Evaluating Roget’s Thesauri

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Abstract

Roget’s Thesaurus has gone through many revisions since it was first published 150 years ago. But how do these revisions affect Roget’s usefulness for NLP? We examine the differences in content between the 1911 and 1987 versions of Roget’s, and we test both versions with each other and WordNet on problems such as synonym identification and word relatedness. We also present a novel method for measuring sentence relatedness that can be implemented in either version of Roget’s or in WordNet. Although the 1987 version of the Thesaurus is better, we show that the 1911 version performs surprisingly well and that often the differences between the versions of Roget’s and WordNet are not statistically significant. We hope that this work will encourage others to use the 1911 Roget’s Thesaurus in NLP tasks.

1 Introduction

Roget’s Thesaurus, first introduced over 150 years ago, has gone through many revisions to reach its current state. We compare two versions, the 1987 and 1911 editions of the Thesaurus with each other and with WordNet 3.0. Roget’s Thesaurus has a unique structure, quite different from WordNet, of which the NLP community has yet to take full advantage. In this paper we demonstrate that although the 1911 version of the Thesaurus is very old, it can give results comparable to systems that use WordNet or newer versions of Roget’s Thesaurus.

The main motivation for working with the 1911 Thesaurus instead of newer versions is that it is in the public domain, along with related NLP-oriented software packages. For applications that call for an NLP-friendly thesaurus, WordNet has become the de-facto standard. Although WordNet is a fine resource, we believe that ignoring other thesauri is a serious oversight. We show on three applications how useful the 1911 Thesaurus is. We ran the well-established tasks of determining semantic relatedness of pairs of terms and identifying synonyms (Jarmasz and Szpakowicz, 2004). We also proposed a new method of representing the meaning of sentences or other short texts using either WordNet or Roget’s Thesaurus, and tested it on the data set provided by Li et al. (2006). We hope that this work will encourage others to use Roget’s Thesaurus in their own NLP tasks.

Previous research on the 1987 version of Roget’s Thesaurus includes work of Jarmasz and Szpakowicz (2004). They propose a method of determining semantic relatedness between pairs of terms. Terms that appear closer together in the Thesaurus get higher weights than those farther apart. The experiments aimed at identifying synonyms using a modified version of the proposed semantic similarity function. Similar experiments were carried out using WordNet in combination with a variety of semantic relatedness functions. Roget’s Thesaurus was found generally to outperform WordNet on these problems. We have run similar experiments using the 1911 Thesaurus.

Lexical chains have also been developed using the 1987 Roget’s Thesaurus (Jarmasz and Szpakowicz, 2003). The procedure maps words in a text to the Head (a Roget’s concept) from which they are most likely to come. Although we did not experiment
with lexical chains here, they were an inspiration for our sentence relatedness function.

*Roget's* Thesaurus does not explicitly label the relations between its terms, as *WordNet* does. Instead, it groups terms together with implied relations. Kennedy and Szpakowicz (2007) show how disambiguating one of these relations, hypernymy, can help improve the semantic similarity functions in (Jarmasz and Szpakowicz, 2004). These hypernym relations were also put towards solving analogy questions.

This is not the first time the 1911 version of *Roget's* Thesaurus has been used in NLP research. Cassidy (2000) used it to build the semantic network FACTOTUM. This required significant (manual) restructuring, so FACTOTUM cannot really be considered a true version of *Roget's* Thesaurus.

The 1987 data come from *Penguin's Roget's Thesaurus* (Kirkpatrick, 1987). The 1911 version is available from Project Gutenberg\(^1\). We use *WordNet* 3.0, the latest version (Fellbaum, 1998). In the experiments we present here, we worked with an interface to *Roget's* Thesaurus implemented in Java 5.0\(^2\). It is built around a large index which stores the location in the thesaurus of each word or phrase; the system individually indexes all words within each phrase, as well as the phrase itself. This was shown to improve results in a few applications, which we will discuss later in the paper.

## 2 Content comparison of the 1911 and 1987 Thesauri

Although the 1987 and 1911 Thesauri are very similar in structure, there are a few differences, among them, the number of levels and the number of parts-of-speech represented. For example, the 1911 version contains some pronouns as well as more sections dedicated to phrases.

