IMTKU Question Answering System for World History Exams at NTCIR-12 QA Lab2

Min-Yuh Day*,[1], Cheng-Chia Tsai[1], Wei-Chun Chuang[1], Jin-Kun Lin[1],Hsiu-Yuan Chang[1], Tzu-Jui Sun[1], Yuan-Jie Tsai[1], Yi-Heng Chiang[1],Cheng-Zhi Han[1], Wei-Ming Chen[1], Yun-Da Tsai[1], Yi-Jing Lin[1], Yue-Da Lin[1], Yu-Ming Guo[1], Ching-Yuan Chien[1], Cheng-Hung Lee[2]

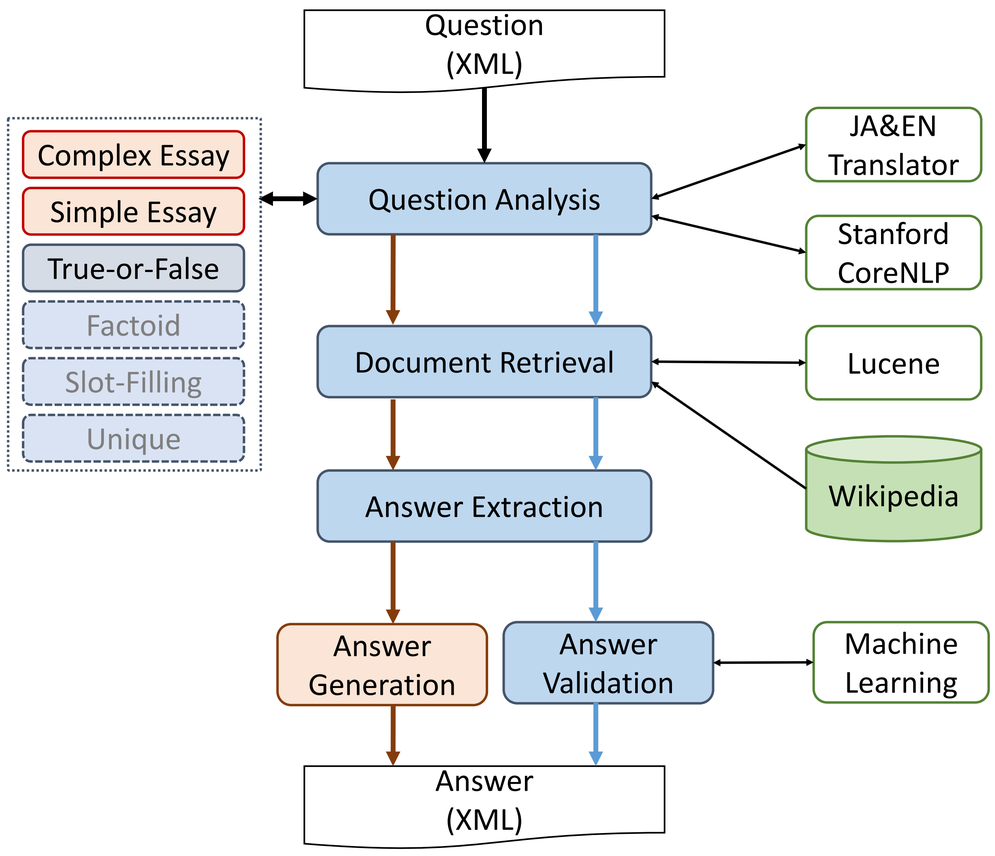
*** myday@mail.tku.edu.tw**

[1] Department of Information Management, Tamkang University, New Taipei City, Taiwan

[2] Sagacity Technology Co., Ltd.

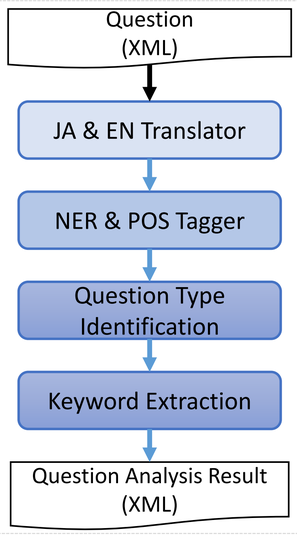
In this paper, we describe the IMTKU (Information Management at Tamkang University) question answering system for Japanese university entrance exams at NTCIR-12 QA-Lab2. We proposed a question answering system using a hybrid approach that integrate natural language processing and machine learning techniques for Japanese university entrance exams at NTCIR-12 QA-Lab2. In phase-1, we submitted 6 End-to End QA run results for English subtask for National Center Test for University Admissions and Secondary exams subtask. In phase-3, we submitted 7 End-to End QA run results for English and Japanese subtask for Nation Center Exams and Secondary exams subtask. In NTCIR-12 QA-Lab2 phase-1, the IMTKU team total score achieved 31, 27 and 0 in the English subtask. In NTCIR-12 QA-Lab2 phase-3, the IMTKU team total score achieved 20, 20 and 14 in the English subtask, 24, 12 and 8 in the Japanese subtask and 31 in a combination run with KitAi.

