An Introduction to Summarization

Prof. Dr. Margot Mieskes

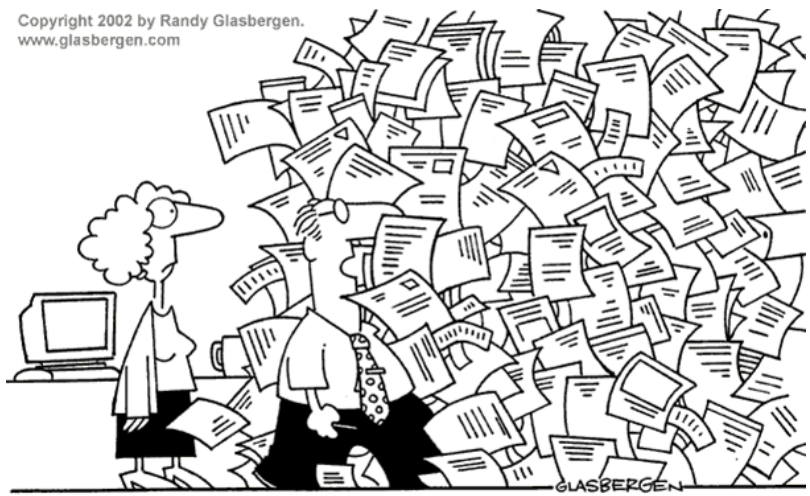
h_da

12. April 2018

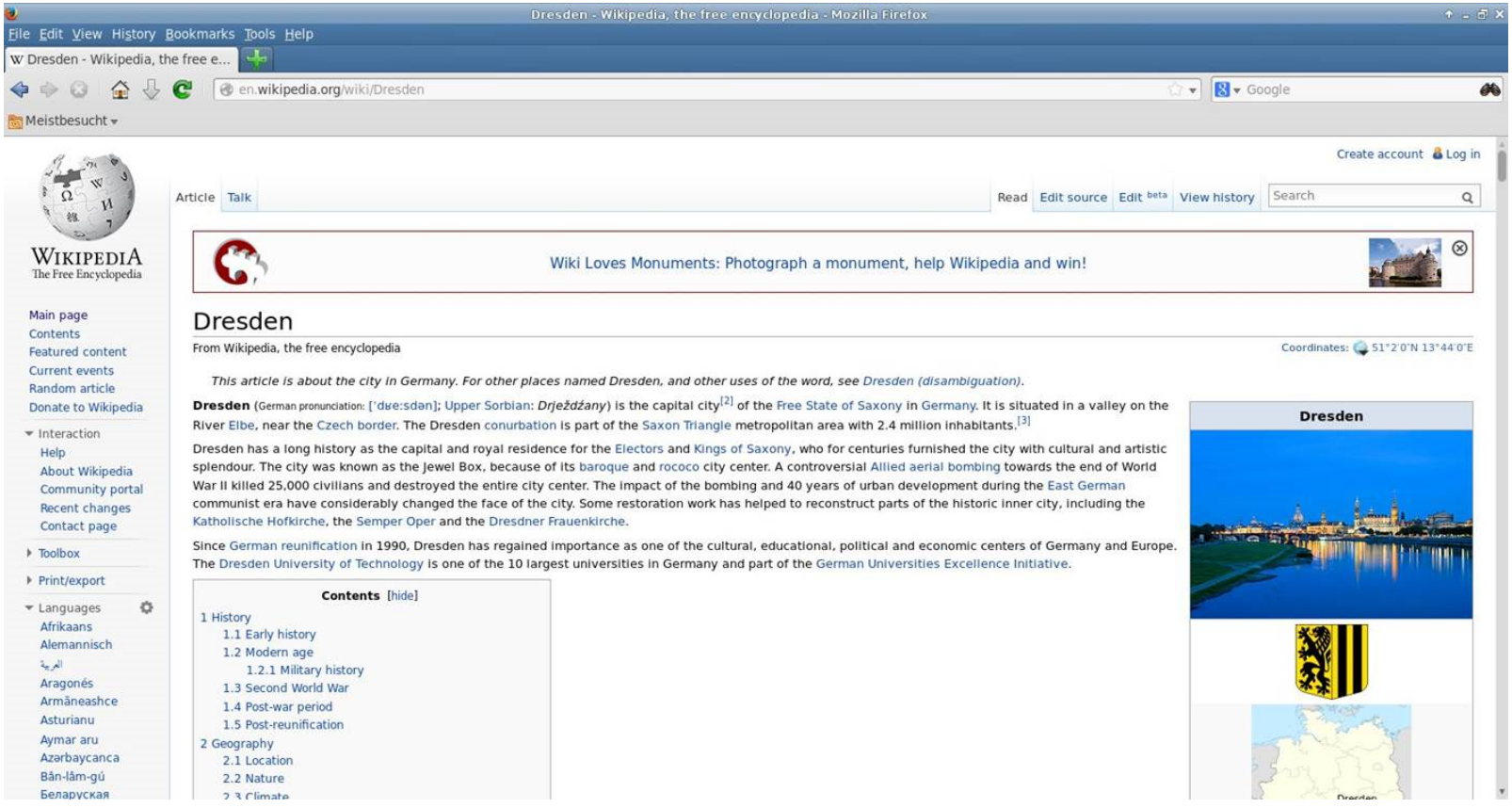
Overview

What is a summary?

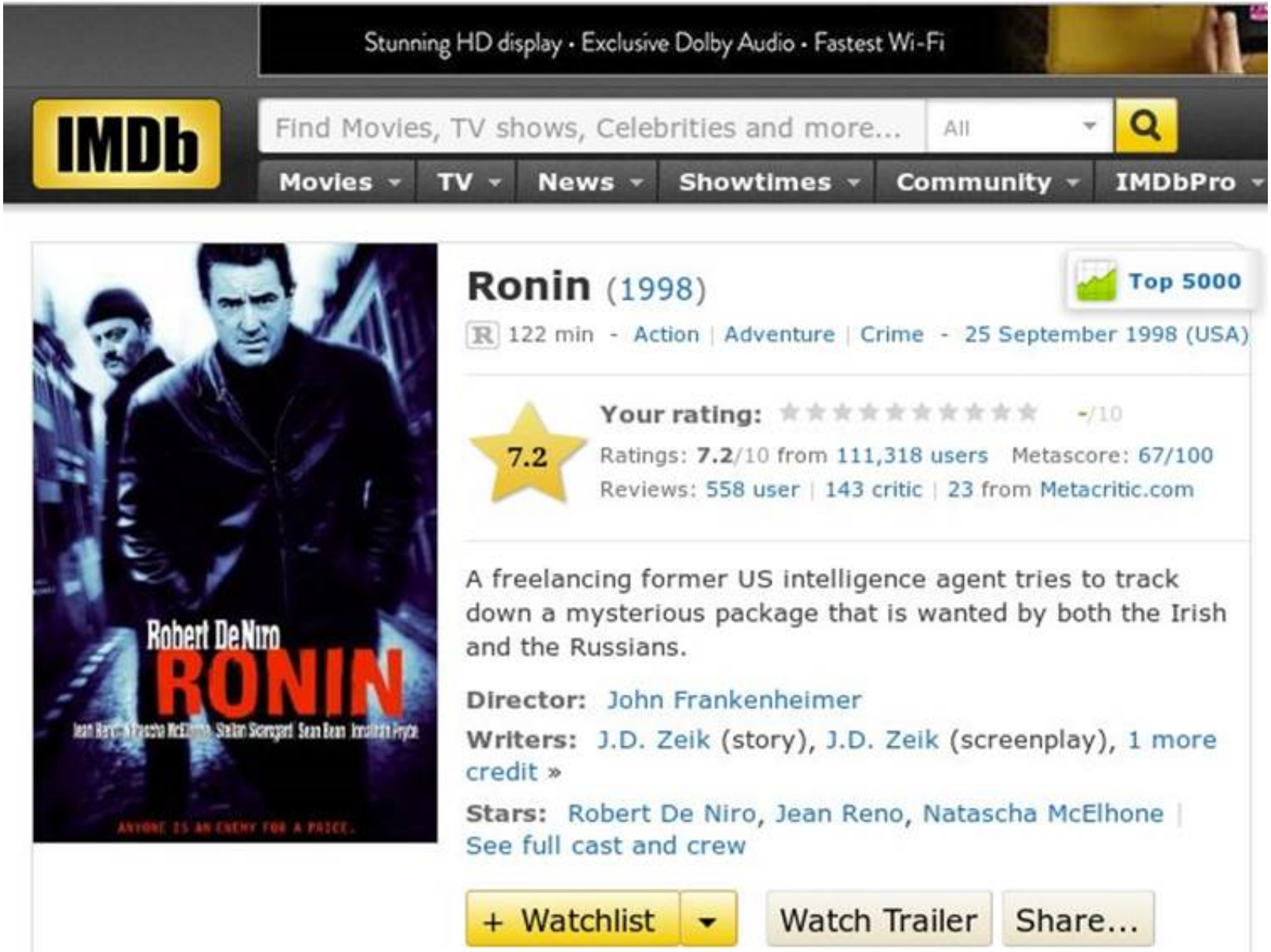
A *summarizer* (...) has the goal to produce a condensed representation of the content of ist input for human consumption.
A *summary* takes an information source, extracts contents from it and presents the most important content to the user in a condensed form and in a manner sensitive to the user's or application's need.



