

# English-Chinese Machine Translation in the Healthcare Domain

Shawn Chuan Summers

Supervisor: Tony Hartley

Centre for Translation Studies, University of Leeds, LS2 9JT, UK

## Problem Scenario:

Medical screening software manuals need to be translated from English to Chinese on a regular basis as they are updated

## Open Question:

**Is MT a viable solution?**

Problems encountered range from word order to sense disambiguation

## The Research:

Analyse 'raw' input and output (423 sentences, 10,012 SL words)

**Propose re-write rules, re-translate and evaluate**

Large scale human evaluation and scoring:

Fluency, Accuracy, Adequacy

Comparing with human translation done by professional translators

## The Results:

Disparities between English and Chinese ...

character-based *vs* word-based

analogy *vs* logic

Failed areas in MT translation...

Tense, word order, sense disambiguation, etc.

How to mitigate these problems...

Simple sentences, specific time reference and word sense

## English-Chinese Problems

### Proper Nouns

New People Hospital *vs* Xin Min Hospital

### Tense

who pulls the needle *vs* who pulled the needle

### Prepositions

on, in

**Articles:** disambiguating number and generalised reference

a process *vs* the process

## Proposed Re-Write Solutions

### Transliteration table for not-to-be translated words

新民-Xin Ming

### Explicit time references

yesterday, just now

### Specific prepositions

- in → within      on → upon  
- in → into        on → about

### Avoid interchange of definite articles and indefinite article

'the' - general reference

'a' - singular reference

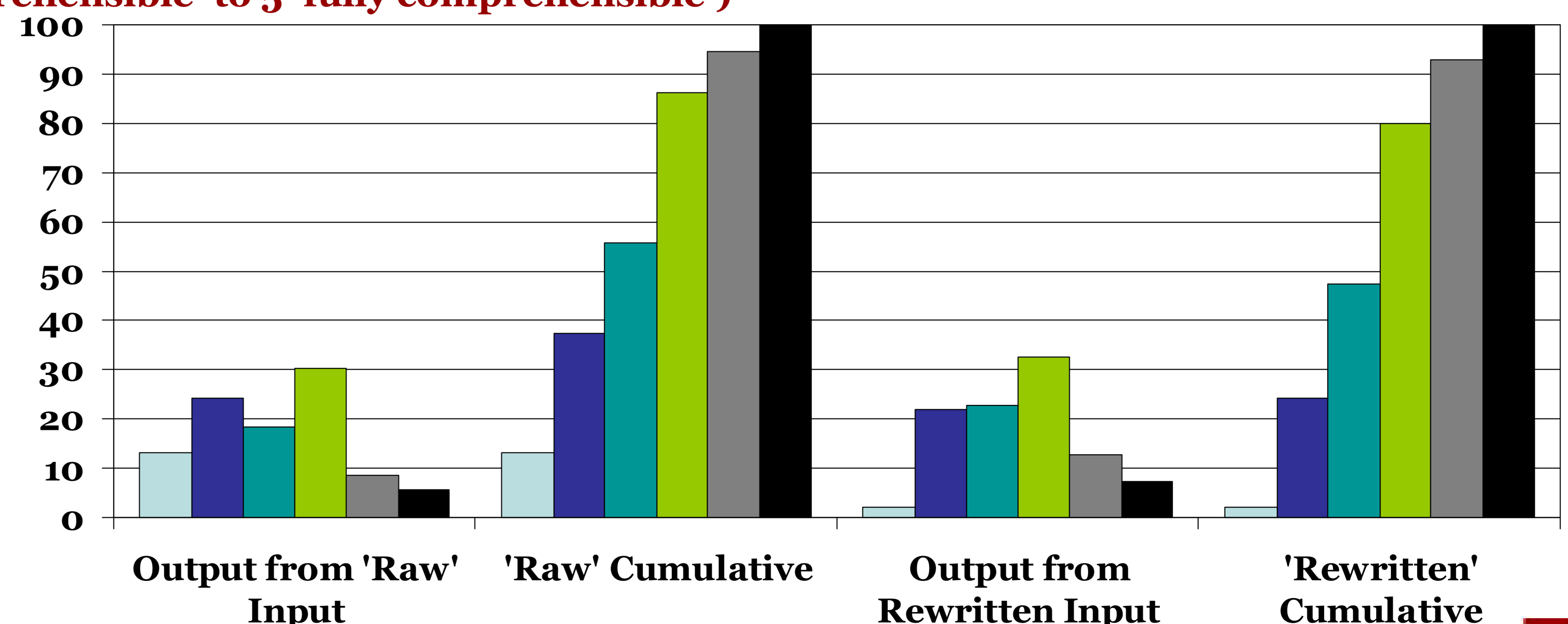
## Evaluation Scores (scale: 0 'incomprehensible' to 5 'fully comprehensible')

### Raw Machine Translation

0	1	2	3	4	5
55	103	78	128	36	23

### Translation after Rewriting

0	1	2	3	4	5
10	93	97	138	54	31



English                      German  
Kindergarten      Kindergarten

English                      French  
etiquette                      etiquette

English                      Spanish  
aficionado                      aficionado

English                      Chinese

Sofa                      沙发

- No Separation

- 我们一起去散步。
- Let (space) us.have. a .walk.

- No Inflections

- | English  | Chinese |
|----------|---------|
| • is-    | 是       |
| • was-   | 是       |
| • were-  | 是       |
| • been-  | 是       |
| • being- | 是       |

- No Strict Tense

- Fluid Part of Speech

- The same character 美
- 美-beauty-beautiful-beautify-beautified-beautifying-beatification-
- Isn't this beautiful?!

- **Articles:** a number or generalized reference
- sentence No.1
- We should expect **a** healing programme to be simple yet effective.
- 我们应该盼望一个 医治用的节目 是简单，并且有效的。
- (We should expect **1** medical programme to be simple and effective. )
- Sentence No.2
- We should expect **the** healing programme to be simple yet effective.

Sentence No.1

Who pulled the needle?

谁拔针头?

(Who pulls the needle?)

Sentence No.2

Just now who pulled the needle?

## Sentence No.1

In the screening process, there is not so much demand on the patients' part.

在筛选过程, 非常没有需求在患者的部分。

(By the screening process, very much no need on patient's part.)

## Sentence No.2

Within the screening process, there is not so much demand on the patients' part.

- The significance of conducting the research
- Potential in These Languages
- 1.5 billion market worth 2004
- Expected increase in 2008 and 2010

