

Text Summarization

Noah Gallant // Jacob House

Computer Science 4750
Fall 2018



Outline

- Topic
- Different Approaches
 - Evolutionary Algorithm
 - Nested Tree
 - Graph-Based
- Our Design
- Implementation
 - The Graph Class
 - The Node Class
 - The Edge Class
- References





Different Approaches

Evolutionary Algorithm

1. Assign weights to text features
2. Create population of distinct summaries
3. Assess fitness
4. Choose summaries with highest fitness
5. Create offspring from chosen summaries
6. Repeat steps 3–5 until the summary is concise enough

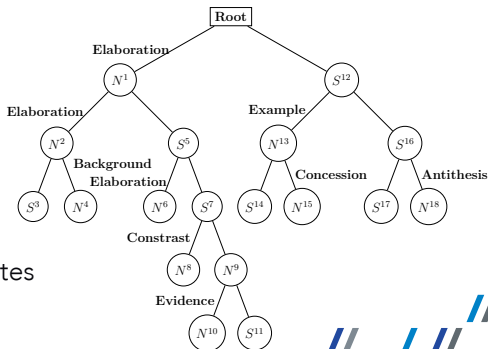


Different Approaches

Nested Tree

The goal in this approach is to repeatedly trim the tree until the desired summary size is reached.

- ▶ Tree structure is dependency based
 - ▶ Inter-sentence
 - ▶ Inter-word
- ▶ Tree trimming to reduce size
 - ▶ Removes duplicates
 - ▶ Removes less important nodes



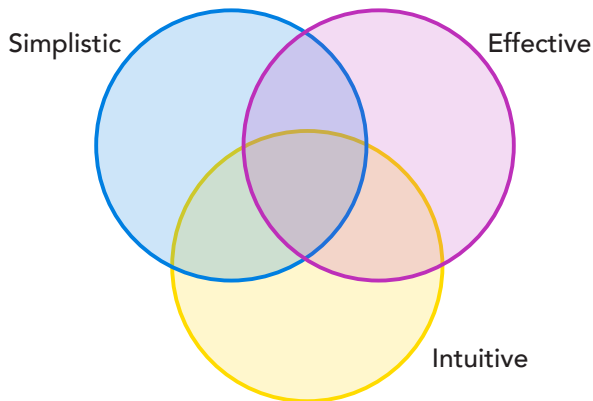
Different Approaches

Graph-Based

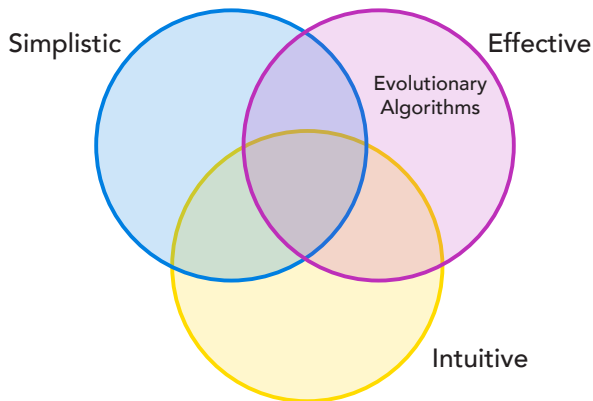
- ▶ Nodes created for each sentence
- ▶ Edges added between sentence nodes
 - ▶ Adjacent sentences in the text
 - ▶ Sentences that share common words
- ▶ Edges with higher weight denote dependency
- ▶ Nodes (sentences) with highest total edge weight should be included in the summary



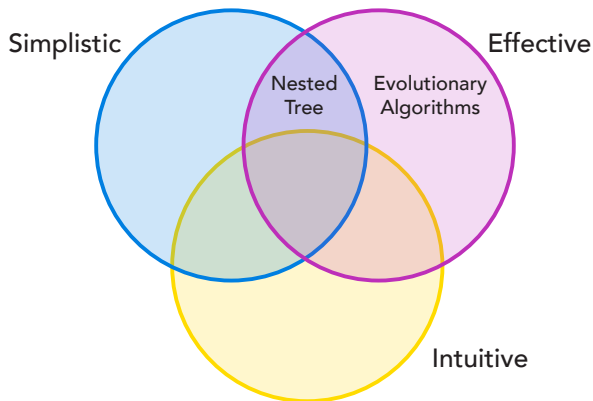
Our Design



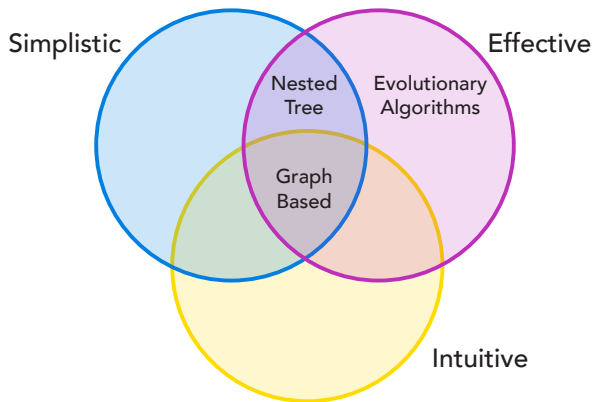
Our Design



Our Design



Our Design



Implementation

The Graph Class

content...