Summary Types



Summary Types



Summary Types

SCHAUSPIELER

Otto Sander ist tot

Er hat das deutschsprachige Theater und Dutzende Filme geprägt. Der Schauspieler Otto Sander ist im Alter von 72 Jahren in Berlin gestorben. 6 Kommentare

OTTO SANDER Ich habe einen Traum

SERIE WAHLEMPFEHLUNGEN

Fünf gute Gründe für die SPD

Sie können sich nicht entscheiden? Dann wählen sie doch SPD. Damit gewinnen Sie zwar nicht unbedingt. Aber es muss sich ja mal was ändern! Teil 2 unseres Parteienchecks VON LUDWIG GREVEN

34 Kommentare

SERIE WAHLEMPFEHLUNGEN Fünf gute Gründe für die CDU
WAHLOMAT Welche Partei wählen?
BUNDESTAGSWAHL Welche Koalition ist am wahrscheinlichsten?

SYRIEN

Wie John Kerry zu Assads schärfstem Gegner wurde

Erst wollte der amerikanische Außenminister Syrien angreifen, jetzt verhandelt er über die C-Waffen. Was treibt Kerry um, der einst an Assads Reformfähigkeit glaubte? VON MARTIN KLINGST

CHEMIEWAFFEN Putin warnt US-Öffentlichkeit vor Syrien-Angriff
SYRIEN-KRISE US-Präsident wirbt für diplomatische Syrien-Lösung
BÜRGERKRIEG Syrien stimmt internationaler Kontrolle seiner Chemiewaffen zu

WAHLKANTINE

Alle Gehälter auf einen Teller

In der Wahlkantine werden heute fleißig Erbsen gezählt: Wir machen den Faktencheck zur Lohndiskussion und servieren einen Überblick über die Gehälter in Deutschland.

Summary Types

In entertainment [edit]

- *Ronin* (film), a 1998 action thriller directed by John Frankenheimer
- Ronin (band), a four-member hard rock band based in Singapore
- Ronin, a "zen-funk" group led by Swiss pianist and composer Nik Bärtsch
- *Ronin* (DC Comics), a graphic novel by Frank Miller
- Ronin (Marvel Comics), an identity used by several Marvel Comics characters
- Ronin, a game engine made to run Digital Molecular Matter, Euphoria (software) and Havok (software) with one another.
- The Ronin, a gang in the videogame Saints Row 2.

Companies [edit]

- Green Ronin Publishing, a role-playing game publisher
- Ronin Arts, a role-playing game company
- Ronin Publishing, book publisher specializing in psychedelic and drug literature

Other uses [edit]

- Rōnin (student), a student studying outside of the school system for entrance in a future year
- Ronin, Poland, a village
- Tenjiku Rōnin, one of the pen names of Hiraga Gennai
- The Ronin, nickname of mixed martial arts fighter Carlos Newton
- The Ronin, a Japanese gang from the 2008 game Saints Row 2
- Sulfapyridine, by the trade name *Ronin*
- Ronin, a web application framework for Gosu (programming language)

See also [edit]

- *Rounin* (TV series), a Philippine TV epic

Content Selection

An *extractive* summary is a summary that consist entirely of material copied from the input.

An *abstractive* summary is a summary which contains material that is not present in the input.

Content

An *informative* summary is a summary which convers all the salient information in the source at some level of depth.

An *indicative* summary is a summary which provides a reference function for selecting documents for more in-depth reading.

Parameters

- Compression Rate
- Target
- Relation to Source
- Function
- Coherence
- Source Document(s)
- Language(s)
- Genre(s)
- Source Type
- Time
- Manner
- Place
- Form

Procedure

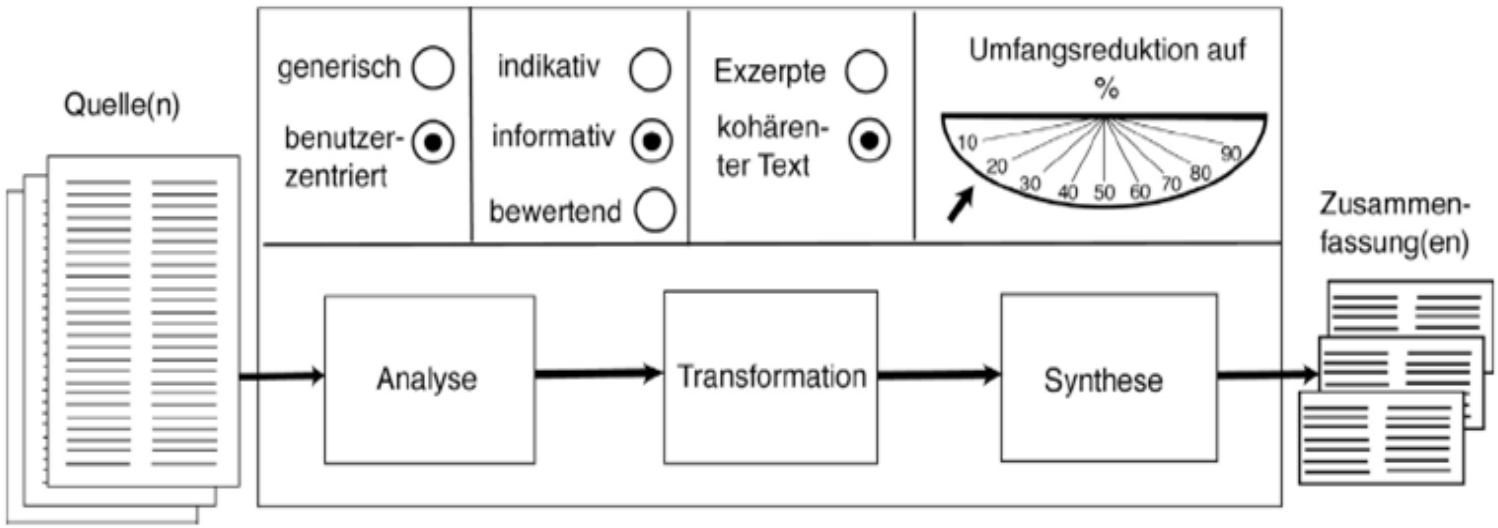
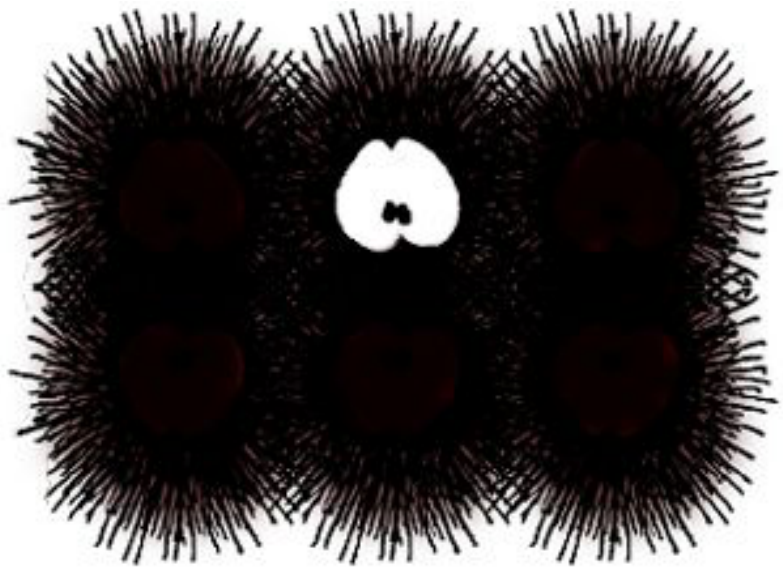


Abbildung: Schematic Procedure based on Endres-Niggemeyer, based on (Mani(2000))

Quality Criteria

- Complete
- Precise
- Objective
- Short
- Understandable

Fragen?



