Using Time Periods Comparison for Eliminating Chronological Discrepancies between Question and Answer Candidates at QALab NTCIR11 Task

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NNLP

Basic idea
To solve the Center Exams for world history in Japanese, our system firstly extracts time related phrases from questions and their answer candidates. Then the terms are compared from various viewpoints to the compared one. The candidate whose terms are the most consistent with each other is selected as most probable answer. There are a numerous viewpoints to find correctness of answer candidate, e.g. date, place, country, religion, etc. The NNLP team considered that dates of the terms are most important clue to solve an exam for history.

Method
Our system focuses on dates within the terms from world history. The system checks up temporal overlaps between periods of terms in questions and their answer candidates. Incorrect candidates are likely to contain terms that do not overlap with other terms. The dates related to most of the terms usually span over a period of several years, although some terms are events within a year. Therefore, we needed to specify the Time Period Beginning point (TPB) and the Time Period Ending point (TPE) of all applicable terms.

Creation of annotated dictionary
We considered Dictionary of World History as a sufficient database since almost each term contains such information as "time period", "area" or "religion". However, the Dictionary of World History was not applicable as a database in a straightforward manner, since the date expressions are usually not plain numerical values, but time-related expressions, such as "9th century" and "10th century BC", etc. Therefore the NNLP team created a database which contains both TPB and TPE using the Dictionary of World History.

Example
"After Tang dynasty and Song dynasty, brilliant people which had cultural and artistic talents had passed the imperial examination."

The underlined sentence of the question

Candidates
① Ouyang Xiu and Su Shi are famous literary men in Tang dynasty.
② Yan Zhengqing is a representative calligrapher in Song dynasty.
③ Wang Anshi performed the reform called the new law in Song dynasty.
④ Qin Hui was opposed to the main party in relation to Yuan dynasty.

Results

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<th>Phase</th>
<th>Exam ID</th>
<th>Question</th>
<th>Correct</th>
<th>Total Score</th>
<th>Correct answer rate</th>
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Conclusion
We created and applied a date identification method, which checks for temporal overlaps between time periods in questions and their answer candidates. In this paper, we introduced details of this method and analyzed the test results. When tested on the World History Dictionary that is used for preparing to the exams, our approach achieved 30% of correct answers in the 2007 Center Exam Task and 17% for the 2003 Center Exam Task.