Introduction

This paper discusses the two CRL named entity recognition systems submitted for MUC-6. The systems are based on entirely different approaches. The first is a data intensive method, which uses human generated patterns. The second uses the training data to develop decision trees which detect the start and end points of names.

Background

CRL submitted two systems for the Named Entity task. One of these (Basic) is an improved version of the CRL name recognizer developed in phase one of Tipster[1]. The second (AutoLearn) is a system which learns automatically from training data. The Basic system had approximately six man months of work in its original development. Improvements for MUC-6 were carried out by one graduate student (about one man month). The AutoLearn system was developed by one graduate student specifically for MUC-6 (also one man month).

Availability

The Basic system can be accessed for testing through the mail server - ne_tag@crl.nmsu.edu. The subject field of the message should consist of the word “tag”. A web interface to the tagger is also available from CRL’s home page. Source code and data files can be ftp’ed from CRL (mail cable@crl.nmsu.edu for ftp address and access password). The system has been successfully tested on Linux running on a PC.

Basic NE System

The Basic system consists of a pipeline of Unix process. These can be identified as carrying out four different types of task.

1. Recognizing names based on character patterns (numbers, dates).
2. Recognizing names based on pre-stored names.
3. Applying mark-up to potential components of complete names.
4. Recognizing names based on patterns of components.
For the most part the system is context free. A few of the patterns used require some additional context before a name is recognized. For example an ambiguous human name in isolation may be recognized if it is followed closely by a title.

The system consists of suite of ‘C’ and lex programs.

Component units recognized by the system are cities, provinces, countries, company prefixes and suffixes, company beginning and ending words (Club, Association etc.), unambiguous and ambiguous human first and last names, titles and human position words.

Additional Fix-up Procedures

Final patterns are used to join together units of the same type which are immediately next to each other in the text.

After all the pattern based procedures have operated on the text a final pass is made to recognize abbreviated forms of names. This takes the lists of names found so far and truncates them. (right to left for person and left to right for companies). These new lists are then used as lists of known organizations and persons and any occurrences of these in the text are marked. In particular for organizations the headline is not processed apart from this last stage. This avoids recognition of organizations such as “Leaves Bank”. The assumption that names mentioned in the heading will be repeated in the body of the text holds almost universally.

Data Sources

The data used in the Basic system is derived from public domain source, university phone lists, the Tipster Gazetteer and government data-bases of company names.

Performance

The performances of the for the test set and for the walk through article are given in Appendix A. Overall performance was Recall - 85% and Precision - 87% giving an F measure of 85.8.

Walk through article

Performance here was Recall - 63% and Precision - 83%.

The main source of error was missing patterns in the system. For example Robert L. James was partially recognized (as L. James), McCann-Erickson was missed as no hyphenated company pattern had been added. Once a frequently mentioned name is ignored in its full form the system unfortunately misses all abbreviated forms. This article also shows the importance of context in reliably recognizing some names (e.g. an analyst with PayneWebber).
AutoLearn NE System

The AutoLearn system was developed to explore the possibility of using simple learning algorithms to detect specific features in text. An implementation of Quinlan’s ID3 Algorithm was used [2,3]. This algorithm constructs a decision tree which decides whether an element of a collection satisfies a property or not. Each element of a collection has a finite number of attributes each of which may take one of several values. Quinlan’s original paper suggests the range of values of the attributes should be “small”. In the case of the AutoLearn system the values are every word occurring in the training collection.

Collections for Name Recognition

In order to apply the ID3 algorithm the data needs to be structured into a collection, each member of which has specific values for a set of attributes and for each of which it is known whether the member has a specific property or not. For the name recognition problem the training data was converted in tuple of five words. Each tuple was marked as having the start (or end) of a specific type of proper name at the middle word of the tuple. This data can be easily generated from the training articles. Thus for the beginning of a person -

many differences between Robert L. -1

differences between Robert L. James 1

between Robert L. James , -1

etc.

Fourteen sets of training data were generated using the 318 development articles supplied for MUC-6. The quality of the tagging is not particularly uniform, but no attempt has been made to improve this.