Manual Summarization

- Discovery
- Relevance
- Create Summary – Cut and Paste

Cues for Summaries

- Cue phrases
- In-text summaries
- Position of information in the text
- Titles, Subtitles, Headlines, etc.

Strategies

- Never read the document completely from start to end
- They rather use the structure of the document
- They use discourse relations to connect passages
- Create abstracts through cut and paste

Summary auf manual summarization

- A lot of work (vgl. Cremmins 1996)
- Screening a document and finding relevant passages – 3-5 minutes for a scientific article
- Reading of relevant passages, identification of material for summary, reorganisation, creation of summary – 8-12 minutes
- Checking the summary in terms of length, coherence, style, etc. – 1-3 Minuten

Summarizing one scientific article takes 12-20 minutes.

Manual Summarization for Automatic Summarization

- Only select sentences that add to the content of the extract
- Avoid redundancy
- Maximize Coherence
- Number of sentences is fixed

Edmundson(1969)

DUC/TAC

- Series of summarization evaluations
- Goals:
  - further progress in automatic text summarization"
  - enable researchers to participate in large-scale experiments in both the development and evaluation of summarization systems."
  - Promote the creation and comparison of summarization systems
- Since 2008: Text Analysis Conference (TAC)
  - 2008: Update summarisation task Opinion summarisation task
  - 2009: Update summarisation task

http://www.nist.gov/tac/

DUC/TAC

Example Schedule:

- 1. Nov 2003 – Apply for participation (see call for instructions)
- 16. Feb 2004 – Test data available from NIST
- 1. Mar – Submissions due at NIST for evaluation
- 26. Mar – Evaluated results returned to participants
- 26. Apr – Papers due at NIST
- 6,7. May – Summarization workshop at HLT/NAACL in Boston, MA
- 1. July – Final papers due at NIST (if notebook version to be replaced)

Creation of Summarization Corpora

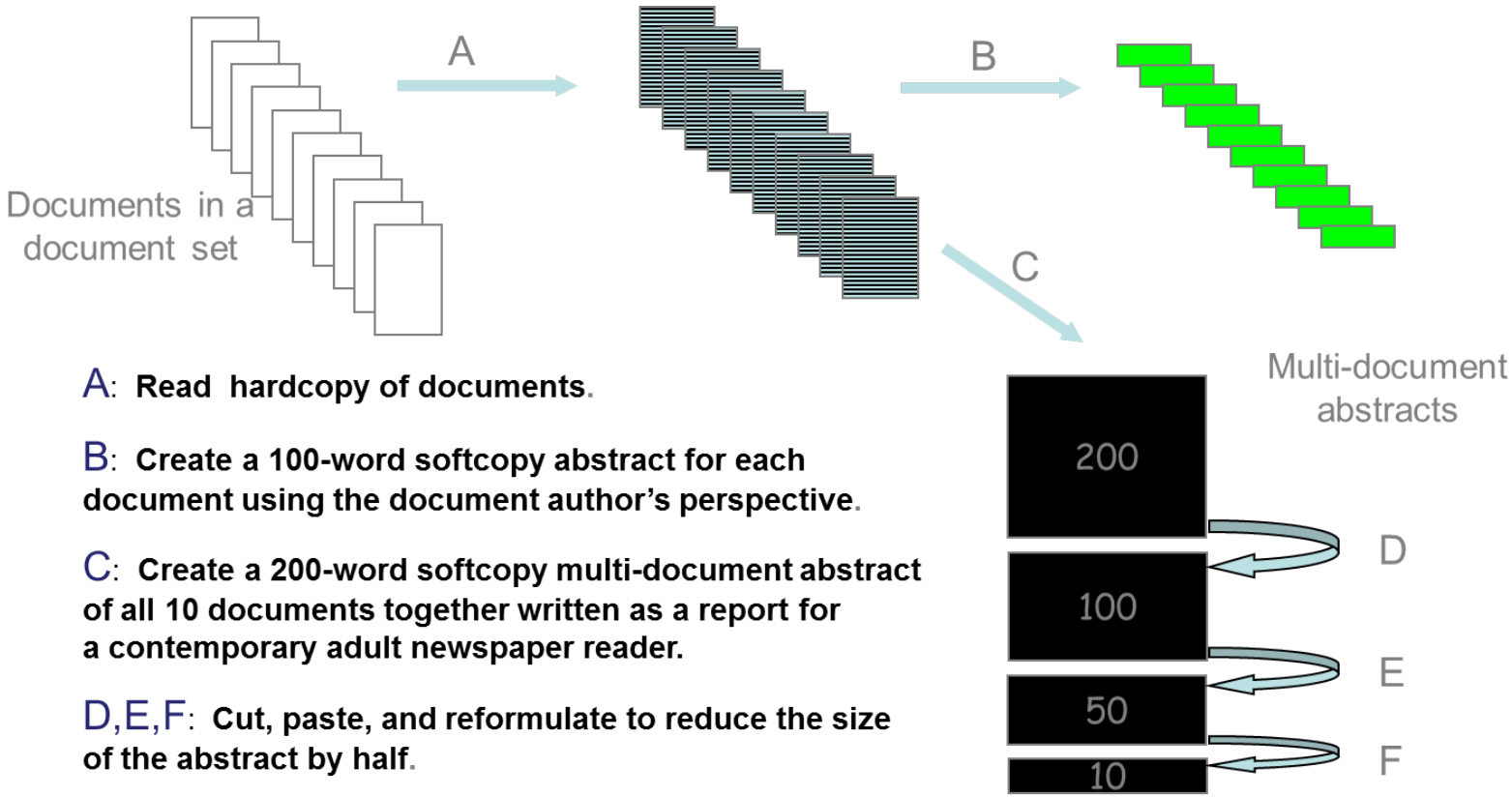
- Each of 10 NIST information analysts chose one set of newswire/paper articles of each of the following types:
  - A single natural disaster event with documents created within at most a 7-day window
  - A single event of any type with documents created within at most a 7-day window
  - Multiple distinct events of the same type (no time limit)
  - Biographical (discuss a single person)
- Each assessor chose 2 more sets of articles so that we ended up with a total of 15 document sets of each type.
- Each set contains about 10 documents
- All documents in a set to be mainly about a specific “ concept”

Over&Liggett 2001

Example Topics in DUC

- Hurricane Gilbert (1)
- Outcome of longest criminal trial in US history (2)
- Grievances strikes of miners around the world (3)
- Andrei Sakharov (4)
- The eruption of Mt. Pinatubo in the Philippines (1)
- The Clarence Thomas confirmation hearings (2)
- Heart attacks (3)
- Margaret Thatcher (4)

Example Procedure in DUC



A: **Read hardcopy of documents.**

B: **Create a 100-word softcopy abstract for each document using the document author's perspective.**

C: **Create a 200-word softcopy multi-document abstract of all 10 documents together written as a report for a contemporary adult newspaper reader.**

D,E,F: **Cut, paste, and reformulate to reduce the size of the abstract by half.**

