Manual and Automatic Annotation of Patients’ Values and Preferences Using Seton HCAHPS Survey Data

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Human Values
Health Information Wants

Biomedicine or Alternative? How will I cope with this?

Treatment A or Treatment B?
Specific Aims

• To understand the role of patients’ values in their hospital experience
• To understand the role of patients’ information preferences in their hospital experience
• To automate the identification of patients’ values and preferences in large volumes of text
Innovation

• Particular emphasis on information values and preferences moves beyond traditional emphasis on generic values and needs

• Innovative study design incorporating a computational social science approach, including machine learning, natural language processing, and visualizations
Source of Data

- The Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey (provided by Seton Healthcare Family)
- Measures inpatients’ experiences with healthcare providers and hospitals
- Conducted via telephone, with open-ended questions at the end, providing a unique way to understand patient values and preferences
HCAHPS Data

During this hospital stay, was there anything that you feel was outstanding?

What could have been done to improve your hospital stay?
Research Questions

1. How are human values invoked by patients, and how are they related to patient ratings?
2. How are health information preferences invoked by patients, and how are they related to patient ratings?
3. Can we automate the process of identifying values and preferences within this dataset?
Approach

• Step 1: Gain a “feeling” for the data
  – Need new ways to make sense of big text data

• Step 2: Develop manual content analysis
  – Expert researchers annotate a subset of the data

• Step 3: Automate the content analysis
  – Machine learning to automate data annotation
How can we enable domain experts to make sense of large text datasets?
Word Clouds (Wordle)

• Pros
  – Pretty
  – (Sort of) interpretable
  – No underlying model

• Cons
  – Word positioning is arbitrary
  – Cannot *interact* or *query*
Graphical models

- *Graphical models* of text provide a rich formal probabilistic view of text
- But not interpretable or easy to visualize
Can we combine the strengths of word clouds and graphical models?
Preliminary Results
Word Frequency: Positive Question
Possibly Related Documents

The food could have been better.
The food could've been better.
The food could be better.
The food could have been better.
Food could have been better.

Word Frequency:
Negative Question
Query ‘Helpful’: Positive Question

Possibly Related Documents

The nurses and how helpful they were.
The nurses’ care, they were very helpful.
The nurses were outstanding and helpful.
The nursing staff were very helpful.
Nursing staff. Receptionist was helpful.
The doctors were very good indeed. They were very capable, helpful.
Query ‘Helpful’: Negative Question

Possibly Related Documents

The nurses being more helpful.

More helpful night nurses.

Lactation consultant was not helpful.

One of the aides was not very helpful, he was just there one day, not very helpful.

The aides weren’t as helpful.

First two nurses weren’t as courteous and helpful.
The nurses and all their help. [name] was very helpful, helping with any kind of information. She was helpful and nice.

The nursing staff were very thorough. [name] provided a lot of good information for me.

The service from nurse [name] was very helpful, informative. She helped with breastfeeding, gave me good information.

The nurses in the NICU were amazing. [name] and [name], they were a wealth of information and very comforting in a very stressful time.

Query ‘Information’: Positive Question
Query ‘Information’: Negative Question
Preliminary Results: Comparing Query Results
Preliminary Results: Providers

Nurses

Doctors

+ care.p

- communication.n
good.n
care.n
didn.n
give.n
room.n
tell.n
one.n
care.n
medication.n
patient.n
need.n
take.n
night.n
time.n
could.n
good.n

+ care.p

- communication.n
good.n
care.n
didn.n
give.n
room.n
tell.n
one.n
care.n
medication.n
patient.n
need.n
take.n
night.n
time.n
could.n
good.n
Preliminary Results: Helpful
Preliminary Results: Information
Implications for Science

• Improve our understanding of human values as they pertain to experience with health care
• Improve our understanding of patients’ information needs and preferences
• Improve our ability to scale up social science research through use of automatic annotation
Implications for Practice

• Make healthcare more sensitive to the values of patients

• Make healthcare more sensitive to the health information needs and preferences of patients
Implications for Seton

• Providing more patient value/preference-centered care, aligning with the branding of Seton as providing “Human Care”

• Influence care more broadly, by employing an evidence-based approach to patient-centered care via information values and preferences
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