

NLP on Beliefs Network Literature

Acquiring the Literature

- Based on Elsevier database
- Any papers that referenced either
 - **Converse, P. E. (1964).** The nature of belief systems in mass publics.
 - 4342 citations
 - **Axelrod, R. (1976).** Structure of Decision.
 - 2017 citations

Keyword Matching

```
▼ keywords = [  
    # 'network of belief',  
    # 'networks of belief',  
    # 'belief network',  
    # 'beliefs network',  
    # 'map of belief',  
    # 'maps of belief',  
    # 'relationship between belief',  
    # 'cognitive map',  
    # 'map of cognitive behavior',  
    # 'map of opinion',  
    # 'network of opinion',  
    # 'networks of opinion',  
    # 'relationship between opinion',  
    'system of belief',  
    'systems of belief',  
    'belief system',  
    'beliefs system',  
    'set of opinion',  
    'opinion set',  
    # 'set of value',  
    'values set',  
    'system of opinion',  
    'opinion system',  
    'opinions system',  
    'system of value',  
    'values system',  
    'value system',  
]
```

Frequencies by keywords

seed_paper	nature_of_belief	structure_of_decision
keyword		
belief network	14	31
cognitive map	8	2378
map of belief	0	0
map of cognitive behavior	0	0
map of opinion	0	0
network of belief	0	0
network of opinion	0	0
relationship between belief	1	1
relationship between opinion	1	0

seed_paper	nature_of_belief	structure_of_decision
keyword		
belief system	233	42
beliefs system	0	0
system of belief	1	1
systems of belief	2	0

And a last round too:

seed_paper	nature_of_belief	structure_of_decision
keyword		
belief system	233	42
beliefs system	0	0
opinions system	0	0
opinion set	1	0
opinion system	0	0
set of opinion	2	0
set of value	1	2
system of belief	1	1
system of opinion	0	0
system of value	1	0
systems of belief	2	0
value system	3	3
values set	0	0
values system	0	0

Not a lot of success.

Topic Modeling, first try

We chose the best model based on coherence score
and complexity:

Elbow Rule Model:

Topic 1: maps, computer, cognitive, intelligence, foreign

Topic 2: diversification, stakeholder, stakeholders, adjustment, political

Topic 3: bipolar, theorizing, federalist, computers, classrooms

Topic 4: bipolar, reviewed, organisational, autonomous, renewal

Topic 5: abstract, available, transfer, negotiation, aids

Topic 6: organizational, strategic, cognitive, model, decision

Topic 7: maps, cognitive, decision, mapping, planning

Topic 8: lane, stages, indian, tension, tmt

Embeddings

- Compare embeddings of every keyword with every abstract, pairwise
- Consider it a match when similarity is above a threshold (0.8 here)

seed_paper keyword	nature_of_belief	structure_of_decision
belief system	3	4
beliefs system	836	602
opinions system	1	15
opinion set	29	0
opinion system	3	0
set of opinion	29	0
set of value	3690	1930
system of belief	3	4
system of opinion	3	0
system of value	113	927
systems of belief	2	0
value system	113	927
values set	792	763
values system	52	218

Topic modeling, on "matched" papers

Elbow Rule Model:

Topic 1: marketing, drought, knowledge, political, tmt

Topic 2: abstract, available, fcm, fuzzy, fcms

Topic 3: fuzzy, maps, cognitive, fcm, model

Topic 4: management, problem, knowledge, strategic, mental

Topic 5: causal, maps, teams, systems, agents

Topic 6: risks, privacy, administrative, erp, semantic

Topic 7: modeling, cognitive, environmental, turnover, planning

Topic 8: available, abstract, cognitive, knowledge, managers

Topic 9: fcm, cognitive, fuzzy, maps, map

Topic 10: abstract, available, organisation, organizational, ontology

Questions?