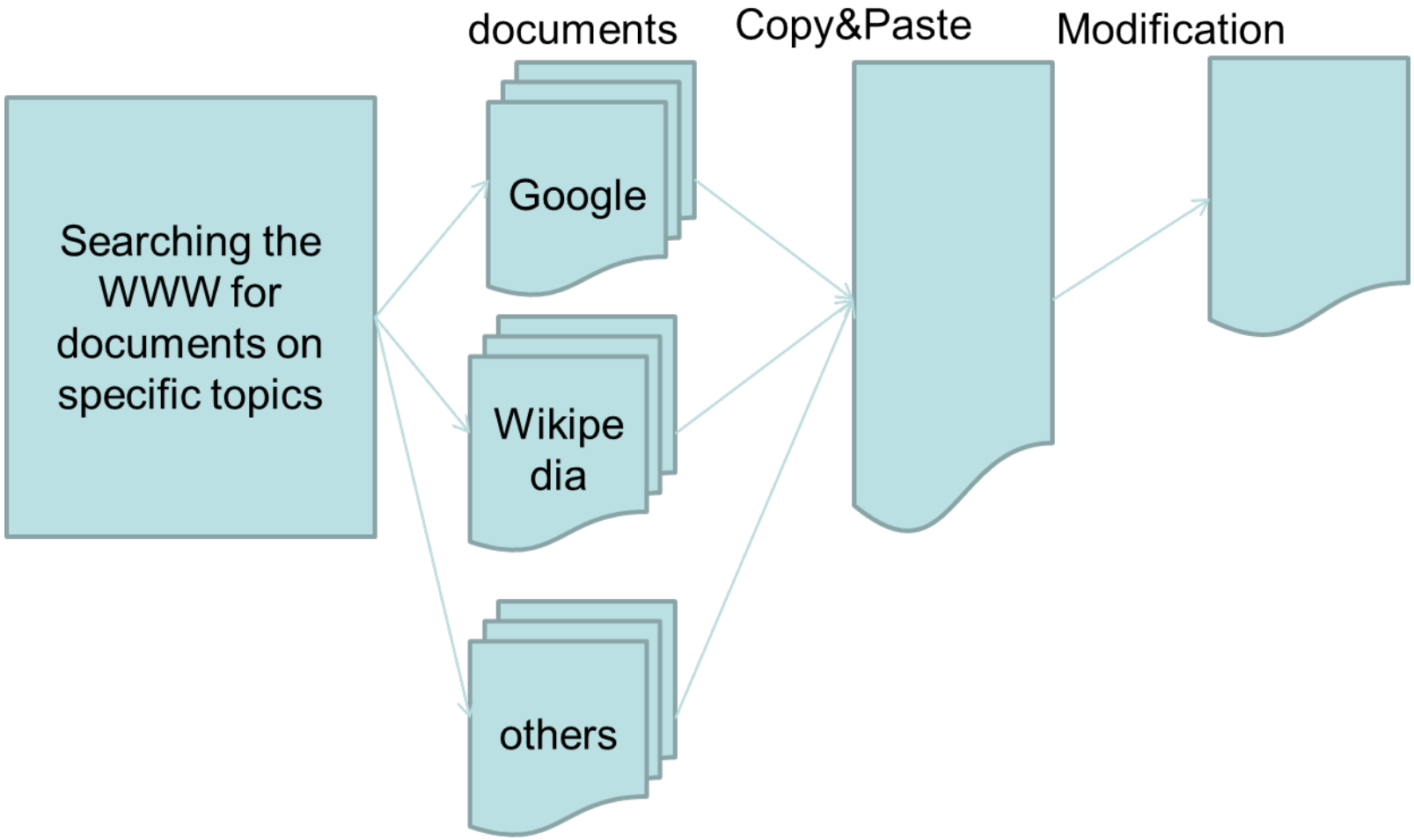
DUC/TAC Tasks

- Generic Summarization
- Update Summarization
- Topic Summarization
- Query Summarization
- Opinion Summarization
- AESOP – Evaluation of Evaluation

Special Track: Multilingual Summarization

- Identify Sources (news paper articles) from WikiNews – in English
- Translate to different languages – Arabic, Czech, French, Greek, Hebrew, Hindi, ...
- Summarize translated documents
- Reference corpus contains 700 documents in 7 languages, 10 topics per language, 10 texts per topic
- Aim: Evaluation of language independent summarization algorithms
- Multi-Document Summarization
- Summary is in the same language as the source documents
- Problems:
  - Translation of Names (Hebrew)
  - Translation of Acrnoyms
  - Idioms
  - Evaluation problem
  - ...

Special Case: Essay Writing



Special Case: Essay Writing

- Controlled and observed web-environment (chatnoir) – for searching
- Controlled and observed web-environment for creating the essays (Webis)
- On average 2132 Edits/Essay
- On average 5738 Words/Essay
- On average 15.4 Sources/Essay
- On average 7.5 hours/Essay
- 2 strategies observed : boil-down (45%) vs. build-up (40%) (13% mixed, 2% undetermined)
- boil-down writer have bigger variance in their writing habits
- Most authors use the same strategy about 80% of the time

Example Annotation

Ein gutes Abitur braucht seine Zeit
Das neunjährige Gymnasium galt als Auslaufmodell. Doch Eltern und Schüler waren mit der Verkürzung der Schulzeit nie glücklich. Nun besinnt sich die Politik und dreht die Uhr zurück. In Nordrhein-Westfalen und Schleswig-Holstein können Gymnasien bereits zur längeren Schulzeit zurückkehren. Baden-Württemberg will folgen. Weil sie später pubertieren als die Mädchen, bereitet das achtjährige Gymnasium gerade Jungen häufig Probleme. Leon hat eine Klasse wiederholt. Dabei ist er gar nicht sitzen geblieben. Seine Noten waren nicht prächtig, doch gut genug. Freiwillig hat er die Ehrenrunde auch nicht absolviert. “Als ich in der siebten Klasse war”, erzählt der 15-Jährige aus dem hessischen Eschwege, “ist meine Schule vom G8 wieder zum G9 gewechselt.” Der Weg zum Abitur war plötzlich ein Jahr länger. G8, G9 - diese beiden Kürzel kennen alle Eltern, Schüler und Lehrer. Sie meinen das achtjährige oder neujährige Gymnasium. G8, das stand für Zukunft, für den einen Standard, nach dem bald alle Schüler lernen sollten. G9, das war Vergangenheit. War, wohlgemerkt. Denn G8 steht eben bis heute auch für Turboabitur, für lange Nachmittage im Klassenzimmer, für Hausaufgaben bis zur Dämmerung, für Überforderung und übervolle Lehrpläne. Die Schuluhren sollen deshalb an vielen Orten wieder langsamer gehen, nicht nur in Eschwege.

Example Annotation

Ein gutes Abitur braucht seine Zeit

Das neunjährige Gymnasium galt als Auslaufmodell. Doch Eltern und Schüler waren mit der Verkürzung der Schulzeit nie glücklich. Nun besinnt sich die Politik und dreht die Uhr zurück.

In Nordrhein-Westfalen und Schleswig-Holstein können Gymnasien bereits zur längeren Schulzeit zurückkehren. Baden-Württemberg will folgen

Weil sie später pubertieren als die Mädchen, bereitet das achtjährige Gymnasium gerade Jungen häufig Probleme

Leon hat eine Klasse wiederholt. Dabei ist er gar nicht sitzen geblieben. Seine Noten waren nicht prächtig, doch gut genug. Freiwillig hat er die Ehrenrunde auch nicht absolviert. "Als ich in der siebten Klasse war", erzählt der 15-Jährige aus dem hessischen Eschwege, "ist meine Schule vom G8 wieder zum G9 gewechselt." Der Weg zum Abitur war plötzlich ein Jahr länger.

G8, G9 - diese beiden Kürzel kennen alle Eltern, Schüler und Lehrer. Sie meinen das achtjährige oder neujährige Gymnasium. G8, das stand für Zukunft, für den einen Standard, nach dem bald alle Schüler lernen sollten. G9, das war Vergangenheit. War, wohlgemerkt. Denn G8 steht eben bis heute auch für Turboabitur, für lange Nachmittage im Klassenzimmer, für Hausaufgaben bis zur Dämmerung, für Überforderung und übervolle Lehrpläne. Die Schuluhren sollen deshalb an vielen Orten wieder langsamer gehen, nicht nur in Eschwege.

Example Annotation

Das neunjährige Gymnasium galt als Auslaufmodell.

Doch Eltern und Schüler waren mit der Verkürzung der Schulzeit nie glücklich.

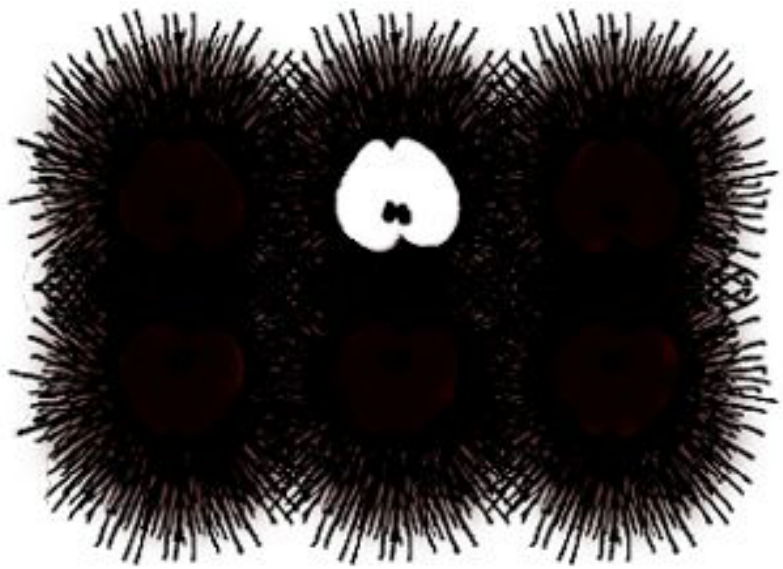
Nun besinnt sich die Politik und dreht die Uhr zurück.

