Modern Information Retrieval

Some IR applications

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January 8, 2023

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Sentiment analysis

Introduction

1. Sentiment analysis
   - Computational study of opinions, sentiments, evaluations, attitudes, appraisal, affects, views, emotions, subjectivity, etc., expressed in text.
   - Texts= Reviews, blogs, discussions, news, comments, feedback, ...
2. Sometimes called opinion mining
3. Extract from text how people feel about different products.
4. Examples:
   - Honda Accords and Toyota Camrys are nice sedans
   - Honda Accords and Toyota Camrys are nice sedans, but hardly the best car on the road

Opinions are widely stated

1. Organization internal data
   - Customer feedback from emails, call centers, etc.
2. News and reports
   - Opinions in news articles and commentaries
3. Word-of-mouth on the Web
   - Personal experiences and opinions about anything in reviews, forums, blogs, Twitter, micro-blogs, etc
   - Comments about articles, issues, topics, reviews, etc.
   - Postings at social networking sites, e.g., Facebook.

Sentiment analysis applications

1. Businesses and organizations
   - Benchmark products and services; market intelligence.
   - Businesses spend a huge amount of money to find consumer opinions using consultants, surveys and focus groups, etc
2. Individuals
   - Make decisions to purchase products or to use services
   - Find public opinions about political candidates and issues
3. Ad placement (such as Ad in social media)
   - Place an ad if one praises a product.
   - Place an ad from a competitor if one criticizes a product.
4. Opinion retrieval
   - provide general search for opinions.

Sentiment analysis problem

1. Sentiment analysis problem consists of two parts.
2. Part 1: Opinion definition (What is an opinion?)
3. Part 2: Opinion summarization
   - Opinions are subjective. An opinion from a single person is often not sufficient for action.
   - We need opinions from many people, and thus opinion summarization.

What is an opinion?

1. Consider the following text
   I bought an iPhone a few days ago. It is such a nice phone. The touch screen is really cool. The voice quality is clear too. It is much better than my old Blackberry, which was a terrible phone and so difficult to type with its tiny keys. However, my mother was mad with me as I did not tell her before I bought the phone. She also thought the phone was too expensive ...

How do look at this review/blog?

1. Document level, (is this review + or -?)
2. Sentence level, (is each sentence + or -?)
3. Entity and feature/aspect level

Question Answering

1. Finding small segments of text which answer users' questions
2. How many presidents do the USA have?
   - 45
   - List of names in chronological order

1. Information retrieval
   - Keywords (short input)
   - Document (long output)
2. Question Answering
   - Natural language question (long input)
   - Short answer (short input)

1. QA engines attempt to let you ask your question the way you'd normally ask it.
2. What is involved in QA?
   - Natural Language Processing
   - Knowledge Base to store candidate answers
   - Candidate answer search and answer processing

Expert retrieval

1. Information retrieval
   - Keywords (short input)
   - Document (long output)
2. Expert finding addresses the task of identifying the right person with appropriate skill and knowledge.
3. Expert finding
   - Keywords (short input)
   - Experts (a ranked list of experts)

Expertise finding

1. Person A set of texts are generated by an individual.
2. Expertise A keyword or a key phrase, specifying the field of knowledge (such as Machine learning)
3. Expert profiling Given an expert, retrieve (profile) its expertise.
4. Expertise retrieval Given an expertise, retrieve persons with such expertise.

Recommender systems

1. What is a recommender system?
2. Estimate a utility function that automatically predicts how a user will like an item.
3. Based on
   - Past behavior
   - Relation to other users
   - Item similarity
   - Context

Value of Recommendations

1. Netflix: $\frac{2}{3}$ of the movies watched
2. Amazon: 35% sales
3. Google news: recommendations $\Rightarrow$ 38% more clickthrough

Information retrieval

Information retrieval is the activity of obtaining information resources relevant to an information need from a collection of information resources.

Recommender system

The goal of a recommender system is to generate meaningful recommendations to a collection of users for items or products that might interest them.

Questions?