Information Extraction From Medical Notes

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Motivation

- Medical Notes
  - Thousands of medical notes in any hospital system
  - Unstructured text not amenable for data mining
- Goal :
  - Accurately extract information from each note
    - Drug
    - Dosage
    - Method of delivery

Materials

- Data Set
  - Transcribed dictated notes
  - 12,222 patients in UNC Hospital
  - Anonymized
- Part of UNC DEcIDE project
  - Identify over-dosage of diabetes patients
- Gold standard
  - structured data sets
  - Physician annotated

Method Summary

Method	Trigger	Output
1	Drug name	± 50 chars from drug
2	Drug name or 'Insulin' or 'Diabetes	•Sentence •Trigger
3/4	Word > 3 letters & Number & Measurement Unit	•Drug •Amount •Method of delivery

Example – Method 1

- Trigger: drug name

Trigger: Drug name

We will begin the patient on her home dose of **Glucotrol**, 5 milligrams PO QD and we will give sliding scale insulin as needed.

- Output: 50 characters either side of drug

We will begin the patient on her home dose of **Glucotrol**, 5 milligrams PO QD and we will give sl

50 Character limit

Example – Method 2

- Trigger: drug, ‘diabetes’, ‘insulin’

Trigger: ‘diabetes’

The other diabetes related medications are Actos 45 mg and Lantus at bedtime 20 units.

Trigger: Drug name

- Output: Entire Sentence

Example – Method 3/4

- Trigger: word > 3 letters, dosage, measurement

Trigger: word > 3 letters

Trigger: dosage

He continued on Metformin 500 mg p.o. b.i.d.

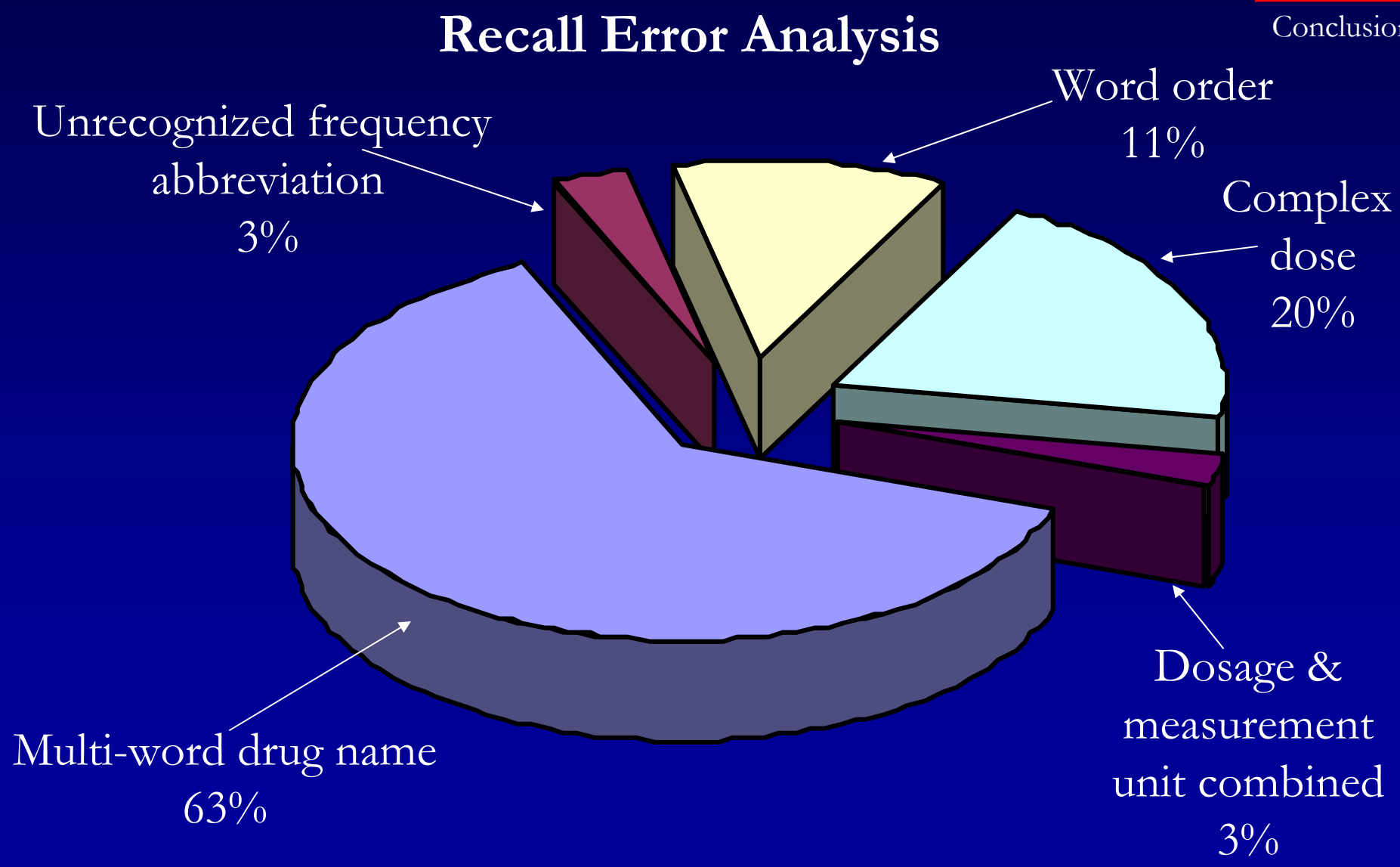
Trigger: measurement

- Output: Drug, dosage, unit, delivery, frequency

Method 3/4 – Advantages

- Processing Speed
  - 24-26 patient notes/sec
  - Pentium 4 2.0GHz processor
- Drug name not used in trigger
  - Identifies new drugs
  - Missing or obscure drugs do not lower performance

Method 4 Limitations



Results of Method 4

	Training Set		Test Set	
	Precision	Recall	Precision	Recall
Drug	86.96%	82.76%	86.81%	82.78%
Amount	100%	91.39%	100%	96.08%
Method of Delivery	100%	62.03%	100%	91.89%
Prescribed Frequency	100%	41.73%	100%	48.15%
Average	**96.74%**	**69.48%**	**96.70%**	**79.72%**

Conclusion

- Average F-Measure (Test Set)
  - Drug 84.80%
  - Amount 98.04%
  - Method of Delivery 95.95%
  - Prescribed Frequency 74.06%
  - **Average 88.21%**
- Scales well : 24-26 patient notes/sec

Questions or Comments ?

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