Generating the decision trees

As each word of the training data is read it is hashed and stored in a hash table. Thereafter words are referred to by their hash values. For each of the values of the five attributes (words 1 through 5) a count is maintained of the number of times this value contributed to an element holding a proper named occurrence at the middle attribute. The attribute to be tested first is chosen by computing for each value the relative frequency of positive and negative outcomes for this value. This is used to approximate the information content of that attribute

\[ -p^+ \log_2 p^+ - p^- \log_2 p^- \] (EQ 1)

The sum of the approximate information contents for each column is calculated and the column with the highest value is chosen as the primary decision. Here all the values which always contributed to a positive outcome are used as the primary decision. Values which are always negative are ignored (this is primarily to reduce the size of the data being handled). New sub-collections are formed with elements containing one value which contributed both to positive or negative outcomes are collected and the tree building process is repeated for each of these new collections.
The decision trees thus formed can be output in a readable if somewhat lengthy form. In most cases the first choice is the third word in a group taking one of a large number of values. Thereafter a group of fairly impenetrable tests occur. For example for location beginnings -

If word 3 is one of the following - Milwaukee Ridgefield Pa ST.. (around 300 more words) then location_beginning

else if word 3 is Illinois and word 1 is Indiana then location_beginning

else if word 3 is Northeast and word 1 is 'in' then location_beginning

The printed decision table takes about 5 pages.

**Running the AutoLearn System**

A pass through the texts is made for each decision tree (beginning and end) of each named entity.

First the hash table of words is read and the corresponding decision tree. The text is then processed in groups of five words. Whenever a positive decision is made a new tag is added to the output stream.

Ideally at this stage the tagging would be done. However, given that we are processing new texts, there are many occasions where an end or a beginning is identified, but the corresponding beginning or end is not. For example a surname may have been seen previously, but not the attached forename. At this point a heuristic is applied which for every unmatched bracket in the text works forward or backward until some appropriate point is reached. The actual skipping heuristics need to be different for organizations, persons, locations, dates and numbers.

**Data Sources**

The only data source used for the AutoLearn system was the 318 MUC-6 training texts.

**Performance**

A high precision was expected from this system. Most of the errors that occur are due to failures of the bracket insertion heuristic. The overall scores were Recall - 47% and Precision- 81% giving an F measure of 59.3.

No specific code was inserted to handle numbers or dates. The method was more successful with organizations and locations than with persons. More training data is perhaps required to make the system aware of the spread of examples for human names.

**Walk through article**

The performance here was Recall - 36% and Precision - 88%.
The major problem here is that the system has not learned a rule which uses "Mr." to identify the word previous to a name.

**Relationship of Performance to Amount of Training Data.**

The evaluation texts were processed with decision trees generated using subsets of the MUC-6 development data. This was done in increasing units of 50 texts. The results are shown in Figure 1 below. Both recall and precision increase with increasing training data. Precision appears to tail off at around 82%. Recall, however, increases (with one exception) steadily over the whole range.

![Figure 1: Relationship of Performance to Amount of Training](image)

**Future Developments**

We intend to rebuild the Basic system. One of the principle drawbacks of the system is its sequential application of component tags. In many cases a second tag is not applied because the word or
phrase is ambiguous. The correct solution here is to apply all tags in a manner that allows the cor-
rect tags to be selected by the pattern processing mechanisms. In addition we plan to improve our
collection of patterns. The current version of the system is being made generally available. This,
we hope, will provide us with some feedback on patterns and errors in the data files.

Some further experiments are also planned with the AutoLearn system. The main drawback with
the system is that it doesn’t make maximal use of the training data in so far that with small train-
ing samples one word may be sufficient to make a decision. This situation can probably be
improved by replacing specific words with a NULL word. This will force the system to develop
rules based more on context. In particular when the system encounters unknown words these will
be considered equivalent to the NULL word.

We also intend to apply the learning method described here to other NLP tasks such as part of
speech tagging and disambiguation.

References

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Systems in the Micro-Electronic Age, ed Michie D., Edinburgh University Press, 1979.