Implementation

The Node Class

content...



Implementation

The Edge Class

content...



References



H. P. Edmundson. "Problems in Automatic Abstracting". In: *Commun. ACM* 7.4 (Apr. 1964), pp. 259–263. ISSN: 0001-0782. DOI: 10.1145/364005.364088. URL: <http://doi.acm.org/10.1145/364005.364088>.



H. P. Edmundson and R. E. Wyllys. "Automatic Abstracting and Indexing — Survey and Recommendations". In: *Commun. ACM* 4.5 (May 1961), pp. 226–234. ISSN: 0001-0782. DOI: 10.1145/366532.366545. URL: <http://doi.acm.org/10.1145/366532.366545>.



References



Mahak Gambhir and Vishal Gupta. "Recent automatic text summarization techniques: a survey". English. In: *The Artificial Intelligence Review* 47.1 (Jan. 2017). Copyright - Artificial Intelligence Review is a copyright of Springer, 2017; Last updated - 2018-10-06, pp. 1–66. URL: <https://search-proquest-com.qe2a-proxy.mun.ca/docview/1857255406?accountid=12378>.



Jaya Jagadeesh, Prasad Pingali, and Vasudeva Varma. "Sentence Extraction Based Single Document Summarization". In: (Jan. 2005).



Gunnel Källgren. "Automatic Abstracting Content in Text". In: *Nordic Journal of Linguistics* 11.1-2 (1988), pp. 89–110. DOI: 10.1017/S0332586500001761



References



Yuta Kikuchi et al. "Single Document Summarization based on Nested Tree Structure". In: *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*. Baltimore, Maryland: Association for Computational Linguistics, 2014, pp. 315–320. DOI: 10.3115/v1/P14-2052. URL: <http://aclweb.org/anthology/P14-2052>.



Nandhini Kumaresh and Balasundaram Sadhu Ramakrishnan. "Graph Based Single Document Summarization". eng. In: *Data Engineering and Management: Second International Conference, ICDEM 2010, Tiruchirappalli, India, July 29-31, 2010. Revised Selected Papers*. Vol. 6411. Lecture Notes in Computer Science. Berlin, Heidelberg: Springer Berlin Heidelberg, 2012, pp. 32–35. ISBN: 9783642278716.



References



Yogesh Kumar Meena and Dinesh Gopalani.
"Evolutionary Algorithms for Extractive Automatic Text Summarization". In: *Procedia Computer Science* 48 (2015). International Conference on Computer, Communication and Convergence (ICCC 2015), pp. 244–249. ISSN: 1877-0509. DOI: <https://doi.org/10.1016/j.procs.2015.04.177>. URL: <http://www.sciencedirect.com/science/article/pii/S1877050915006869>.



Dragomir R. Radev. "Experiments in single and multidocument summarization using MEAD". In: *In First Document Understanding Conference*. 2001. URL: <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.119.4643>.



References



J. E. Rush, R. Salvador, and A. Zamora. "Automatic abstracting and indexing. II. Production of indicative abstracts by application of contextual inference and syntactic coherence criteria". In: *Journal of the American Society for Information Science* 22.4 (), pp. 260–274. DOI: 10.1002/asi.4630220405. eprint: <https://onlinelibrary.wiley.com/doi/pdf/10.1002/asi.4630220405>. URL: <https://onlinelibrary.wiley.com/doi/abs/10.1002/asi.4630220405>.



Prateek Singh. *PSSummary*. 2018. URL: <https://github.com/PrateekKumarSingh/PSSummary>.



References



Caroline Uyttendaele, Marie-Francine Moens, and Jos Dumortier. "Salomon: Automatic Abstracting of Legal Cases for Effective Access to Court Decisions". In: *Artificial Intelligence and Law* 6.1 (Mar. 1998), pp. 59–79. ISSN: 1572-8382. DOI: [10.1023/A:1008256030548](https://doi.org/10.1023/A:1008256030548). URL: <https://doi.org/10.1023/A:1008256030548>.