There are nine levels in *Roget's* Thesaurus hierarchy, from Class down to Word. We show them in Table 1 along with the counts of instances of each level. An example of a Class in the 1911 Thesaurus is “Words Expressing Abstract Relations”, a Section in that Class is “Quantity” with a Subsection “Comparative Quantity”. Heads can be thought of as the heart of the Thesaurus because it is at this level that the lexical material, organized into approximately a thousand concepts, resides. Head Groups often pair up opposites, for example Head #1 “Existence” and Head #2 “Nonexistence” are found in the same Head Group in both versions of the Thesaurus. Terms in the Thesaurus may be labelled with cross-references to other words in different Heads. We did not use these references in our experiments.

The part-of-speech level is a little confusing, since clearly no such grouping contains an exhaustive list of all nouns, all verbs etc. We will write “POS” to indicate a structure in *Roget’s* and “part-of-speech” to indicate the word category in general. The four main parts-of-speech represented in a POS are nouns, verbs, adjectives and adverbs. Interjections are also included in both the 1911 and 1987 thesauri; they are usually phrases followed by an exclamation mark, such as “for God’s sake!” and “pshaw!”.

Table 2 shows the frequency of paragraphs, semicolon groups and both total and unique words in a given type of POS. Many terms occur both in the 1911 and 1987 thesauri; they are usually phrases followed by an exclamation mark, such as “for God’s sake!” and “pshaw!”.

| Hierarchy         | 1911 | 1987 |
|-------------------|------|------|
| Class             | 8    | 8    |
| Section           | 39   | 39   |
| Subsection        | 97   | 95   |
| Head Group        | 625  | 596  |
| Head              | 1044 | 990  |
| Part-of-speech    | 3934 | 3220 |
| Paragraph         | 10244| 6443 |
| Semicolon Group   | 43196| 59915|
| Total Words       | 98924| 225124|
| Unique Words      | 59768| 100470|

Table 1: Frequencies of each level of the hierarchy in the 1911 and 1987 Thesauri.

\(^1\)http://www.gutenberg.org/ebooks/22
\(^2\)http://rogets.site.uottawa.ca/
### Table 2: Frequencies of paragraphs, semicolon groups, total words and unique words by their part of speech; we omitted prefixes and pronouns.

| POS   | Total Word | Unique Words |
|-------|------------|--------------|
|       | 1911       | 1987         |
| Noun  | 4495       | 2884         |
| Verb  | 2402       | 1499         |
| Adjective | 2080   | 1501         |
| Adverb| 594        | 499          |
| Interjection | 108 | 60          |
| Phrase| 561        | 0            |

| POS   | Both | Only 1911 | Only 1987 |
|-------|------|-----------|-----------|
| N.    | 46308| 114473    | 29793     |
| Vb.   | 25295| 55724     | 15150     |
| Adj.  | 20447| 48802     | 12739     |
| Adv.  | 4039 | 5720      | 3016      |
| Int.  | 598  | 405       | 484       |
| Phr.  | 2228 | 0         | 2038      |

Table 3: Frequencies of terms in either the 1911 or 1987 Thesaurus, and in both; we omitted prefixes and pronouns.

### Table 3: Frequencies of terms in either the 1911 or 1987 Thesaurus, and in both; we omitted prefixes and pronouns.

| POS   | Both | Only 1911 | Only 1987 |
|-------|------|-----------|-----------|
| N.    | 18685| 11108     | 37502     |
| Vb.   | 8618 | 6532      | 15998     |
| Adj.  | 8584 | 4155      | 13030     |
| Adv.  | 1684 | 1332      | 2460      |
| Int.  | 68   | 416       | 315       |
| Phr.  | 0    | 2038      | 0         |

“implanted” in the older but not the newer version. Some mismatches may be due to small changes in spelling, for example, “Nirvana” is capitalized in the 1911 version, but not in the 1987 version.

The lexical data in Project Gutenberg’s 1911 Roget’s appear to have been somewhat added to. For example, the citation “Go ahead, make my day!” from the 1971 movie Dirty Harry appears twice (in Heads #715-Defiance and #761-Prohibition) within the Phrase POS. It is not clear to what extent new terms have been added to the original 1911 Roget’s Thesaurus, or what the criteria for adding such new elements could have been.

In the end, there are many differences between the 1987 and 1911 Roget’s Thesauri, primarily in content rather than in structure. The 1987 Thesaurus is largely an expansion of the 1911 version, with three POSs (phrases, pronouns and prefixes) removed.

## 3 Comparison on applications

In this section we consider how the two versions of Roget’s Thesaurus and WordNet perform in three applications – measuring word relatedness, synonym identification, and sentence relatedness.