Weil sie später pubertieren als die Mädchen, bereitet das achtjährige Gymnasium gerade Jungen häufig Probleme

Um das Jahr 2000 ging ständig die Rede davon, deutsche Schüler seien zu alt, deutsche Studenten ebenfalls und die Berufsanfänger ebenso.

Deutschland , so die Angst, büße in Anbetracht der Globalisierung seine Konkurrenzfähigkeit ein.

Fragen?



Automatic Summarization

- Baselines
- Historical Methods
- Lexical Chains
- Maximal Marginal Relevance
- Machine Learning Based
- LexRank

Baselines

Single-document summaries: take the first 100 words in the document

Multi-document summaries: take the first 50, 100, or 200 words in the most recent document.

Multi-document summaries: take the first sentence in the 1st, 2nd, 3rd,... document in chronological sequence until you have the target summary size.

Random Select sentences randomly from everywhere in the document and from any document

Luhn(1959)

- Goal: Automatic creation of Abstracts
- Method: Statistical – no linguistic knowledge
- Problems:
  - Texts were not digitalized
- Method
  - Select Sentences based on Importance
  - Determine Importance through:
    - Frequency of a word
    - Distance to a frequent word
    - List of words sorted by Frequency
- Problem: Common words occur frequently, but are not important

Edmundson(1969)

- Design and test new extraction methods
- Observe human extraction criteria
- Created Features
  - Signal Words
  - Cue words
  - Titel
  - Position
- Evaluation

Lexical Chains

- Concept first introduced by Morris and Hirst in 1991
- Lexical chains group sets of words, esp. nouns, which are semantically related (same word – same sense, synonyms, hypernyms/hyponyms, co-hyponyms, collocations)
- Lexical chains can be used to identify important concepts from a document
- Each noun instance usually belongs to exactly one lexical chain – it is necessary to perform word sense disambiguation

Lexical Chains – An Example

Sentences:

1. John has a **Renault**.
2. He loves his **car**.
3. John works next to the **garage** taking care of his **Renault**.

Lexical Chain = (Renault, car, garage, Renault)
Lexical Semantic Relationships:

Renault, car hyponomy

car, garage collocation

garage, Renault collocation

Lexical Chains for Summarization

- All terms representing the same concept occur in the same chain – avoids repetition
- The chain combines the weight (frequency) of its members, so that low frequency terms may still help identifying important concepts
- Method:
  - Build lexical chains:
    - Extract nouns and noun phrases
    - Use WordNet (or another lexical resource) to determine word relatedness
  - Identify strong chains based on their length
  - Extract significant sentences (one sentence for each chain)

Redundancy Detection with MMR

- MMR = Maximum Marginal Relevance
- Pick sentences iteratively, based on their MMR score
- Lambda parameter to change "width" of topic coverage
- Alternative method: apply a clustering algorithm to produce clusters of related sentences and then select a single sentence from each cluster for the summary

$$MMR \stackrel{\text{def}}{=} Arg \max_{D_i \in R \setminus S} \left[\lambda (Sim_1(D_i, Q) - (1-\lambda) \max_{D_j \in S} Sim_2(D_i, D_j)) \right]$$

Supervised Content Selection

- Define features to assess sentence importance ("saliency")
- Training data: corpus with sentences manually annotated as part of the extract summary (1, "positive example") or not (0, "negative example")
- Supervised machine learning methods can be used to combine the features ("training phase") – model
- The model can now give scores to previously unseen texts, i.e., sentences
- Rank sentences according to score and take top *n*

Example Features

Fixed-phrase feature Certain phrases indicate summary, e.g. "in summary"

Position feature 1^{st} / last paragraph, paragraph initial/final sentence more likely to be important

Thematic word feature Repetition is an indicator of importance

Uppercase word feature Uppercase often indicates named entities

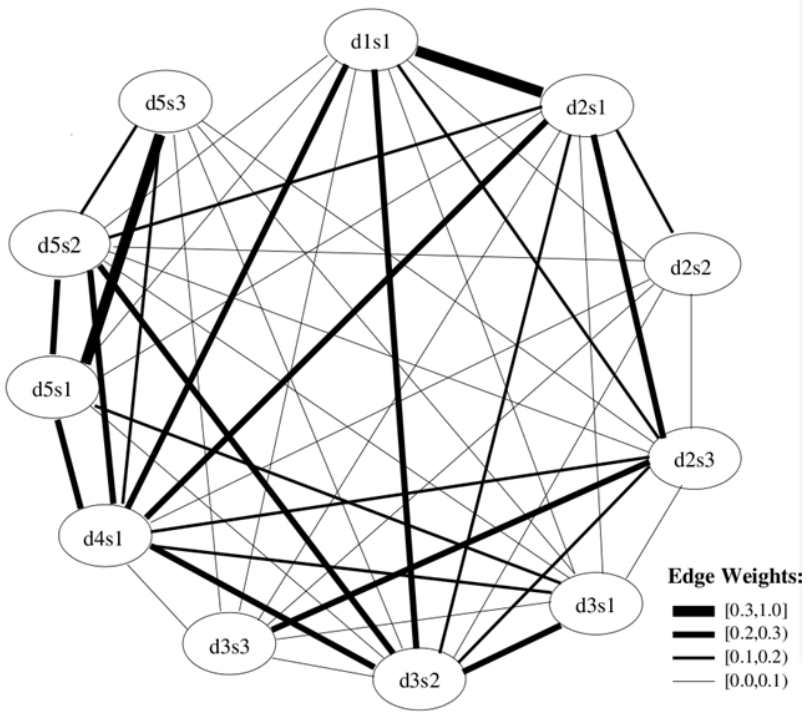
Important words Sentence with more salient words (e.g. high several words with high tf-idf weight) likely to be important

Sentence length cut-off Summary sentence should be > 5 words

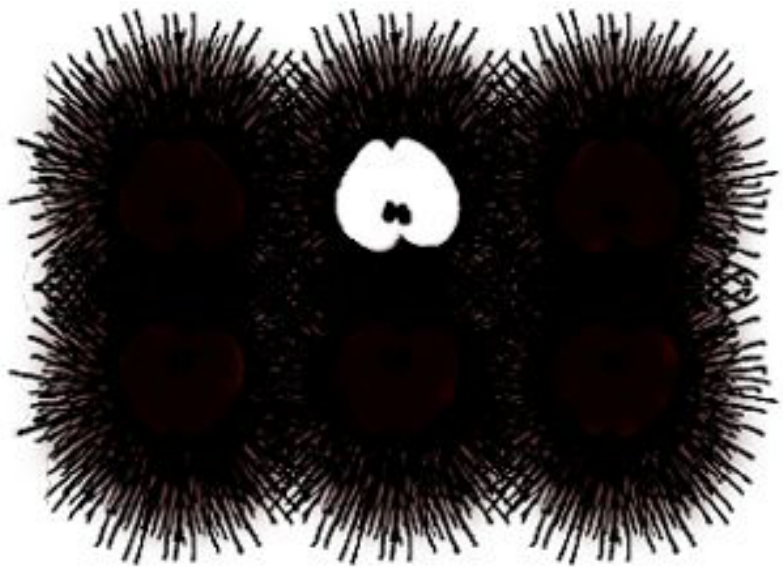
LexRank – Erkan & Radev(2004)

- Represents a cluster of documents as a network of sentences that are related to each other
- Sentences that are similar to many of the other sentences in the cluster are more central (salient)

LexRank – Erkan & Radev(2004)



Fragen?



Summarization Tasks

- Query Focused Summary
- Opinion Summarization
- Contrastive Summarization
- Update Summarization
- Structured Summarization

Query Focused Summarization

- Started in DUC 2004
- Phrase the topic in a query or short paragraph
- Create a summary that answers the query
- “Wo is X?” or “What is X?”