System Architecture



IMTKU QA System Components

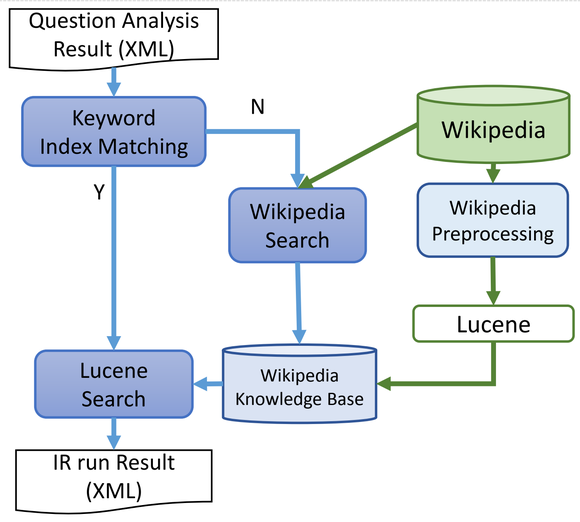
• Question Analysis



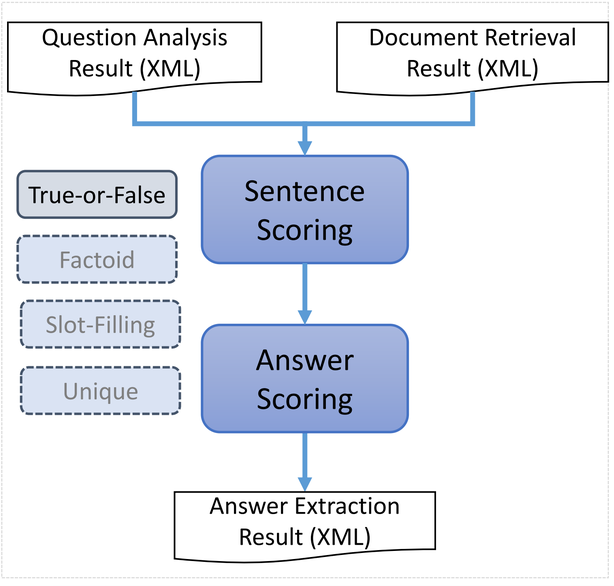
Japanese:
欧陽脩や蘇軾は，唐代を代表する文筆家である。
English (provided by organizer):
Ouyang Xiu and Su Shi are writers representative of the Tang period.
English (JA & EN Translator by Google Translate):
Ouyang Xiu and Su Shi is a writer representative of the Tang Dynasty.

Wang Anshi, who lived during the Song period, carried out reforms called the New Policies (xin fa).
Wang/PERSON/NNP Anshi/PERSON/NNP ,/O/, who/O/WP lived/O/VBD during/O/IN the/O/DT Song/O/NN period/O/NN ,/O/, carried/O/VBD out/O/RP reforms/O/NNS called/O/VBD the/O/DT New/O/JJ Policies/O/NNS -LRB-/O/-LRB-xin/O/FW fa/O/FW -RRB-/O/-RRB- ./O/.