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## Appendix A - Basic System Scores

| SLOT       | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <enamex>   | 925 | 889 | 841 | 0   | 0   | 48  | 84  | 0   | 91  | 95  | 9   | 5   | 14  | 0   |
| type       | 925 | 889 | 784 | 0   | 57  | 48  | 84  | 0   | 85  | 88  | 9   | 5   | 19  | 7   |
| text       | 925 | 889 | 755 | 0   | 86  | 48  | 84  | 0   | 82  | 85  | 9   | 5   | 22  | 10  |
| subtotals  | 1850| 1778| 1539| 0   | 143 | 96  | 168 | 0   | 83  | 86  | 9   | 5   | 21  | 8   |
| <timex>    | 111 | 108 | 102 | 0   | 0   | 6   | 9   | 0   | 92  | 94  | 8   | 6   | 13  | 0   |
| type       | 111 | 108 | 102 | 0   | 0   | 6   | 9   | 0   | 92  | 94  | 8   | 6   | 13  | 0   |
| text       | 111 | 108 | 92  | 0   | 10  | 6   | 9   | 0   | 83  | 85  | 8   | 6   | 21  | 10  |
| subtotals  | 222 | 216 | 194 | 0   | 10  | 12  | 18  | 0   | 87  | 90  | 8   | 6   | 17  | 5   |
| <numex>    | 93  | 102 | 91  | 0   | 0   | 11  | 2   | 0   | 98  | 89  | 2   | 11  | 12  | 0   |
| type       | 93  | 102 | 91  | 0   | 0   | 11  | 2   | 0   | 98  | 89  | 2   | 11  | 12  | 0   |
| text       | 93  | 102 | 88  | 0   | 3   | 11  | 2   | 0   | 95  | 86  | 2   | 11  | 15  | 3   |
| subtotals  | 186 | 204 | 179 | 0   | 3   | 22  | 4   | 0   | 96  | 88  | 2   | 11  | 14  | 2   |
| ALL OBJECTS| 2258| 2198| 1912| 0   | 156 | 130 | 190 | 0   | 85  | 87  | 8   | 6   | 20  | 8   |
| MATCHED ONLY| 2068| 2068| 1912| 0   | 0   | 0   | 0   | 0   | 92  | 92  | 0   | 0   | 8   | 8   |

| P&R | 2P&R | P&R |
|-----|------|-----|
| F-MEASURES | 85.82 | 86.52 | 85.13 |

| SLOT       | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| EnameX:    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| organization| 442 | 392 | 330 | 0   | 40  | 22  | 72  | 0   | 75  | 84  | 16  | 6   | 29  | 11  |
| person     | 373 | 378 | 353 | 0   | 9   | 16  | 11  | 0   | 95  | 93  | 3   | 4   | 9   | 2   |
| location   | 110 | 119 | 101 | 0   | 8   | 10  | 1   | 0   | 92  | 85  | 1   | 8   | 16  | 7   |
| other      | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |

| Timex:     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| date       | 111 | 108 | 102 | 0   | 0   | 6   | 9   | 0   | 92  | 94  | 8   | 6   | 13  | 0   |
| time       | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |
| other      | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |

| Numex:     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| money      | 76  | 77  | 74  | 0   | 0   | 3   | 2   | 0   | 97  | 96  | 3   | 4   | 6   | 0   |
| percent    | 17  | 25  | 17  | 0   | 0   | 8   | 0   | 0   | 100 | 68  | 0   | 32  | 32  | 0   |
| other      | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |

* * * DOCUMENT SECTION SCORES * * *

| SLOT       | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| HL         | 136 | 130 | 115 | 0   | 11  | 4   | 10  | 0   | 84  | 88  | 7   | 3   | 18  | 9   |
| DD         | 60  | 60  | 60  | 0   | 0   | 0   | 0   | 0   | 100 | 100 | 0   | 0   | 0   | 0   |
| DATELINE   | 52  | 50  | 49  | 0   | 1   | 0   | 2   | 0   | 94  | 98  | 4   | 0   | 6   | 2   |
| TXT        | 2010| 1958| 1688| 0   | 144 | 126 | 178 | 0   | 84  | 86  | 9   | 6   | 21  | 8   |
### Appendix A - Autolearn System Scores