Query Focused Summarization

- Topic Signature Words – most descriptive words
- Sentences containing words that are suitable for a summary are:
  - Prob = 0 – if word appears neither in query nor a signature word
  - Prob = 0.5 – if word appears either in query or signature word
  - Prob = 1 – if word appears both in query and signature word
- Graph-based using cosine similarity between query and sentences

Query Focused Summarization

DefScriber

- Looking for predicates that have to be in a biography
  - Fame
  - Nationality
  - Scandal
  - Work
  - Classification
- Define Patterns, that explain X
  - The Hajj is a type of ritual.
  - The Hajj begins in the 12th month of the Islamic year.
- Bottom-up data driven via WWW

Query Focused Summarization

Linguistics

- Contributions of various elements
  - Appositives
  - Copulas
  - Relations
  - Propositions

Opinion Summarization

- Started in DUC 2005
- Summarizing Opinions in Blogs
- Summarization of Opinion Asking Topcs (e.g. “why is ... important?)
- Summarization of Subectivity-Related Questions

Contrastive Summarization (Lerman McDonald(2009)

- Contrastive summarization is the problem of jointly generating summaries for two entities in order to highlight their differences. In this paper we present an investigation into contrastive summarization through an implementation and evaluation of a contrastive opinion summarizer in the consumer reviews domain.
- The goal of opinion summarization is to select some number of text excerpts to form a summary S of the product so that S is representative of the average opinion and speaks to its important aspects (also proportional to opinion)
- Thus, a good summary should (1) mention aspects in roughly the same proportion that they are mentioned in the full set of opinions and (2) mention aspects with sentiment also in proportion to what is observed in the full opinion set.

Update Summaries

- Focus on new Facts
- Procedure
  - Create Summary based on 10 articles on one topic
  - Additional summary based on 10 other articles on the same topic

Update Summaries

- Generic Summarization + Redundancy component
  - Redundancy component checks sentences against the first *and* the second set of articles
  - Similarity Scores
  - Machine Learning
- Post-Processing
  - Exchange temporal expressions with dates
  - Exchange abbreviations with the full form
- Use a different approach for the second summary
  - each timeslice can be represented as the structure of logical sub-topics,
  - the overall rank score of less informative sentences overlapping with the sentences in update summary is decreased.
  - The sentence with highest rank score in the most important subtopic is chosen to produce the summary until satisfying the summary length limit, which are considered informative, novel and evolving.

Structured Summaries – Erbs et al(2013)

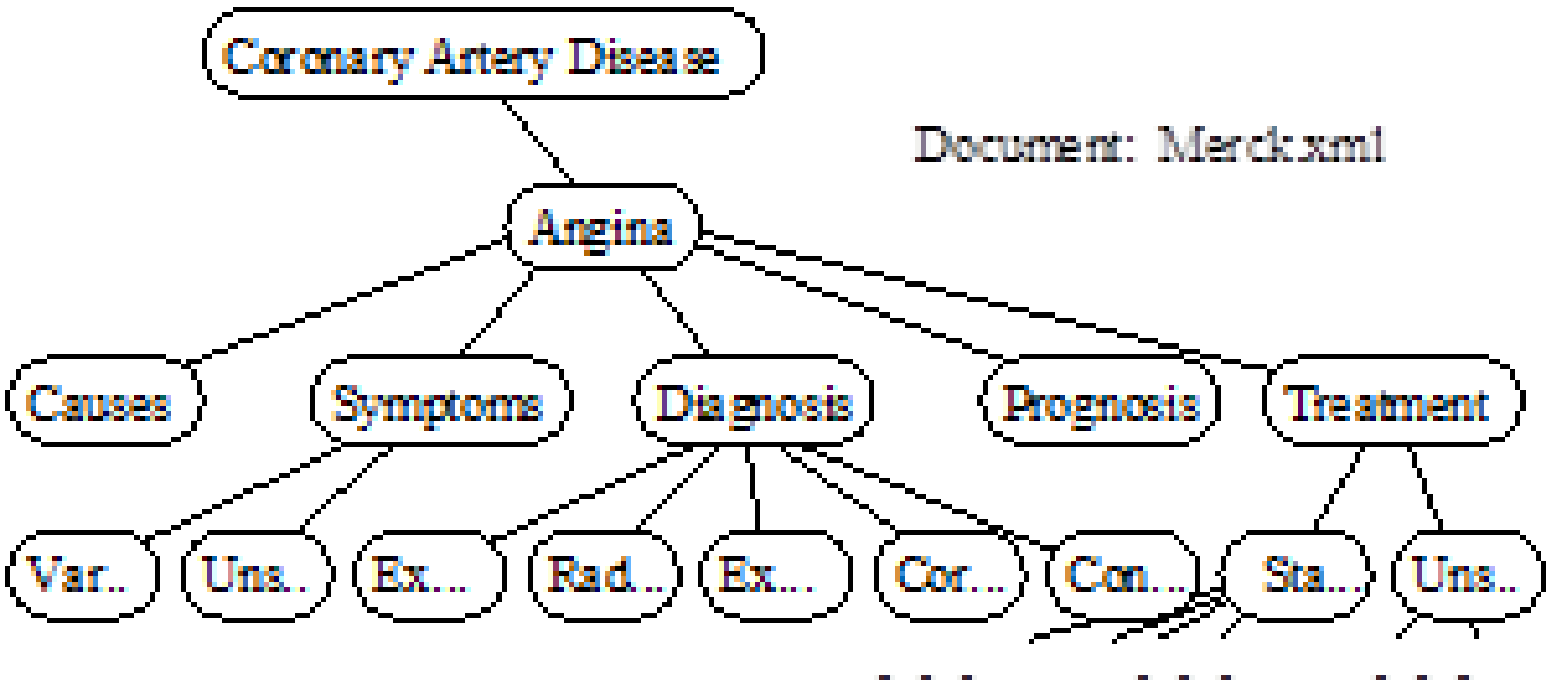
Contents

Structured Summaries – Erbs et al(2013)

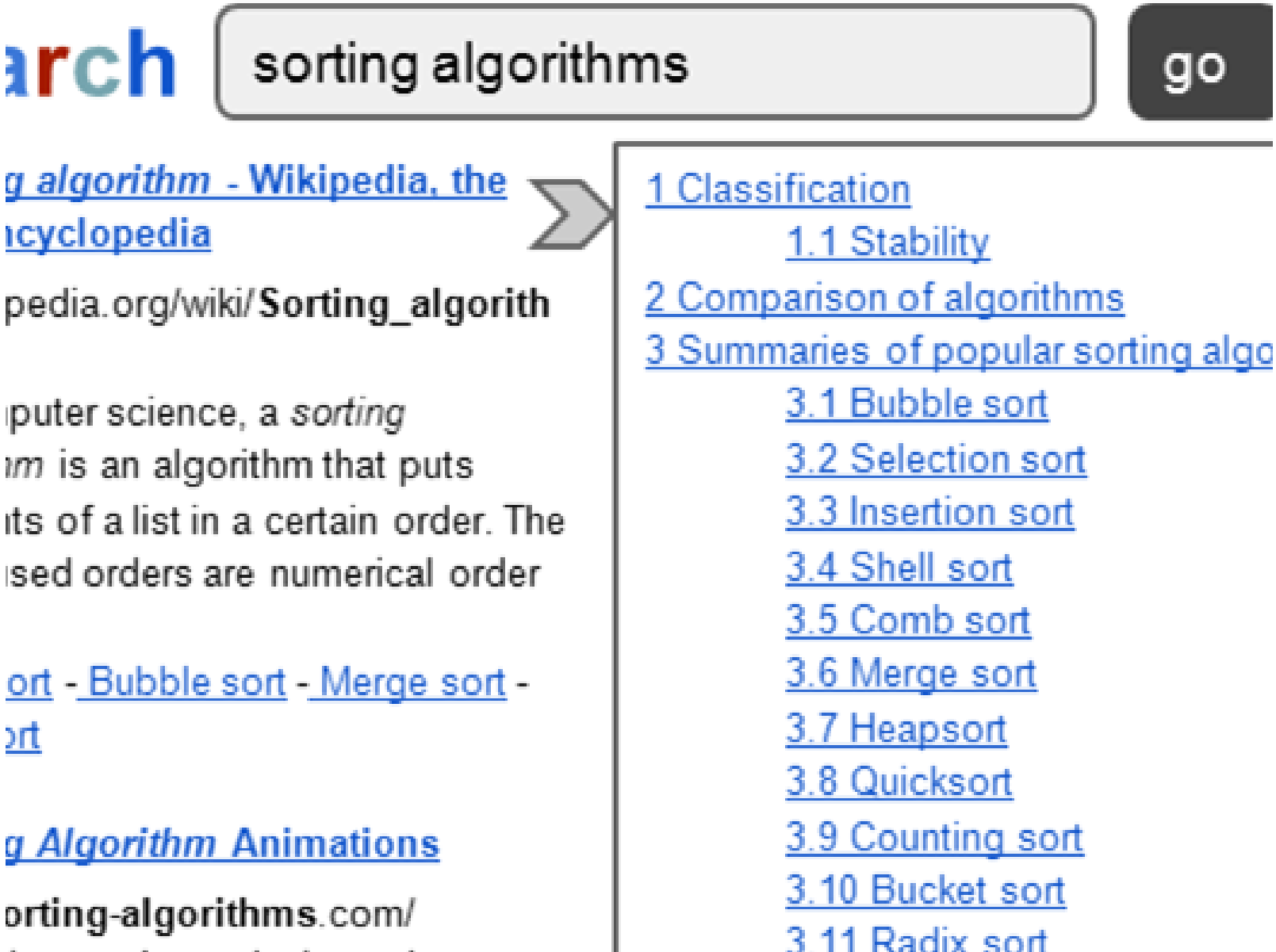
- Tasks:
  - Identify segments of text
  - Identify their hierarchical relation
  - Generate Headline
- Machine Learning – SVM
  - n-gram
  - length
  - entity
  - noun chunks
  - keyphrases
  - frequency
  - 6-n-gram classifier for headline generation