### 3.1 Word relatedness

Relatedness can be measured by the closeness of the words or phrases – henceforth referred to as terms – in the structure of the thesaurus. Two terms in the same semicolon group score 16, in the same paragraph – 14, and so on (Jarmasz and Szpakowicz, 2004). The score is 0 if the terms appear in different classes, or if either is missing. Pairs of terms get higher scores for being closer together. When there are multiple senses of two terms \( A \) and \( B \), we want to select senses \( a \in A \) and \( b \in B \) that maximize the relatedness score. We define a distance function:

\[
\text{semDist}(A, B) = \max_{a \in A, b \in B} 2 \times (\text{depth}(\text{lca}(a, b)))
\]

\( \text{lca} \) is the lowest common ancestor and \( \text{depth} \) is the depth in the Roget’s hierarchy; a Class has depth 0, Section 1, ..., Semicolon Group 8. If we think of the function as counting edges between concepts in the Roget’s hierarchy, then it could also be written as:

\[
\text{semDist}(A, B) = \max_{a \in A, b \in B} 16 - \text{edgesBetween}(a, b)
\]

We do not count links between words in the same semicolon group, so in effect these methods find distances between semicolon groups, that is to say, these two functions will give the same results.

The 1911 and 1987 Thesauri were compared with WordNet 3.0 on the three data sets containing pairs of words with manually assigned similarity scores: 30 pairs (Miller and Charles, 1991), 65 pairs (Rubenstein and Goodenough, 1965) and 353 pairs (Finkelstein et al., 2001). We assume that all terms are nouns, so that we can have a fair comparison of the two Thesauri with WordNet. We measure the correlation with Pearson’s Correlation Coefficient.

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\(^3\)http://www.cs.technion.ac.il/~gabr/resources/data/wordsim353/wordsim353.html
Table 4: Pearson’s coefficient values when not breaking / breaking phrases up.

| Year       | Miller & Charles | Rubenstein & Goodenough | Finkelstein et. al |
|------------|------------------|--------------------------|-------------------|
|            | Index words and phrase |                      |                   |
| 1911       | 0.7846           | 0.7313                   | 0.3449            |
| 1987       | 0.7984           | 0.7865                   | 0.4214            |
|            | Index phrase only |                        |                   |
| 1911       | 0.7090           | 0.7168                   | 0.3373            |
| 1987       | 0.7471           | 0.7777                   | 0.3924            |

A preliminary experiment set out to determine whether there is any advantage to indexing the words in a phrase separately, for example, whether the phrase “change of direction” should be indexed only as a whole, or as all of “change”, “of”, “direction” and “change of direction”. The outcome of this experiment appears in Table 4. There is a clear improvement: breaking phrases up gives superior results on all three data sets, for both versions of Roget’s. In the remaining experiments, we have each word in a phrase indexed.

We compare the results for the 1911 and 1987 Roget’s Thesauri with a variety of WordNet-based semantic relatedness measures — see Table 5. We consider 10 measures, noted in the table as J&C (Jiang and Conrath, 1997), Resnik (Resnik, 1995), Lin (Lin, 1998), W&P (Wu and Palmer, 1994), L&C (Leacock and Chodorow, 1998), H&SO (Hirst and St-Onge, 1998), Path (counts edges between synsets), Lesk (Banerjee and Pedersen, 2002), and finally Vector and Vector Pair (Patwardhan, 2003). The latter two work with large vectors of co-occurring terms from a corpus, so WordNet is only part of the system. We used Pedersen’s Semantic Distance software package (Pedersen et al., 2004).

The results suggest that neither version of Roget’s is best for these data sets. In fact, the Vector method is superior on all three sets, and the Lesk algorithm performs very closely to Roget’s 1987. Even on the largest set (Finkelstein et al., 2001), however, the differences between Roget’s Thesaurus and the Vector method are not statistically significant at the $p < 0.05$ level for either thesaurus on a two-tailed test. The difference between the 1911 Thesaurus and Vector would be statistically significant at $p < 0.07$.

On the (Miller and Charles, 1991) and (Rubenstein and Goodenough, 1965) data sets the best system did not show a statistically significant improvement over the 1911 or 1987 Roget’s Thesauri, even at $p < 0.1$ for a two-tailed test. These data sets are too small for a meaningful comparison of systems with close correlation scores.