| SLOT       | POS | ACTI | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <enamex>   | 915 | 514  | 469 | 0   | 0   | 45  | 446 | 0   | 51  | 91  | 49  | 9   | 51  | 0   |
| type       | 915 | 514  | 445 | 0   | 24  | 45  | 446 | 0   | 49  | 86  | 49  | 9   | 54  | 5   |
| text       | 915 | 514  | 371 | 0   | 98  | 45  | 446 | 0   | 40  | 72  | 49  | 9   | 61  | 21  |
| subtotals  |     |      | 1830| 1028| 1816| 0   | 1221|     |     |     |     |     |     |     |
| <timex>    | 111 | 65   | 59  | 0   | 0   | 6   | 52  | 0   | 53  | 91  | 47  | 9   | 50  | 0   |
| type       | 111 | 65   | 59  | 0   | 0   | 6   | 52  | 0   | 53  | 91  | 47  | 9   | 50  | 0   |
| text       | 111 | 65   | 48  | 0   | 11  | 6   | 52  | 0   | 43  | 74  | 47  | 9   | 59  | 19  |
| subtotals  |     |      | 222 | 1301| 107 | 0   | 111 |     |     |     |     |     |     |     |
| <numex>    | 93  | 72   | 56  | 0   | 0   | 7   | 28  | 0   | 70  | 90  | 30  | 10  | 35  | 0   |
| type       | 93  | 72   | 56  | 0   | 0   | 7   | 28  | 0   | 70  | 90  | 30  | 10  | 35  | 0   |
| text       | 93  | 72   | 63  | 0   | 2   | 7   | 28  | 0   | 68  | 88  | 30  | 10  | 37  | 3   |
| subtotals  |     |      | 186 | 1441| 128 | 0   | 111 |     |     |     |     |     |     |     |
| ALL OBJECTS| 2238| 1302| 1051| 0   | 135 | 116| 1052| 0   | 47  | 81  | 47  | 9   | 55  | 11  |
| MATCHED ONLY| 1186| 1186| 1051| 0   | 135 | 0   | 0   | 0   | 89  | 89  | 0   | 0   | 11  | 11  |

| F-MEASURES | P&R | 2P&R | P&2R |
|------------|-----|------|------|
|            | 59.38| 70.57| 51.25 |

| SLOT       | POS | ACTI | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Enamex:    |     |      |     |     |     |     |     |     |     |     |     |     |     |     |
| organization| 433 | 287  | 251 | 0   | 8   | 28  | 174 | 0   | 58  | 87  | 40  | 10  | 46  | 3   |
| person     | 372 | 155  | 131 | 0   | 14  | 10  | 227 | 0   | 35  | 84  | 61  | 6   | 66  | 10  |
| location   | 110 | 72   | 63  | 0   | 2   | 7   | 45  | 0   | 57  | 88  | 41  | 10  | 46  | 3   |
| other      | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |

| Timex:     |     |      |     |     |     |     |     |     |     |     |     |     |     |     |
| date       | 111 | 65   | 59  | 0   | 0   | 6   | 52  | 0   | 53  | 91  | 47  | 9   | 50  | 0   |
| time       | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |
| other      | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |

| Numex:     |     |      |     |     |     |     |     |     |     |     |     |     |     |     |
| money      | 76  | 55   | 52  | 0   | 0   | 3   | 24  | 0   | 68  | 94  | 32  | 5   | 34  | 0   |
| percent    | 17  | 17   | 13  | 0   | 0   | 4   | 4   | 0   | 76  | 76  | 24  | 24  | 38  | 0   |
| other      | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   | *   |

* * * DOCUMENT SECTION SCORES * * *

| SLOT       | POS | ACTI | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| HL         | 128 | 92   | 65  | 0   | 0   | 20  | 56  | 0   | 51  | 71  | 44  | 22  | 56  | 10  |
| DD         | 60  | 0    | 0   | 0   | 0   | 0   | 60  | 0   | 0   | *   | 100 | *   | 100 | *   |
| DATELINE   | 52  | 24   | 24  | 0   | 0   | 0   | 28  | 0   | 46  | 100 | 54  | 0   | 54  | 0   |
| TXT        | 1998| 1186 | 962 | 0   | 128 | 96  | 908 | 0   | 48  | 81  | 45  | 8   | 54  | 12  |
Appendix A - Basic System Walk-through Scores