Structured Summaries – Erbs et al(2013)

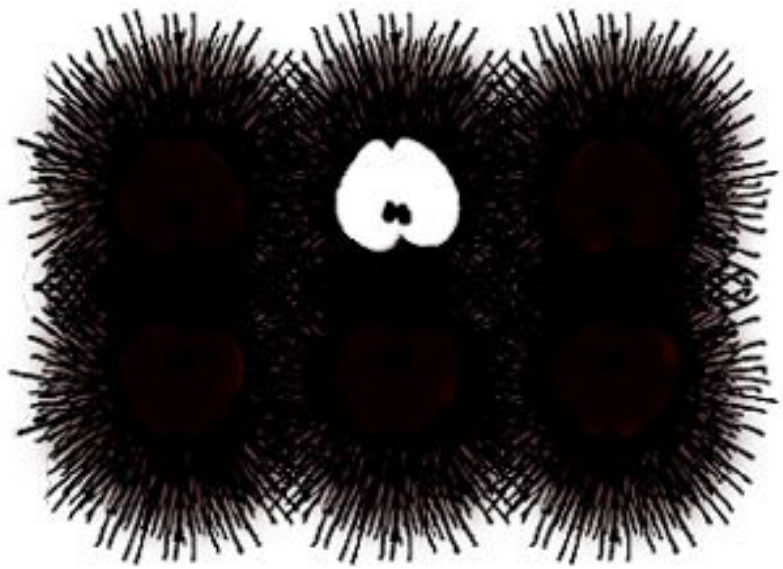
- Indicative Summaries of Mutli-Party Dialogues – Kleinbauer et al
- Topic Identification – Saggion and Lapalme
- Topic Trees – Kan et al



Structured Summaries – Erbs et al(2013)



Fragen?



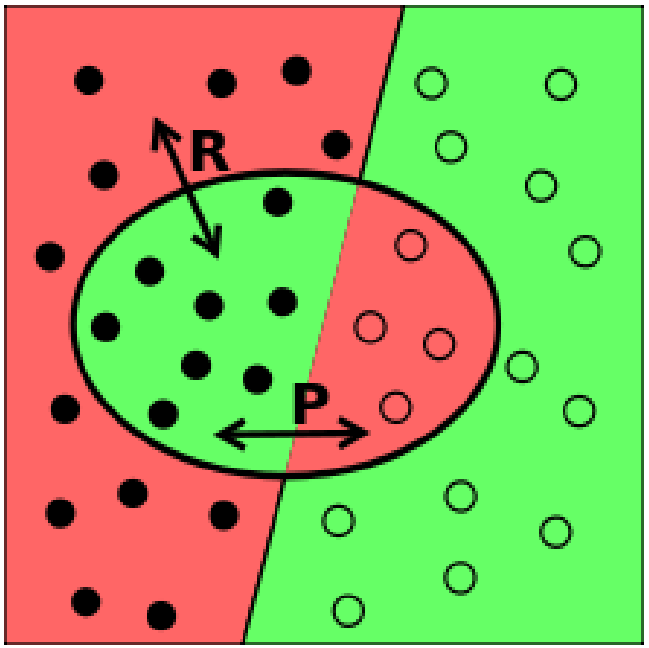
Evaluation

- Manual Evaluation Methods
- Automatic Evaluation Methods

Evaluation Types

- Extrinsic evaluation: measure how different summarisation algorithms influence the perfomance of human subjects for specific tasks
  - gather facts on a given topic
  - decide if a document is relevant or not to a query based on the summary, etc.
- Intrinsic evaluation: score an automatically generated summary by comparing it to human-generated reference summaries
  - Evaluation metrics usually measure the amount of n-gram overlap between the candidate and the references

Classic Approach – Accuracy



$$Accuracy = \frac{tp + tn}{tp + tn + fp + fn}$$

$$F_\beta = 1 + \beta^2 \cdot \frac{precsion \cdot recall}{\beta^2 \cdot precision + recall}$$

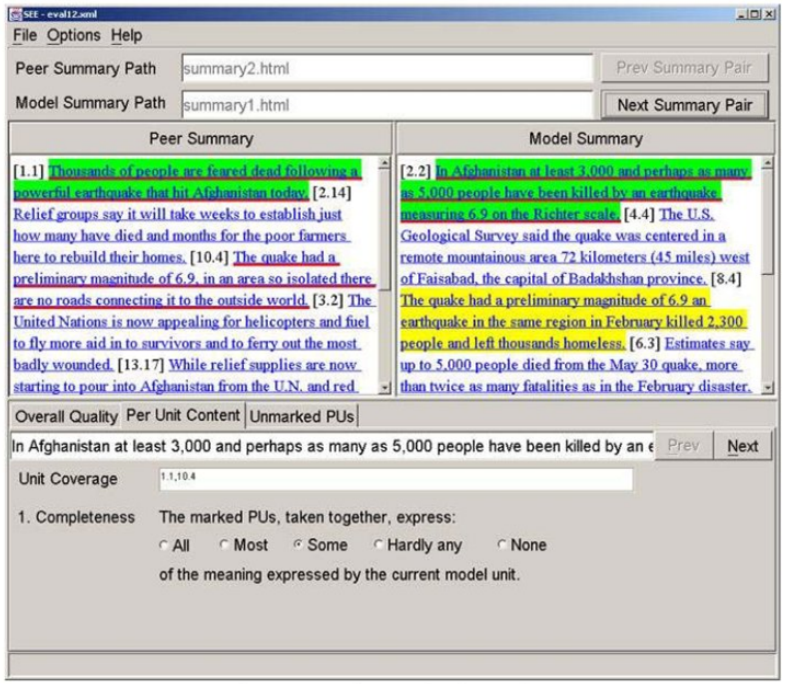
Manual Evaluation – Likert Scales

- Grammaticality
- Non-redundancy
- Referential clarity
- Focus
- Structure and Coherence

Scale:

- Very Good
- Good
- Barely Acceptable
- Poor
- Very Poor

Manual Evaluation – SEE



- Judge Content
- Judge Quality
- Per Unit
- Manual comparison

Manual Evaluation – PYRAMID (Nenkova et al (2007))

- Measures the amount of units of meaning shared between the candidate and reference summaries
- Units of meaning: Summary Content Units (SCU)
- Roughly correspond to propositions or coherent pieces of propositions
- Human annotators labels the SCUs in each reference and candidate summary

Manual Evaluation – PYRAMID (Nenkova et al (2007))

A1. The industrial espionage case involving GM and VW began with the hiring of Jose Ignacio Lopez, an employee of GM subsidiary Adam Opel, by VW as a production director.

B3. However, he left GM for VW under circumstances, which along with ensuing events, were described by a German judge as "potentially the biggest-ever case of industrial espionage".

C6. He left GM for VW *in March 1993*.

D6. The issue stems from the alleged recruitment of GM's eccentric and visionary Basque-born procurement chief Jose Ignacio Lopez de Arriortura and seven of Lopez's business colleagues.

E1. On March 16, 1993, with Japanese car import quotas to Europe expiring in two years, renowned cost-cutter, Agnacio Lopez De Arriortua, left his job as head of purchasing at General Motor's Opel, Germany, to become Volkswagen's Purchasing and Production director.

