

Overview of the NTCIR-10 Cross-lingual Link Discovery Task

Ling-Xiang Tang†, In-Su Kang‡, Fuminori Kimura*, Yi-Hsun Lee♦, Andrew Trotman♠, Shlomo Gevat†, Yue Xu†

†Queensland University of Technology ‡Kyungsung University *Ritsumeikan University ♦Academia Sinica ♠University of Otago

What's New



New Collections

| LANG | #DOC | SIZE | DATE OF DUMP |
|----------|-----------|--------|--------------|
| Chinese | 404,620 | 3.6GB | 11/01/2012 |
| English | 3,581,772 | 33.0GB | 04/01/2012 |
| Japanese | 858,610 | 9.8GB | 04/01/2012 |
| Korean | 297,913 | 2.2GB | 22/01/2012 |

New Tasks

New Participants

New Challenges

| GROUP | AFFILIATION |
|-------|-------------------------------------|
| DCU | Dublin City University |
| III | Institute for Information Industry |
| KECIR | Shenyang Aerospace University |
| KMI | The Open University |
| KSLP | Kyungsung University |
| NTHU | National Tsing Hua University |
| OKSAT | Osaka Kyoiku University |
| QUT | Queensland University of Technology |
| RDLL | Ritsumeikan University |
| UKP | TU Darmstadt |

布丁

维基百科，自由的百科全书

Bread pudding 布丁一词源自音译的pudding，意译则为「奶冻」。布丁是用蛋液状的材料凝固成固体里液体的食品，如圣诞布丁、蔓布丁等，常以製法包括蒸及煮等。疾疫来说，布丁是一种市廉的甜品，主要材料为糖、麵粉、果凍。



市售大量生產的布丁，为了省成本，故很少使用雞蛋与牛奶做原料，而是使用「布丁粉」冲泡冷食。其主要原料为海藻类出物、食用色素等。



胸甲骑兵放弃了对躯干部分和腿部的严密防护 (Cuirassier gives up the protection for part of body and legs)
Without proper segmentation the two words 部分 (means "part") 和 (means "and") in the second sentence could be easily processed as one and linked to the less relevant mathematical article -部分和 (Series (mathematics)).

Evaluation

F2F Evaluation

$$Precision_{f2f} = \frac{\text{number of correct links}}{\text{number of identified links}}$$

$$Recall = \frac{\text{number of correct links}}{\text{number of links in qrels}}$$

$$f_{\text{anchor}}(i) = \begin{cases} 1, & \text{if relevant with } \geq 1 \text{ relevant targets} \\ 0, & \text{otherwise} \end{cases}$$

$$f_{\text{link}}(j) = \begin{cases} 1, & \text{if relevant} \\ 0, & \text{otherwise} \end{cases}$$

$$Precision_{a2f} = \left(\sum_{i=1}^n (f_{\text{anchor}}(i)) \times \frac{\sum_{j=1}^k f_{\text{link}}(j)}{k_i} \right) / n$$

$$Recall_{a2f} = \left(\sum_{i=1}^n (f_{\text{anchor}}(i)) \times \frac{\sum_{j=1}^k f_{\text{link}}(j)}{k_i} \right) / N$$

$$LMAP = (\sum_{t=1}^n \frac{\sum_{k=1}^m p_{kt}}{m}) / n$$

where n is the number of topics (source articles used in evaluation); m is the number of identified items (articles for F2F or anchors in A2F); and P_{kt} is the precision of the top K items for topic t .

