries, hospitals, subways, and more, as well as links to Web sites for these facilities.
Exercise
The **Stardust** company is in charge building the new football stadium. It is tipped to be the grandest sport venue in the city and a potential tourist attraction. There are 50+ project teams looking after the design and build works...
To manage the development, the managers hold a **weekly meeting** where 4 types of outcomes are expected:

1. For info
2. Approved
3. Rejected
4. Pending

The process works like this:

1. Any team can submit an **action item** for the meeting
2. The items are tabled to the management and a decision is taken as to which ones will be discussed
3. The teams are told if their item is selected or not
4. The selected teams prepare a presentation (ppt) for the meeting
5. Meeting takes place and the minutes (doc) are recorded

---

**Weekly meetings**

- Feb 12, 2018
  - facilities: designs.ppt
  - facilities: designs.doc
  - building: vendor selection.ppt
  - building: vendor selection.doc
  - marketing: partner selection.ppt
  - marketing: partner selection.doc

- Feb 19, 2018
  - ...

<table>
<thead>
<tr>
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<th>Content</th>
<th>Skills</th>
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<tbody>
<tr>
<td>Weekly meetings are held at the Stardust company to manage the development of the new stadium. The materials for this meeting and the decision made during these meetings are done via email. With 4 more years to go before the stadium is built, the inability to find, learn and reuse knowledge from these meetings is leading to mistakes and misinformation</td>
<td>Increase productivity by having all users self-serve weekly meeting information. Increase inter-team awareness. Making reporting more efficient and effortless.</td>
<td></td>
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<tr>
<td>Pain points</td>
<td>Job story/queries</td>
<td></td>
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<tr>
<td>The secretary is overwhelmed by the info requests on previous meetings, especially from new staff and managers. There seems to be a lack of awareness of what the other teams are doing. There was this case where a vendor blacklisted by one team was awarded a contract by another team.</td>
<td></td>
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</tbody>
</table>
Job story
Job story

When — I want to — So I can —

Situation  Motivation  Expected Outcome

Job story

When I join a new team, I want to quickly get up to speed on decisions taken, so that I can start contributing immediately.

When I start on a new project, I want to check if similar work was done so that I don't have to start from scratch.

When my boss asks for a quick update, I want to give it to her within 15 minutes so that I don't become a bottleneck in her work.
<table>
<thead>
<tr>
<th><strong>Job story</strong></th>
<th><strong>Queries</strong></th>
</tr>
</thead>
</table>
| When I join a new team, I want to quickly get up to speed on decisions taken, so that I can start contributing immediately. | Browse by ‘facilities’
Browse by ‘rejected’ items in the last 4 months |
| When I start on a new project, I want to check if similar work was done so that I don't have to start from scratch. | Browse by ‘air conditioning’ |
| When my boss asks for a quick update, I want to give it to her within 15 minutes so that I don't become a bottleneck in her work. | Chart of of all items in the last 3 months |
Content
What queries can I answer with this setup?

- facilities: designs.ppt
- facilities: designs.doc
- building: vendor selection.ppt
- building: vendor selection.doc
- marketing: partner selection.ppt
- marketing: partner selection.doc

Feb 12, 2018

Feb 19, 2018

Weekly meetings

• ...
## Content

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<td>Role</td>
<td>Team</td>
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<td>2</td>
<td>John Doe</td>
<td>Member</td>
<td>Aircon</td>
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</table>

**Weekly meetings**

**Feb 12, 2018**

- facilities: designs.ppt
- facilities: designs.doc
- building: vendor selection.ppt
- building: vendor selection.doc
- marketing: partner selection.ppt
- marketing: partner selection.doc

**Feb 19, 2018**

- ...

**Metadata.xls**

Feb 12, 2018

- facilities: designs.ppt
- facilities: designs.doc
- building: vendor selection.ppt
- building: vendor selection.doc
- marketing: partner selection.ppt
- marketing: partner selection.doc
People — attend → Meeting

Teams — Belong to

Action item

Documents → support

Outcome → results in

submit → tabled in
People 
- attend 
- submit 
- Belong to 

Meeting 
- titled in 
- Team 

Action item 
- support 
- results in 

Documents 
- Item ID 
- Submitted on 

Outcome 

People 
- Name 
- Role 

Meeting 
- Title 
- Date 
- People attended 

Action item 
- ID 
- Title 
- Submitted on 

Type
Skills
## Skills

<table>
<thead>
<tr>
<th>Natural language understanding</th>
<th>Query analysing</th>
<th>Faceted navigation</th>
<th>Clustering</th>
<th>...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entity extraction</td>
<td>Entity enrichment</td>
<td>Answer extraction</td>
<td>Sentiment analysis</td>
<td>...</td>
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</tbody>
</table>
Measurements
Measurements

- **Goal**: Eg, drive people to use meeting app so that they can be more productive.
- **Signal**: The evidence that can help measure the goals. Eg, increase in the number of people using the meeting app.
- **Metric**: a quantifiable measure of a signal. Eg, #of staff using the app.
- **Target**: numerical values you’ve pre-determined as indicators of success or failure. Eg, 5% increase in the number of staff using the app.
<table>
<thead>
<tr>
<th>Signals</th>
<th>Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in the number of staff using the app</td>
<td></td>
</tr>
<tr>
<td>Decrease in requests sent to secretary</td>
<td></td>
</tr>
<tr>
<td>Effectiveness of popular queries</td>
<td></td>
</tr>
</tbody>
</table>
Interface
Interface

Search bar  Filters  Results snippets  Visualisations
Search bar

who won the gloden globes this year

Autosuggest  Natural language  Instant answers  Recent searches
Filters

Filter (Cell Phone Features)

Filter values (Smartphone)

Filter value type (checkbox)
Result snippets

Rich results

Answers

New Delhi
Visualisations

Rich Blocks Poor Blocks
Mapping rent, income and other data in every American neighborhood

Menu

Median rent

- $399.99 or less
- $400.00-$599.99
- $600.00-$799.99
- $800.00-$999.99
- $1,000.00-$1,199.99

Sign up  Sign in  About
Group activity

It’s time to sketch out an interface for your app.

- Take a sheet of flipchart paper
- Brainstorm a list of interface components for your app
- Lay out your components and create the app homepage, detail page
- Use the job stories to test out your design
- Iterate
### Background
Weekly meetings are held at the Stardust company to manage the development of the new stadium. The materials for this meeting and the decision made during these meetings are done via email. With 4 more years to go before the stadium is built, the inability to find, learn and reuse knowledge from these meetings is leading to mistakes and misinformation.

### Business objectives
- Increase productivity by having all users self-serve weekly meeting information.
- Increase inter-team awareness.
- Making reporting more efficient and effortless.

### Content

### Skills

### Pain points
The secretary is overwhelmed by the info requests on previous meetings, especially from new staff and managers.

There seems to be a lack of awareness of what the other teams are doing. There was this case where a vendor blacklisted by one team was awarded a contract by another team.

### Job story

### Measurements

### Skills
Discussion

- Do you see value in using such a method of building productivity apps?
- What challenges stand do you see?
Thank you