F3. In March 1993, Lopez and seven other GM executives moved to VW overnight.

Manual Evaluation – PYRAMID (Nenkova et al (2007))

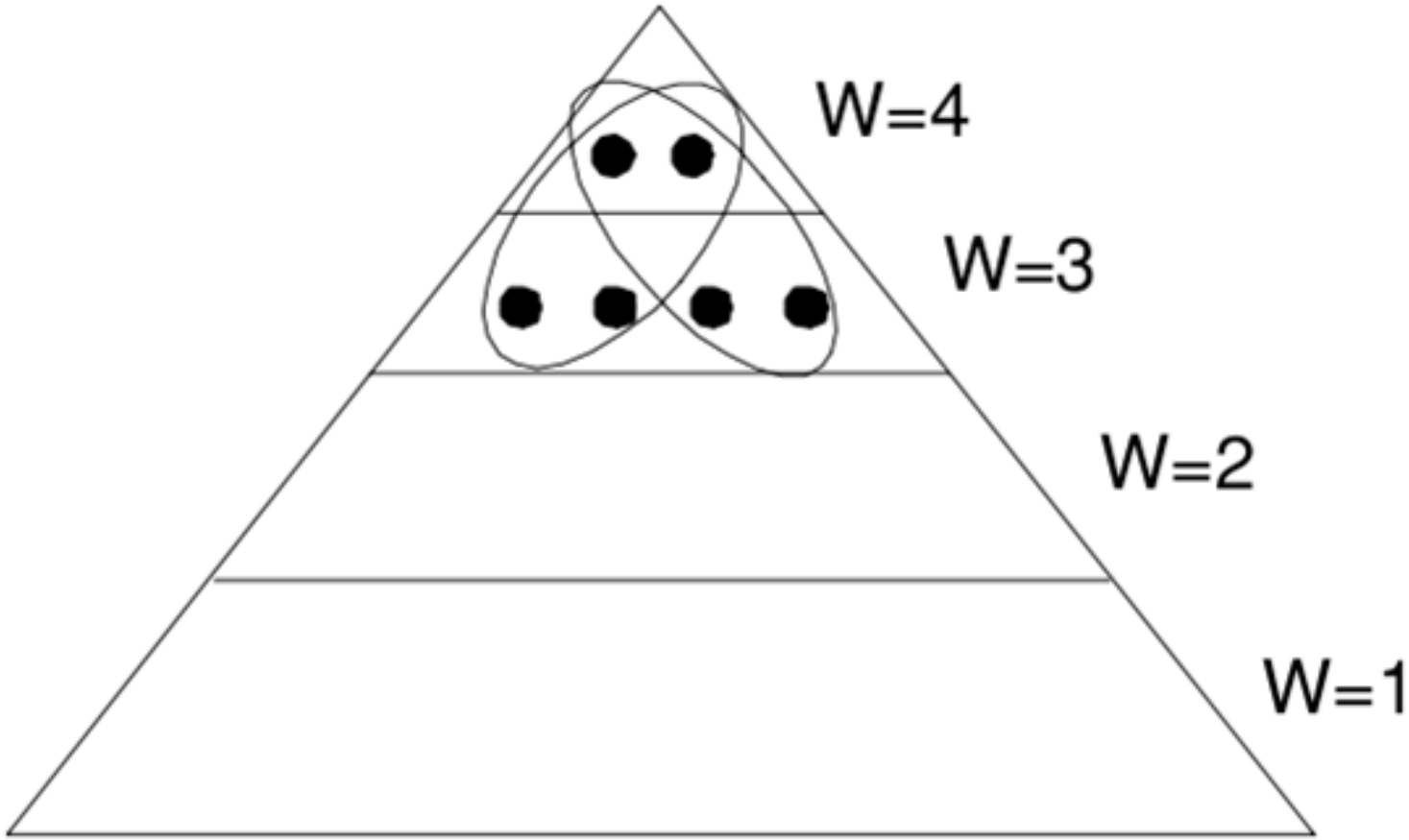


Fig. 1. Two of six optimal summaries with 4 SCUs.

Manual Evaluation – PYRAMID (Nenkova et al (2007))

C6. He left GM for VW
D6. recruitment of GM's ... Jose Ignacio Lopez
E1. Agnacio Lopez De Arriortua, left his job ... at General Motor's Opel ... to become Volkswagen's ... director
F3. Lopez ... GM ... moved to VW

SCU2 (w=3) *Lopez changes employers in March 1993*
C6 in March, 1993
E1. On March 16, 1993
F3. In March 1993

ROUGE

$$\text{ROUGE-N} = \frac{\sum_{S \in \{ReferemceSummaries\}} \sum_{gram_n \in S} Count_{match}(gram_n)}{\sum_{S \in \{ReferenceSummaries\}} \sum_{gram_n \in S} Count(gram_n)}$$

- ROUGE = Recall-Oriented Understudy for Gisting Evaluation
- ROUGE-1 uses unigram overlap
- ROUGE-2 uses bigram overlap
- Stemming with WordNet 2.0 entries
- Correlation between automatic and manual evaluation Unigram co-occurrence – Lin & Hovy (2004)

ROUGE

X: [A B C D E F G]
Y_1: [A B C D H I K]
Y_2: [A H B K C I D]

ROUGE

S1. police killed the gunman
S2. police kill the gunman
S3. the gunman kill police
S4. the gunman police killed

Evaluation without Reference – Louis & Nenkova (2009)

- Distributional Similarity
- Summary Likelihood
- Topic Signatures

Evaluation without Reference – Louis & Nenkova (2009)

- Kullback-Leibler Divergence
  - Number of bits wasted by coding samples belonging to P using another distribution Q, an approximate of P
  - Distributions for words in input documents and summaries
- Jason Shannon Divergence
  - Distance between two distributions cannot be very different from the average of distances from their mean distribution
- Cosine Similarity
  - Overlap between $tf * idf$ vector representation of input and summary content

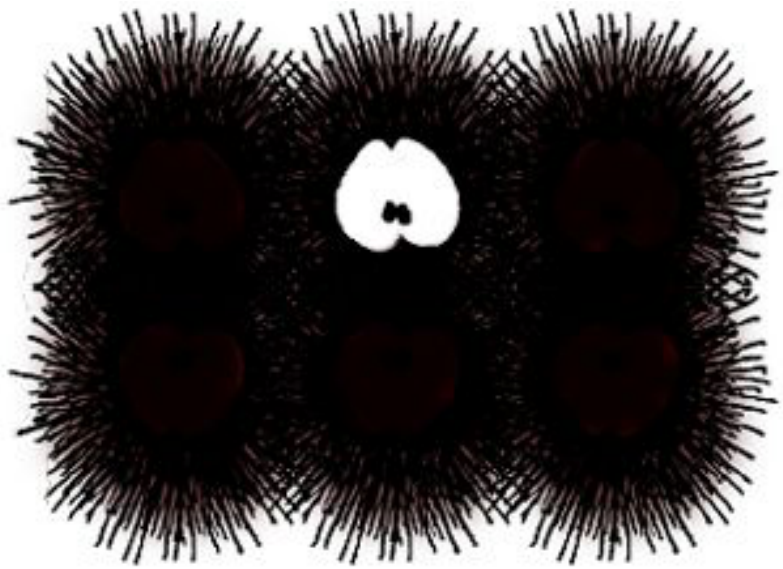
Evaluation without Reference – Louis & Nenkova (2009)

- Summary Likelihood
  - The likelihood of a word appearing in the summary is approximated as being equal to it's probability in the input
- Topic Signatures
  - Signature terms
  - terms that are more likely to occur in the document set than in the background corpus.
  - generally indicative of the content contained in the collection of documents
  - log-likelihood statistic to identify them
  - The statistic is equivalent to a mutual information statistic and is based on a 2-by-2 contingency table of counts for each term (Conroy et al 2006)

Correlation with other evaluations

- Human – Can we automatically identify system performance across all test inputs: YES
- Can we identify which summaries for a given input were good and which were bad: Hmmmm
- Pyramid – High correlation!
- ROUGE – When reference summaries are available, ROUGE correlates better with human judgements than the proposed methods.
- Problems with judgement of linguistic quality

Fragen?



Recap

- Parameters of Summarization
- Summary Types
- Manual Summarization
- Generic Procedure
- Creation of Corpora
- Systems and Methods
- Evaluation

So long and thanks for all the fish...

42