3.2 Synonym identification

In this problem we take a term $q$ and we seek the correct synonym $s$ from a set $C$. There are two steps. We used the system from (Jarmasz and Szpakowicz, 2004) for identifying synonyms with Roget’s. First we find a set of terms $B \subseteq C$ with the maximum relatedness between $q$ and each term $x \in C$:

$$B = \{x \mid \arg\max_{x \in C} \text{semDist}(x, q)\}$$

Next, we take the set of terms $A \subseteq B$ where each $a \in A$ has the maximum number of shortest paths between $a$ and $q$.

$$A = \{x \mid \arg\max_{x \in B} \text{numberShortestPaths}(x, q)\}$$

If $s \in A$ and $|A| = 1$, the correct synonym has been selected. Often the sets $A$ and $B$ will contain just one item. If $s \in A$ and $|A| > 1$, there is a tie. If $s \notin A$ then the selected synonyms are incorrect. If a multi-word phrase $c \in C$ of length $n$ is not found,
it is replaced by each of its words \(c_1, c_2, \ldots, c_n\), and each of these words is considered in turn. The \(c_i\) that is closest to \(q\) is chosen to represent \(c\). When searching for a word in Roget’s or WordNet, we look for all forms of the word.

The results of these experiments appear in Table 6. “Yes” indicates correct answers, “No” – incorrect answers, and “Tie” is for ties. QNF stands for “Question word Not Found”, ANF for “Answer word Not Found” and ONF for “Other word Not Found”. We used three data sets for this application: 80 questions taken from the Test of English as a Foreign Language (TOEFL) (Landauer and Dumais, 1997), 50 questions – from the English as a Second Language test (ESL) (Turney, 2001) and 300 questions – from the Reader’s Digest Word Power Game (RDWP) (Lewis, 2000 and 2001).

Lesk and the Vector-based systems perform better than all others, including Roget’s 1911 and 1987. Even so, both versions of Roget’s Thesaurus performed well, and were never worse than the worst WordNet systems. In fact, six of the ten WordNet-based methods are consistently worse than the 1911 Thesaurus. Since the two Vector-based systems make use of additional data beyond WordNet, Lesk is the only completely WordNet-based system to outperform Roget’s 1987. One advantage of Roget’s Thesaurus is that both versions generally have fewer missing terms than WordNet, though Lesk, Hirst & St-Onge and the two vector based methods had fewer missing terms than Roget’s. This may be because the other WordNet methods will only work for nouns and verbs.

### 3.3 Sentence relatedness

Our final experiment concerns sentence relatedness. We worked with a data set from (Li et al., 2006). They took a subset of the term pairs from (Rubenstein and Goodenough, 1965) and chose sentences to represent these terms; the sentences are definitions from the Collins Cobuild dictionary (Sinclair, 2001). Thirty people were then asked to assign relatedness scores to these sentences, and the average of these similarities was taken for each sentence.

Other methods of determining sentence semantic relatedness expand term relatedness functions to...
create a sentence relatedness function (Islam and Inkpen, 2007; Mihalcea et al., 2006). We propose to approach the task by exploiting in other ways the commonalities in the structure of Roget’s Thesaurus and of WordNet. We use the OpenNLP toolkit\(^6\) for segmentation and part-of-speech tagging.

We use a method of sentence representation that involves mapping the sentence into weighted concepts in either Roget’s or WordNet. We mean a concept in Roget’s to be either a Class, Section, ..., Semicolon Group, while a concept in WordNet is any synset. Essentially a concept is a grouping of words from either resource. Concepts are weighted by two criteria. The first is how frequently words from the sentence appear in these concepts. The second is the depth (or specificity) of the concept itself.

### 3.3.1 Weighting based on word frequency

Each word and punctuation mark \(w\) in a sentence is given a score of 1. (Naturally, only open-category words will be found in the thesaurus.) If \(w\) has \(n\) word senses \(w_1, ..., w_n\), each sense gets a score of \(1/n\), so that \(1/n\) is added to each concept in the Roget’s hierarchy (semicolon group, paragraph, ..., class) or WordNet hierarchy that contains \(w_i\). We weight concepts in this way simply because, unable to determine which sense is correct, we assume that all senses are equally probable. Each concept in Roget’s Thesaurus and WordNet gets the sum of the scores of the concepts below it in its hierarchy.