| SLOT | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <enamex> | 66 | 52 | 47 | 0 | 0 | 5 | 19 | 0 | 71 | 90 | 29 | 10 | 34 | 0 |
| type | 66 | 52 | 42 | 0 | 5 | 5 | 19 | 0 | 64 | 81 | 29 | 10 | 41 | 11 |
| text | 66 | 52 | 42 | 0 | 5 | 5 | 19 | 0 | 64 | 81 | 29 | 10 | 41 | 11 |
| subtotals | 132 | 104 | 84 | 0 | 10 | 10 | 38 | 0 | 64 | 81 | 29 | 10 | 41 | 11 |
| <timex> | 6 | 5 | 5 | 0 | 0 | 0 | 1 | 0 | 83 | 100 | 17 | 0 | 17 | 0 |
| type | 6 | 5 | 5 | 0 | 0 | 0 | 1 | 0 | 83 | 100 | 17 | 0 | 17 | 0 |
| text | 6 | 5 | 5 | 0 | 0 | 0 | 1 | 0 | 83 | 100 | 17 | 0 | 17 | 0 |
| subtotals | 12 | 10 | 10 | 0 | 0 | 0 | 2 | 0 | 83 | 100 | 17 | 0 | 17 | 0 |
| <numex> | 6 | 7 | 6 | 0 | 0 | 1 | 0 | 0 | 100 | 86 | 0 | 14 | 14 | 0 |
| type | 6 | 7 | 6 | 0 | 0 | 1 | 0 | 0 | 100 | 86 | 0 | 14 | 14 | 0 |
| text | 6 | 7 | 6 | 0 | 0 | 1 | 0 | 0 | 100 | 86 | 0 | 14 | 14 | 0 |
| subtotals | 12 | 14 | 12 | 0 | 0 | 2 | 0 | 0 | 100 | 86 | 0 | 14 | 14 | 0 |

| ALL OBJECTS | 156 | 128 | 1 | 0 | 10 | 12 | 40 | 0 | 68 | 83 | 26 | 9 | 37 | 9 |
| MATCHED ONLY | 116 | 116 | 10 | 0 | 0 | 0 | 0 | 0 | 91 | 91 | 0 | 0 | 9 | 9 |

| P&R | 2P&R | F-MEASURES | 74.65 | 79.34 | 70.48 |
|------|------|------------|-------|-------|-------|

| SLOT | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Enamex: | | | | | | | | | | | | | | |
| organization | 29 | 12 | 5 | 0 | 5 | 2 | 19 | 0 | 17 | 42 | 66 | 17 | 84 | 50 |
| person | 35 | 38 | 35 | 0 | 0 | 3 | 0 | 0 | 100 | 92 | 0 | 8 | 8 | 0 |
| location | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 0 | 0 | 0 | 0 |
| other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * |

| Timex: | | | | | | | | | | | | | | |
| date | 6 | 5 | 5 | 0 | 0 | 0 | 1 | 0 | 83 | 100 | 17 | 0 | 17 | 0 |
| time | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * |
| other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * |

| Numex: | | | | | | | | | | | | | | |
| money | 5 | 6 | 5 | 0 | 0 | 1 | 0 | 0 | 100 | 83 | 0 | 17 | 17 | 0 |
| percent | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 0 | 0 | 0 | 0 |
| other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * |

| * | * | DOCUMENT SECTION SCORES | * | * | * |

| SLOT | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| HL | 8 | 6 | 6 | 0 | 0 | 0 | 2 | 0 | 75 | 100 | 25 | 0 | 25 | 0 |
| DD | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 0 | 0 | 0 | 0 |
| DATELINE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * |
| TXT | 146 | 120 | 98 | 0 | 10 | 12 | 38 | 0 | 67 | 82 | 26 | 10 | 38 | 9 |

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### Appendix A - Autolearn System Walk-through Scores

