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ORIGINAL PAPER

Extractive summarization using semigraph (ESSg)

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Abstract
Summary is the meaningful concise version of a text document. Generally existing statistical, knowledge based and discourse based extractive summarization methods use sentence similarity to extract informative sentences. This paper presents an innovative application of semigraph which includes the processes of semigraph construction and sentence extraction. Multi-level association among significant features of the text document can be represented using semigraph. Multi vertices property of semigraph helps in finding linear and nonlinear relationship between features. Some variation in semigraph in context of text document is proposed in this paper. The threshold for sentence length is calculated dynamically based on the sentence score. Challenge of measuring and analyzing performance is countered using proposed HIT ratio and ROUGE measures. Substantial experiments on benchmark dataset demonstrate that the proposed solution achieves encouraging performance. Multi directed mapping among summaries generated, using existing method is used to calculate effective index.

Keywords Summarization · Extractive summarization · Semigraph · Graph model

1 Introduction

Summarization is the process (Kumar and Salim 2012) of condensing a source text into a shorter version without loss of its informative content. There is the need of fast and effective automatic summarization due to the availability of online content to a great extent. The requirement of getting maximum information by giving less time is the main motivation towards development of summarization method. Quality informative summary generation is a challenge which requires full understanding of the text. For example, readers first look at the book summary or an abstract of a scientific document before reading the complete book or paper. Even search engines also use summaries of web pages to help users find relevant pages.

There are two approaches of summarization. (1) Extractive, (2) abstractive summarization. Extractive methods work by selecting a subset of existing words, phrases, or sentences in the original text to form the summary using various statistical features. In contrast, abstractive methods (Das and Martins 2007) build an internal semantic representation. It then uses advanced natural language generation techniques to create a summary that is closer to what a human might generate. Such a summary might contain words not explicitly present in the original text.

In abstractive summarization the semantic representation and generation of natural language is complex as compared to sentence extraction. The sentences in this kind of summary may not be present in the source document. Extractive methods are solely dependent on the extraction of sentences and hence are easy to create, so most research is focused on the extractive methods. In this paper a new technique of extractive summarization is proposed. Semantic representation and association allow proposed method to produce promising results.

Extractive methods are usually performed in three steps (Hong et al. 2014):

1. Representation of the original text document.
2. Sentence scoring.
3. Select high scores sentences in the summary.

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Adjacency Matrix of a Semigraph

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Abstract

Semigraph was defined by Sampathkumar as a generalization of a graph. In this paper the adjacency matrix which represents semigraph uniquely and a characterization of such a matrix is obtained. An algorithm to construct the semigraph from a given square matrix, if semigraphical is given. Some properties of adjacency matrix of semigraph are studied. A sufficient condition for eigen values to be real is also obtained.

Keywords: Semigraph, adjacency matrix of semigraph, semigraphical matrix, eigen values of semigraph.

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ML invariant of the symmetric algebra of a projective module over a one dimensional affine domain

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ABSTRACT

Let k be an algebraically closed field and let A be an affine domain of dimension one over k. Let P be a finitely generated projective A-module of rank d and let $R = \mathrm{Sym}_A(P)$ be the symmetric algebra of P over A. Assume that A is not a polynomial algebra over k. In this article we show that, under these assumptions, the Makar-Limanov invariant $\mathrm{ML}(R) = A$.

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