Meta-Information in Conversational Search

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Both authors contributed equally to the paper.
Conversational Search

Should we introduce a universal basic income?
Should we introduce a universal basic income?

Yes
Meta-Information in Conversational Search

What can meta-information in search be about?

- **Artefact**
  - Conversation
  - Message
  - Query
  - Collection
  - Result
  - Document

- **Agent**
  - Seeker
  - Provider
  - Information need
  - Domain knowledge

Legend:
- **A** is part of **B**
- **B** is associated with **A**
- **B** is an (is of type) **A**

Targets in conversational search vs. non-conversational search
“There are many websites that discuss the statistical analyses of Michael Jordan.”

“As written in a blog post of the SLAM Magazine.”

“SLAM is a renowned basketball magazine.”

Central meta-information properties
1. Meta-information is identifiable as such only by its relation to other information.
2. This (aforementioned) relation is dynamic, i.e., it can be established or broken.
3. The meaning of meta-information depends on both the referred information and the recipient.
Meta-Information in Conversational Search

Should we introduce a universal basic income?
## Meta-Information in Conversational Search

<table>
<thead>
<tr>
<th>Turn</th>
<th>Role</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seeker</td>
<td>Can you type in, uhm, “effective”… “effectiveness of new security measures at airports”?</td>
</tr>
<tr>
<td>2</td>
<td>Provider</td>
<td>Australia, or is it just airports?</td>
</tr>
<tr>
<td>3</td>
<td>Seeker</td>
<td>Put, uhm, “international”… “international airports”</td>
</tr>
<tr>
<td>4</td>
<td>Provider</td>
<td>OK, the first one that comes up is […]</td>
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from the Spoken Conversational Search dataset (Trippas et al., 2017)

QRFA (Vakulenko et al., 2019)
### Meta-Information in Conversational Search

#### Turn | Role | Message
--- | --- | ---
1 | Seeker | Can you type in, uhm, “effective”… “effectiveness of new security measures at airports”?  
2 | Provider | Australia, or is it just airports?  
3 | Seeker | Put, uhm, “international”… “international airports”.  
4 | Provider | OK, the first one that comes up is [...]  

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from the Spoken Conversational Search dataset (Trippas et al., 2017)

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**Information**

| $\mu_1$ “Effectiveness of new security measures at airports?” | **Formal model**
| --- | ---
| $(1) \mu_1$ sets conversation state = query |
| $\mu_2$ “Australia, or is it just airports?” | $(2) \mu_2$ sets conversation state = request |
| $\mu_3$ “International airports” | $(3) \mu_3$ sets conversation state = query |
| $\mu_4$ “OK, the first one that comes up is [...]” | $(4) \mu_4$ sets conversation state = answer |
Meta-Information in Conversational Search

Conclusion

- In a conversation, much information is exchanged effortlessly and without conscious thought
- This information relates to each other, making it meta-information
- These relations then make a directed graph
- We process this meta-information to understand a conversation
- Can machines do the same?