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <enamex> | 69  | 22  | 20  | 0   | 0   | 2   | 49  | 0   | 29  | 91  | 71  | 9   | 72  | 0   |
| type    | 69  | 22  | 20  | 0   | 0   | 2   | 49  | 0   | 29  | 91  | 71  | 9   | 72  | 0   |
| text    | 69  | 22  | 18  | 0   | 2   | 2   | 49  | 0   | 26  | 82  | 71  | 9   | 75  | 10  |
| subtotals | 138 | 44  | 38  | 0   | 2   | 4   | 98  | 0   | 28  | 86  | 71  | 9   | 73  | 5   |
| <timex> | 6   | 5   | 5   | 0   | 0   | 0   | 1   | 0   | 83  | 100 | 17  | 0   | 17  | 0   |
| type    | 6   | 5   | 5   | 0   | 0   | 0   | 1   | 0   | 83  | 100 | 17  | 0   | 17  | 0   |
| text    | 6   | 5   | 4   | 0   | 1   | 0   | 1   | 0   | 67  | 80  | 17  | 0   | 33  | 20  |
| subtotals | 12  | 10  | 9   | 0   | 1   | 0   | 2   | 0   | 75  | 90  | 17  | 0   | 25  | 10  |
| <numex> | 6   | 6   | 6   | 0   | 0   | 0   | 0   | 0   | 100 | 100 | 0   | 0   | 0   | 0   |
| type    | 6   | 6   | 6   | 0   | 0   | 0   | 0   | 0   | 100 | 100 | 0   | 0   | 0   | 0   |
| text    | 6   | 6   | 5   | 0   | 1   | 0   | 0   | 0   | 83  | 83  | 0   | 0   | 17  | 17  |
| subtotals | 12  | 12  | 11  | 0   | 1   | 0   | 0   | 0   | 92  | 92  | 0   | 0   | 8   | 8   |

**ALL OBJECTS**

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <enamex> | 162 | 66  | 58  | 0   | 4   | 4   | 100 | 0   | 36  | 88  | 62  | 6   | 65  | 6   |
| type    | 62  | 62  | 58  | 0   | 4   | 0   | 0   | 0   | 94  | 94  | 0   | 0   | 6   | 6   |

**P&R**

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Enamex: |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| organization | 32  | 12  | 12  | 0   | 0   | 0   | 20  | 0   | 38  | 100 | 62  | 0   | 62  | 0   |
| person    | 35  | 7   | 6   | 0   | 0   | 1   | 29  | 0   | 17  | 86  | 83  | 14  | 83  | 0   |
| location  | 2   | 3   | 2   | 0   | 0   | 1   | 0   | 0   | 100 | 67  | 0   | 33  | 33  | 0   |
| other     | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   |

**Timex:***

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| date    | 6   | 5   | 5   | 0   | 0   | 0   | 1   | 0   | 83  | 100 | 17  | 0   | 17  | 0   |
| time    | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   |
| other   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   |

**Numex:***

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| money   | 5   | 5   | 5   | 0   | 0   | 0   | 0   | 0   | 100 | 100 | 0   | 0   | 0   | 0   |
| percent | 1   | 1   | 1   | 0   | 0   | 0   | 0   | 0   | 100 | 100 | 0   | 0   | 0   | 0   |
| other   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   |

**F-MEASURES**

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| P&R     | 50.88|     |     |     |     |     |     |     |     |     |     |     |     |     |
| 2P&R    | 68.08|     |     |     |     |     |     |     |     |     |     |     |     |     |
| P&2R    | 40.62|     |     |     |     |     |     |     |     |     |     |     |     |     |

**ALL OBJECTS**

| SLOT   | POS | ACT | COR | PAR | INC | SPU | MIS | NON | REC | PRE | UND | OVG | ERR | SUB |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| HL      | 8   | 2   | 2   | 0   | 0   | 0   | 6   | 0   | 25  | 100 | 75  | 0   | 75  | 0   |
| DD      | 2   | 0   | 0   | 0   | 0   | 0   | 2   | 0   | 0   | 100 | *   | 100 | 0   | *   |
| DATELINE| 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | *   | *   | *   | *   | *   |
| TXT     | 152 | 64  | 56  | 0   | 4   | 4   | 92  | 0   | 37  | 88  | 60  | 6   | 64  | 7   |

*** * * DOCUMENT SECTION SCORES * * ***