We will define the scores recursively for a concept \(c\) in a sentence \(s\) and sub-concepts \(c_i\). For example, in Roget’s if the concept \(c\) were a Class, then each \(c_i\) would be a Section. Likewise, in WordNet if \(c\) were a synset, then each \(c_i\) would be a hyponym synset of \(c\). Obviously if \(c\) is a word sense \(w_i\) (a word in either a synset or a Semicolon Group), then there can be no sub-concepts \(c_i\). When \(c = w_i\), the score for \(c\) is the sum of all occurrences of the word \(w\) in sentence \(s\) divided by the number of senses of the word \(w\).

\[
\text{score}(c, s) = \begin{cases} 
\frac{\text{instancesOf}(w, s)}{\text{sensesOf}(w)} & \text{if } c = w_i \\
\sum_{c_i \in c} \text{score}(c_i, s) & \text{otherwise}
\end{cases}
\]

See Table 7 for an example of how this sentence representation works. The sentence “A gem is a jewel or stone that is used in jewellery.” is represented using the 1911 Roget’s. A concept is identified by a name and a series of up to 9 numbers that indicate where in the thesaurus it appears. The first number represents the Class, the second the Section, ..., the ninth the word. We only show concepts with weights greater than 1.0. Words not in the thesaurus keep a weight of 1.0, but this weight will not increase the weight of any concepts in Roget’s or WordNet. Apart from the function words “or”, “in”, “that” and “a” and the period, only the word “jewellery” had a weight above 1.0. The categories labelled 6, 6.2 and 6.2.2 are the only ancestors of the word “use” that ended up with the weights above 1.0. The words “gem”, “is”, “jewel”, “stone” and “used” all contributed weight to the categories shown in Table 7, and to some categories with weights lower than 1.0, but no sense of the words themselves had a weight greater than 1.0.

It is worth noting that this method only relies on the hierarchies in Roget’s and WordNet. We do not take advantage of other WordNet relations such as hyponymy, nor do we use any cross-reference links that exist in Roget’s Thesaurus. Including such relations might improve our sentence relatedness system, but that has been left for future work.

### 3.3.2 Weighting based on specificity

To determine sentence relatedness, one could, for example, flatten the structures like those in Table 7 into vectors and measure their closeness by some vector distance function such as cosine similarity. There is a problem with this, though. A concept inherits the weights of all its sub-concepts, so the concepts that appear closer to the root of the tree will far outweigh others. Some sort of weighting function should be used to re-adjust the weights of particular concepts. Were this an Information Retrieval task, weighting schemes such as tf.idf for each concept could apply, but for sentence relatedness we propose an ad hoc weighting scheme based on assumptions about which concepts are most important to sentence representation. This weighting scheme is the second element of our sentence relatedness function.

We weight a concept in Roget’s and in WordNet by how many words in a sentence give weight to it. We need to re-weight it based on how specific it is. Clearly, concepts near the leaves of the hierarchy are more specific than those close to the root of the hierarchy. We define specificity as the distance in levels between a given word and each concept found above
Table 7: “A gem is a jewel or stone that is used in jewellery.” as represented using Roget’s 1911.

| Identifier | Concept | Weight |
|------------|---------|--------|
| 6          | Words Relating to the Voluntary Powers - Individual Volition | 2.125169028274 |
| 6.2        | Prospective Volition | 1.504066255252 |
| 6.2.2      | Subservience to Ends | 1.128154077172 |
| 8          | Words Relating to the Sentiment and Moral Powers | 3.13220884041 |
| 8.2        | Personal Affections | 1.861744448402 |
| 8.2.2      | Discriminative Affections | 1.636503978149 |
| 8.2.2.2    | Ornament/Jewelry/Blemish [Head Group] | 1.452380952380 |
| 8.2.2.2.886 | Jewelry [Head] | 1.452380952380 |
| 8.2.2.2.886.1 | Jewelry [Noun] | 1.452380952380 |
| 8.2.2.2.886.1.1 | jewel [Paragraph] | 1.166666666666 |
| 8.2.2.2.886.1.1.1 | jewel [Semicolon Group] | 1.0 |
| 8.2.2.2.886.1.1.1.3 | jewellery [Word Sense] | 1.0 |
| or         | -       | 1.0 |
| in         | -       | 1.0 |
| that       | -       | 1.0 |
| a          | -       | 2.0 |
| .          | -       | 1.0 |

it in the hierarchy. In Roget’s Thesaurus there are exactly 9 levels from the term to the class. In WordNet there will be as many levels as a word has ancestors up the hyponymy chain. In Roget’s, a term has specificity 1, a Semicolon Group 2, a Paragraph 3, ..., a Class 9. In WordNet, the specificity of a word is 1, its synset = 2, the synset’s hyponym = 3, its hyponym = 4, and so on. Words not found in the Thesaurus or in WordNet get specificity 1.