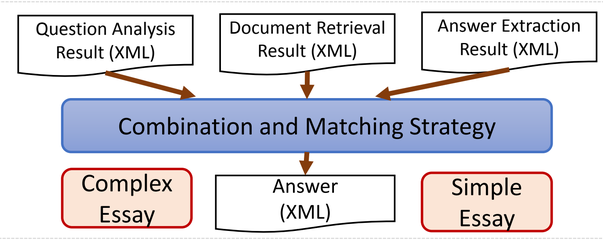
• Document Retrieval



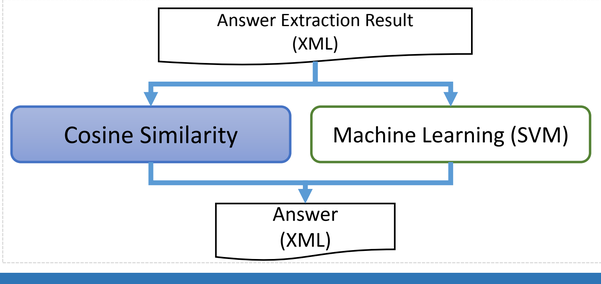
• Answer Extraction



• Answer Generation



• Answer Validation



Performance

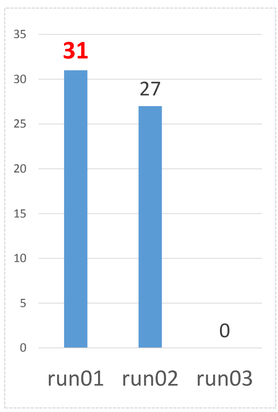
IMTKU National Center Test Official runs	Correct	Incorrect	Unanswered	Score
Center-1999-WorldHistoryB_IMTKU_EN_FA_01	**12**	19	10	**31**
Center-1999-WorldHistoryB_IMTKU_EN_FA_02	10	21	10	27
Center-1999-WorldHistoryB_IMTKU_EN_FA_03	0	0	41	0

IMTKU Second-stage Examination Official runs	Correct	Incorrect	Unanswered	Withholding	Score
D792W10_IMTKU_EN_FA_01	0	8	22	1	0
D792W10_IMTKU_EN_FA_02	0	8	22	1	0
D792W10_IMTKU_EN_FA_03	0	0	22	1	0

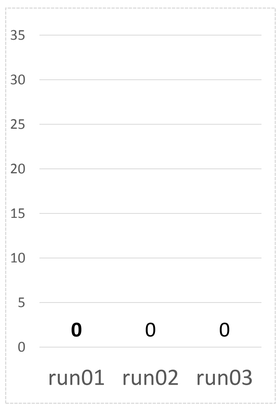
IMTKU National Center Test English Official runs	Correct	Incorrect	Unanswered	Score
Center-2011-WorldHistoryB_IMTKU_EN_FA_01	**7**	29	0	**20**
Center-2011-WorldHistoryB_IMTKU_EN_FA_02	**7**	29	0	**20**
Center-2011-WorldHistoryB_IMTKU_EN_FA_03	5	31	0	14

IMTKU National Center Test Japanese Official runs	Correct	Incorrect	Unanswered	Score
Center-2011-WorldHistoryB_IMTKU_JA_FA_01	4	32	0	12
Center-2011-WorldHistoryB_IMTKU_JA_FA_02	3	33	0	8
Center-2011-WorldHistoryB_IMTKU_JA_FA_03	**8**	28	0	**24**

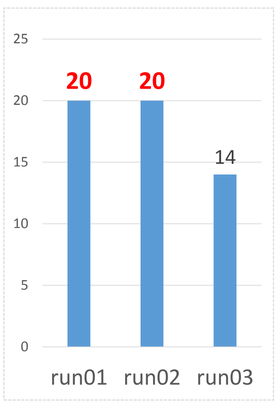
Phase-1 National Center Test Score



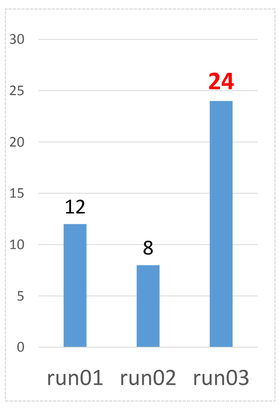
Phase-1 Second-stage Examination Score



Phase-3 National Center Test Score (EN)



Phase-3 National Center Test Score (JP)



Discussion

- Systematic Error of XML output (IMTKU FA run03 on Phase-1)
- Limitations of the IMTKU System

o(symbol-symbol-symbol):
(1) a→b→c (2) a→c→b(3)b→a→c(4)b→c→a
symbol-symbol:
(1)(A)—a (2)(A)—b (3)(B)—a (4)(B)—b
(symbol-TF)*2
(1)a- Correctb- Correct (2)a- Correctb- Incorrect
(3)a- Incorrectb- Correct (4)a- Incorrectb- Incorrect

(symbol-term_other)*2:
(1)(A)- Huguang(B)- Gongsuo (guild)
(2)(A)- Huguang(B)- Zujie (concession)
(3)(A)- Suhu (Jiangzhe)(B)- Gongsuo (guild)
(4)(A)- Suhu (Jiangzhe)(B)- Zujie (concession)

Combination Run	Correct	Incorrect	Score
Center-2011-Main-WorldHistoryB_KitAi_IMTKU_EN_FA_01	**12**	**24**	**34**

DEMO: http://rite.im.tku.edu.tw/qalab2

Acknowledgements:
This research was supported in part of TKU research grant.
We would like to thank the support of IASL, IIS, Academia Sinica, Taiwan.