$$R - Prec = \sum_{t=1}^n P_t @ R / n$$

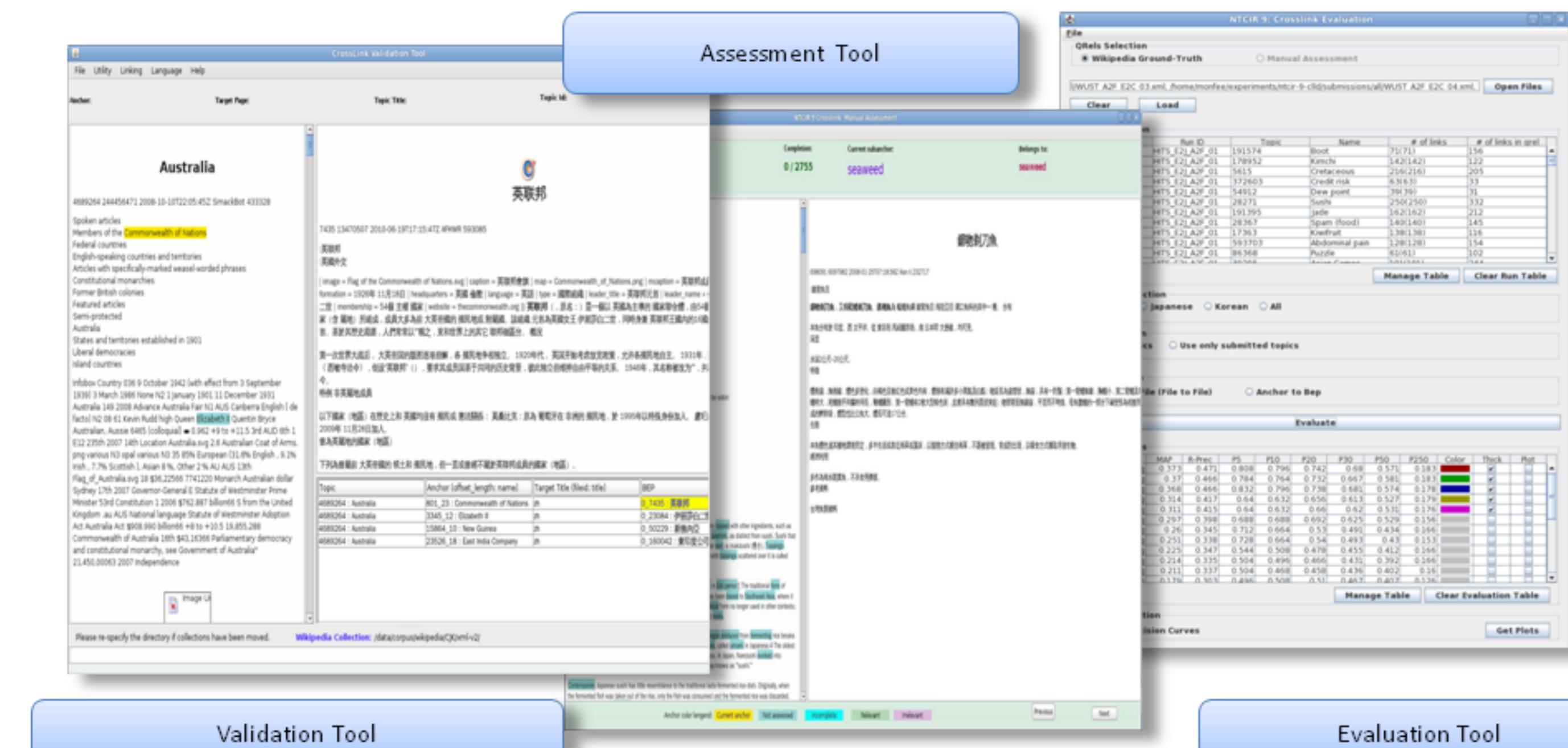
where n is the number of topics; and $P_t @ R$ is the precision at R where R is the number of unique items in the $qrels$ of topic t .

Precision-at-N is computed using the average precision for all topics (source articles) at a pre-defined position N in the results list. Values of N were chosen as: 5, 10, 20, 30, 50, and 250.

Precision and Recall

Where n is the number of identified anchors; N is the number of anchors in $qrels$; k is the number of returned targets for anchor i ; and k_i is the number of targets recommended for this anchor.

