Using Natural Language Search to Turbocharge Chatbots

www.coseer.com
San Francisco, USA
Antarctica just hit 65 degrees, its warmest temperature ever recorded

It comes days after earth’s warmest January on record.
Chatbots are Everywhere

Organizations using/ likely to use Intelligent Assistants
(% Surveyed, n = 529 organizations in North America and Europe)

<table>
<thead>
<tr>
<th>Platform</th>
<th>2019</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortana</td>
<td>49</td>
<td>62</td>
</tr>
<tr>
<td>Siri</td>
<td>47</td>
<td>52</td>
</tr>
<tr>
<td>Google</td>
<td>23</td>
<td>32</td>
</tr>
<tr>
<td>Other OTS</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>Alexa</td>
<td>13</td>
<td>28</td>
</tr>
<tr>
<td>Custom</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>
Current Chatbots are still Full of Errors

(% Surveyed in 2018)

- Does not understand requests: 59%
- Does not understand human language: 59%
- Gives too many unhelpful responses: 48%
- Sends back to trite FAQs: 40%
- Executes inaccurate commands: 30%
- Provides inaccurate responses: 28%

Source: Chatbots Magazine, Spiceworks, Helpshift, eMarketer
Natural Language Search Enables Knowledge Management 4.0

Enterprise search engines find these documents.

Natural Language Search:

- Manages knowledge, not documents
- Understands intents hidden in keywords
- Self-trains without any tagging/annotation
- Has versatile APIs to include all knowledge

This is a document with some of the keywords you searched for.

Hidden deep, on page 87, without any of the keywords in your question, is the real answer.

NLS finds this.
(Text/ Images/ Data points)
Please enter your username and password

braful@coseer.com

*******

Submit
Integrate Natural Language Search with your Chatbots

1. Customer Query → Chatbot → Natural Language Search → Answer

2. Customer Query → Ticket Deflection System
3. Ticket Deflection System → Ticket
4. Ticket → Manual Resolution
5. Manual Resolution → $400, 3 days

Source: Coseer Customer Case Study
Open all Formats to Chatbots

- Human cognition is “multi-media.”
- Everything can be converted to a text footprint.
- Image example -

Identify image
OCR all image text
Identify titles + related text
Split into sub-images and link related text
Text footprint of the image and each sub-image is ready.
3 Do Something

**User:** 12ABC3456 maint

**Joe:** 12ABC3456 Crown Block

**Schedule for Regular Maintenance**

1. Needs approvals from:
   - Equipment Manager
   - Site Manager
   - Head Engineer
   - Manager for Drill Line
   - Manager for Traveling Blk
   - Manager for Derrick

2. Must match conditions:
   - Operation Break For 2 hrs
   - Level C Contractor

3. Needs supplies:

   Type here...

   ASK JOE

---

**User:** 12ABC3456 maint

**Joe:** 12ABC3456 Crown Block

**Regular Maintenance**

- Needs 5 Approvals
  - Send Emails

- Operation break for 2 hrs
  - Check

- Level C Contractor
  - Check

- Needs 14 items from Supplies
  - Check

**START IMMEDIATE JOB**

**REPORT AN ISSUE**

Type here...

ASK JOE
Search based on AI-learned meanings

natural language processing
NLP: Natural Language Processing

What's Next?
Speedy identification to map the right fault codes and
## Knowledge Management 4.0

<table>
<thead>
<tr>
<th>Question</th>
<th>Common Practice</th>
<th>Next Generation Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is knowledge?</td>
<td>Proprietary knowledge, created by humans</td>
<td>Almost anything for a given context e.g. on the web</td>
</tr>
<tr>
<td>Where is knowledge found?</td>
<td>Purpose built documents volunteered to a system</td>
<td>Automatic ingestion of all digitized information like emails and files</td>
</tr>
<tr>
<td>How is knowledge discovered?</td>
<td>Via ontologies/ directories</td>
<td>Automatically pushed to the point of usage</td>
</tr>
<tr>
<td>How is knowledge disseminated?</td>
<td>Documents in a portal</td>
<td>Actionable insights like decisions, relevant data or synopses</td>
</tr>
<tr>
<td>How is knowledge secured?</td>
<td>Documents used as is</td>
<td>Documents not shared, only sanitized, actionable insights</td>
</tr>
<tr>
<td>How involved is the leadership?</td>
<td>Ad hoc approach to knowledge management</td>
<td>Knowledge management as a core competitive advantage</td>
</tr>
</tbody>
</table>
Appx: Coseer’s NLS Focuses on Knowledge Behind the Data

Q: Does GMP for AB1234 molecule need Pd?

Commercial synthetic route for drug substance is based on Suzuki Mayaura process. (/link/to/the/right/page)

1. Access All Data
   - Texts, Images, Tables, Trees, Ontologies

2. Extract Facts and Knowledge
   - NLS reports actionable facts and knowledge, not documents.

3. Translate into Human Ideas
   - NLS understands all ideas denoted by a Keyword.

Answer the Question

Keywords
- Co-occurrences
- Synonyms
- Attachments
- Causal Relationships
- Hyponyms
- Troponyms
- Hypernyms
- Associations
- Mutual Information

Coseer
Appx: Calibrated Quantum Mesh is for Natural Language

- Everything in natural language can have multiple meanings — words, phrases, sentences, etc.
- CQM models these multiple associations as quantum states of each variable.
- Everything is interconnected, and informs or constraint its connections e.g. context specific meaning of words.
- CQM is designed to be “lazy” — it keeps all data in a mesh till it must make a decision.
- Human understanding of a situation improves with experience, and by parsing more and more data.
- CQM learns by calibrating the mesh and its quantum states using external evidence.

We have published multiple academic papers on CQM including at IEEE, AICHE forums.