We seek a function that, given $s$, assigns to all concepts of specificity $s$ a weight progressively larger than to their neighbours. The weights in this function should be assigned based on specificity, so that all concepts of the same specificity receive the same score. Weights will differ depending on a combination of specificity and how frequently words that signal the concepts appear in a sentence. The weight of concepts with specificity $s$ should be the highest, of those with specificity $s \pm 1$ – lower, of those with specificity $s \pm 2$ lower still, and so on. In order to achieve this effect, we weight the concepts using a normal distribution, where the mean is $s$:

$$f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{(x-s)^2}{2\sigma^2}}$$

Since the Head is often considered the main category in Roget’s, we expect a specificity of 5 to be best, but we decided to test the values 1 through 9 as a possible setting for specificity. We do not claim that this weighting scheme is optimal; other weighting schemes might do better. For the purpose of comparing the 1911 and 1987 Thesauri and WordNet, however, this method appears sufficient.

With this weighting scheme, we determine the distance between two sentences using cosine similarity:

$$\cosSim(A, B) = \frac{\sum a_i * b_i}{\sqrt{\sum a_i^2} * \sqrt{\sum b_i^2}}$$

For this problem we used the MIT Java WordNet Interface version 1.1.7.

### 3.3.3 Sentence similarity results

We used this method of representation for Roget’s of 1911 and of 1987, as well as for WordNet 3.0 – see Figure 1. For comparison, we also implemented a baseline method that we refer to as Simple: we built vectors out of words and their count.

It can be seen in Figure 1 that each system is superior for at least one of the nine specificities. The Simple method is best at a specificity of 1, 8 and 9, Roget’s Thesaurus 1911 is best at 6, Roget’s Thesaurus 1987 is best at 4, 5 and 7, and WordNet is best at 2 and 3. The systems based on Roget’s and WordNet more or less followed a bell-shaped curve, with the curves of the 1911 and 1987 Thesauri following each other fairly closely and peaking close together. WordNet clearly peaked first and then fell the farthest.

^7http://www.mit.edu/~markaf/projects/wordnet/
The best correlation result for the 1987 Roget’s Thesaurus is 0.8725 when the mean is 4, the POS. The maximum correlation for the 1911 Thesaurus is 0.8367, where the mean is 5, the Head. The maximum for WordNet is 0.8506, where the mean is 3, or the first hypernym synset. This suggests that the POS and Head are most important for representing text in Roget’s Thesaurus, while the first hypernym is most important for representing text using WordNet. For the Simple method, we found a more modest correlation of 0.6969.

Several other methods have given very good scores on this data set. For the system in (Li et al., 2006), where this data set was first introduced, a correlation of 0.816 with the human annotators was achieved. The mean of all human annotators had a score of 0.825, with a standard deviation of 0.072. In (Islam and Inkpen, 2007), an even better system was proposed, with a correlation of 0.853.

Figure 1: Correlation data for all four systems.

4 Conclusion and future work

The 1987 version of Roget’s Thesaurus performed better than the 1911 version on all our tests, but we did not find the differences to be statistically significant. It is particularly interesting that the 1911 Thesaurus performed as well as it did, given that it is almost 100 years old. On problems such as semantic word relatedness, the 1911 Thesaurus performance was fairly close to that of the 1987 Thesaurus, and was comparable to many WordNet-based measures. For problems of identifying synonyms both versions of Roget’s Thesaurus performed relatively well compared to most WordNet-based methods.

We have presented a new method of sentence representation that attempts to leverage the structure found in Roget’s Thesaurus and similar lexical ontologies (among them WordNet). We have shown that given this style of text representation both versions of Roget’s Thesaurus work comparably to WordNet. All three perform fairly well compared to the baseline Simple method. Once again, the 1987 version is superior to the 1911 version, but the 1911 version still works quite well.

We hope to investigate further the representation of sentences and other short texts using Roget’s Thesaurus. These kinds of measurements can help with problems such as identifying relevant sentences for extractive text summarization, or possibly paraphrase identification (Dolan et al., 2004). Another – longer-term – direction of future work could be merging Roget’s Thesaurus with WordNet.

We also plan to study methods of automatically updating the 1911 Roget’s Thesaurus with modern words. Some work has been done on adding new terms and relations to WordNet (Snow et al., 2006) and FACTOTUM (O’Hara and Wiebe, 2003). Similar methods could be used for identifying related terms and assigning them to a correct semicolon group or paragraph.

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