System Evaluation Metrics



Evaluation Framework

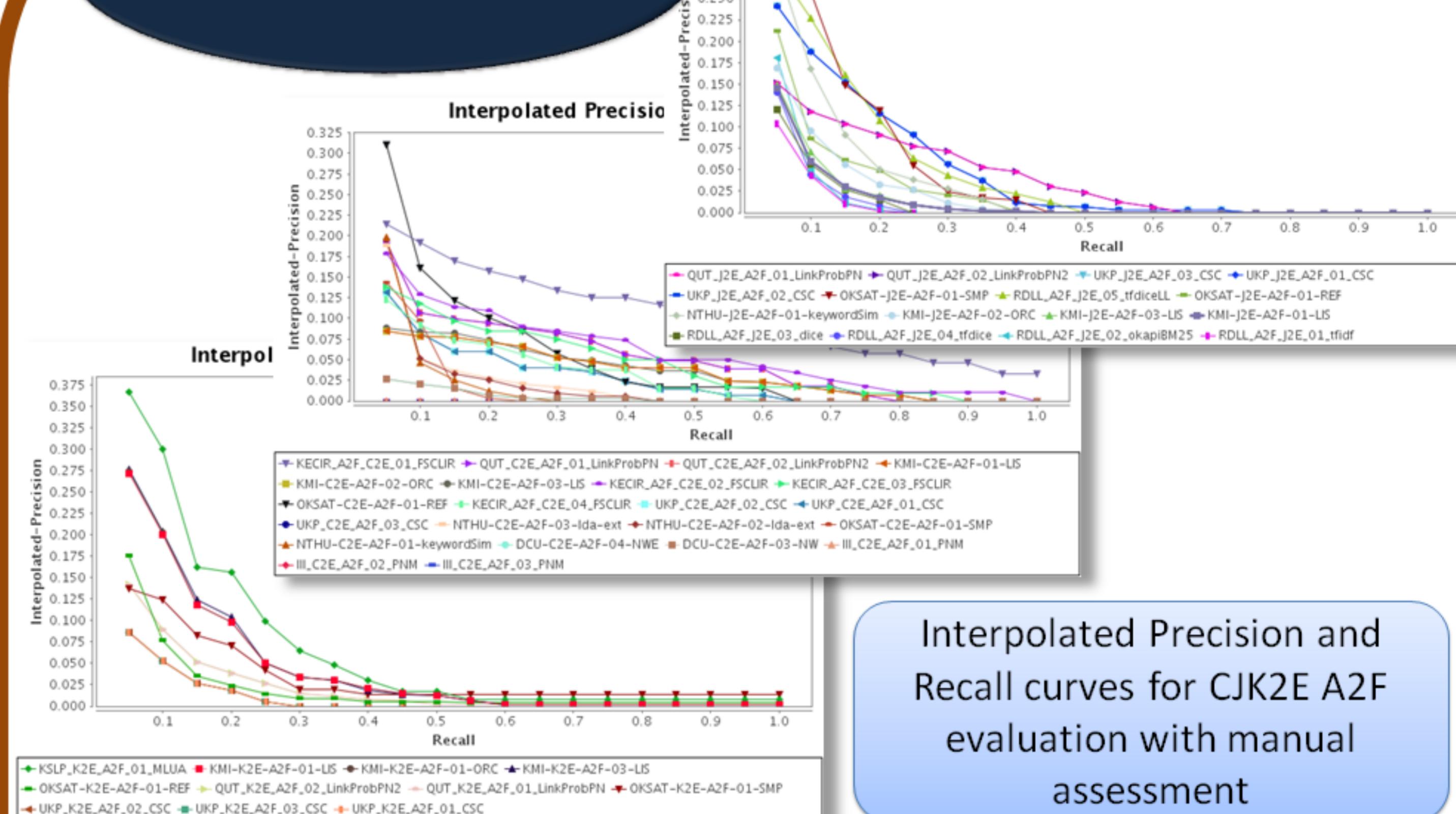
Conclusions

Problems Solved?

- Many good approaches were seen in the CJK to English cross-lingual link discovery tasks.
- The evaluation methods distinguish the effective and less effective CLLD algorithms.
- There is still work to be done; the PR curves are still well below 0.25

- Segmentation seems to help - team KECIR and team KSLP achieved good A2F evaluation scores with manual assessment in the C2E and K2E tasks separately.
- The top performing teams include KMI, OSTAT who employed a unified cross-lingual linking method achieved very good results in different language subtasks even with different link directions.

Results



Interpolated Precision and Recall curves for CJK2E A2F evaluation with manual assessment

Evaluation Results – E2CJK

| F2F GT | F2F MA | A2F MA |
|------------------------------|------------------------------|------------------------------|
| English-to-Chinese | English-to-Chinese | English-to-Chinese |
| LMAP: KMI, OKSAT, QUT | LMAP: KMI, QUT, OKSAT | LMAP: QUT, KMI, OKSAT |
| P@5: KMI, OKSAT, QUT | P@5: KMI, QUT, OKSAT | P@5: KMI, QUT, OKSAT |
| English-to-Japanese | English-to-Japanese | English-to-Japanese |
| LMAP: OKSAT, KMI, QUT | LMAP: KMI, OKSAT, QUT | LMAP: KMI, OKSAT, QUT |
| P@5: KMI, OKSAT, QUT | P@5: KMI, OKSAT, QUT | P@5: KMI, OKSAT, QUT |
| English-to-Korean | English-to-Korean | English-to-Korean |
| LMAP: OKSAT, KMI, QUT | LMAP: KMI, OKSAT, QUT | LMAP: KMI, OKSAT, QUT |
| P@5: OKSAT, KMI, QUT | P@5: KMI, OKSAT, QUT | P@5: KMI, OKSAT, QUT |

Evaluation Results – CJK2E

| F2F GT | F2F MA | A2F MA |
|-------------------------------|-------------------------------|-------------------------------|
| English-to-Chinese | English-to-Chinese | English-to-Chinese |
| LMAP: OKSAT, KMI, UKP | LMAP: QUT, KMI, OKSAT | LMAP: KECIR, QUT, KMI |
| P@5: OKSAT, UKP, KMI | P@5: OKSAT, NTHU, QUT | P@5: OKSAT, NTHU, QUT |
| English-to-Japanese | English-to-Japanese | English-to-Japanese |
| LMAP: OKSAT, UKP, KMI | LMAP: OKSAT, UKP, KMI | LMAP: QUT, UKP, OKSAT |
| P@5: OKSAT, KMI, UKP | P@5: OKSAT, KMI, UKP | P@5: OKSAT, RDLL, UKP |
| English-to-Korean | English-to-Korean | English-to-Korean |
| LMAP: OKSAT, KSLP, KMI | LMAP: KSLP, OKSAT, KMI | LMAP: KSLP, KMI, OKSAT |
| P@5: OKSAT, KSLP, KMI | P@5: KSLP, OKSAT, KMI | P@5: KSLP, KMI, OKSAT |



CLLD Personalisation

What's Next?