



Tamkang
University
淡江大學

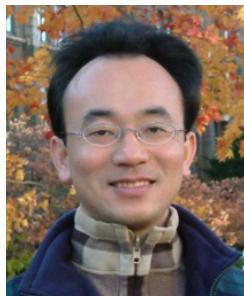
NTCIR Evaluation of Question Answering and Conversation Technologies

Time: 2018/5/1 (Mon) (10:30-12:10)

Place: 國立臺灣師範大學圖書資訊學研究所 正大樓5F

Host: Prof. I-Chin Wu (吳怡瑾 教授)

Graduate Institute of Library and Information Studies, National Taiwan Normal University (NTNU)



Min-Yuh Day

戴敏育

Assistant Professor

專任助理教授

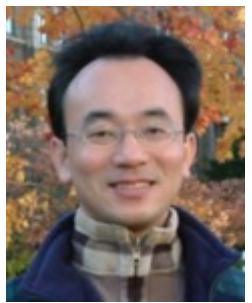
Dept. of Information Management, Tamkang University

淡江大學 資訊管理學系

<http://mail.tku.edu.tw/myday/>

2018-05-01





戴敏育 博士 (Min-Yuh Day, Ph.D.)

淡江大學資管系專任助理教授

中央研究院資訊科學研究所訪問學人

國立台灣大學資訊管理博士

Publications Co-Chairs, IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2013-)

Program Co-Chair, IEEE International Workshop on Empirical Methods for Recognizing Inference in TExt (IEEE EM-RITE 2012-)

Workshop Chair, The IEEE International Conference on Information Reuse and Integration (IEEE IRI)



Outline

- NTCIR Evaluation
- Question Answering (QA)
- Short Text Conversation (STC)



Overview of NTCIR Evaluation Activities



NTCIR

**NII Testbeds and Community
for
Information access Research**

NII:

National Institute of Informatics



NTCIR

- Project started in late 1997
 - 18 months cycle
- NTCIR-13 (2016-2017)
- NTCIR-14 (2018-2019)



→ Japanese



About NTCIR



FAQ

Search



Publications/
Online Proceedings

Data/Tools

NTCIR CMS Site

Related URL's

Contact us

Home > NTCIR-14

NTCIR 14

NTCIR-14 Conference

NEWS

NTCIR-14 Aims

Call for Task Proposals

How to Participate

Task Participation

Task Overview/Call for Task Participation

User Agreement Forms

Organization

Important Dates

Contact Us

NTCIR 13

NTCIR-14

The 14th NTCIR (2018 - 2019)

Evaluation of Information Access Technologies

January 2018 - June 2019

What's New

new April 2, 2018: [Call for NTCIR-14 Additional Pilot Task Proposal released](#) (due: May 20, 2018).

new April 2, 2018: [NTCIR-14 Task Overveiw released](#).

February 1, 2018: [Call for participation to the NTCIR-14 Kick-Off Event released](#).

February 1, 2018: Call for participation to the NTCIR-14 QALab-PoliInfo Kick-Off Event released.

December 5, 2017: The NTCIR-14 Task Selection Committee has selected the following six Tasks.

Lifelip-3, OpenLiveQ-2, QA Lab-4, STC-3, WWW-2, CENTRE.

August 23, 2017: [NTCIR-14 Call for Task Proposals released](#). (Closed.)

new Tasks

NTCIR

Collaborative activity for enhancing Information Access technologies

- For the 20 years, NTCIR has been formulating the **infrastructure for the evaluation**, and contributing to development of the **Information Access** technologies.
- Major forum for researchers to intensively discuss the **evaluation methodology** of emerging information access technologies.

Number of participants (from NTCIR-1 to NTCIR-13) (1999-2017)

| Year | 1999 | 2001 | 2002 | 2004 | 2005 | 2007 | 2008 | 2010 | 2011 | 2013 | 2014 | 2016 | 2017 |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Task/NTCIR round | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Total number | 37 | 39 | 61 | 74 | 79 | 81 | 80 | 66 | 102 | 108 | 93 | 97 | 71 |
| Automatic Term Recognition and Role Analysis (TMREC) (1) | 9 | | | | | | | | | | | | |
| Ad hoc/Crosslingual IR (1) → Chinese/English/Japanese IR (2) → CLIR (3-6) | 28 | 30 | 20 | 26 | 25 | 22 | | | | | | | |
| Text Summarization Challenge (TSC) (2-4) | | 9 | 8 | 9 | | | | | | | | | |
| Web Retrieval (WEB) (3-5) | | | 7 | 11 | 7 | | | | | | | | |
| Question Answering Challenge (QAC) (3-6) | | | 16 | 18 | 7 | 8 | | | | | | | |
| Patent Retrieval [and Classification] (PATENT) (3-6) | | | 10 | 10 | 13 | 12 | | | | | | | |
| Multimodal Summarization for Trend Information (MUST) (5-7) | | | | | 13 | 15 | 13 | | | | | | |
| Crosslingual Question Answering (CLQA) (5, 6) → Advanced Crosslingual Information Access (ACLIA) (7, 8) | | | | | 14 | 12 | 19 | 14 | | | | | |
| Opinion (6) → Multilingual Opinion Analysis (MOAT) (7, 8) | | | | | | 12 | 21 | 16 | | | | | |
| Patent Mining (PAT-MN) (7, 8) | | | | | | | 12 | 11 | | | | | |
| Community Question Answering (CQA) (8) | | | | | | | | 4 | | | | | |
| Geotemporal IR (GeoTime) (8, 9) | | | | | | | | 13 | 12 | | | | |
| Interactive Visual Exploration (Vis-Ex) (9) | | | | | | | | | 4 | | | | |
| Patent Translation (PAT-MT)(7, 8) → Patent Machine Translation (PatentMT)(9, 10) | | | | | | | 15 | 8 | 21 | 21 | | | |
| Crosslingual Link Discovery (Crosslink) (9, 10) | | | | | | | | | 11 | 10 | | | |
| INTENT(9, 10) → Search Intent and Task Mining (IMine) (11, 12) | | | | | | | | | 16 | 11 | 12 | 9 | |
| One Click Access (1CLICK)(9, 10) → Mobile Information Access (MobileClick) (11, 12) | | | | | | | | | 4 | 8 | 4 | 11 | |
| Recognizing Inference in Text (RITE)(9,10) → Recognizing Inference in Text and Validation (RITE-VAL)(11) | | | | | | | | | 24 | 28 | 23 | | |
| IR for Spoken Documents (SpokenDoc) (9, 10) → Spoken Query and Spoken Document Retrieval (SpokenQuery&Doc) (11, 12) | | | | | | | | | 10 | 12 | 11 | 7 | |
| Mathematical Information Access (Math) (10, 11) → MathIR (12) | | | | | | | | | | 6 | 8 | 6 | |
| Medical Natural Language Processing (MedNLP) (10, 11) → MedNLPDoc (12) → MedWeb (13) | | | | | | | | | | 12 | 12 | 8 | 9 |
| QA Lab for Entrance Exam (QALab) (11, 12, 13) | | | | | | | | | | 11 | 12 | 11 | |
| Temporal Information Access (Temporalia) (11, 12) | | | | | | | | | | 8 | 14 | | |
| Cooking Recipe Search (RecipeSearch) (11) | | | | | | | | | | | 4 | | |
| Personal Lifelog Organisation & Retrieval (Lifelog) (12, 13) | | | | | | | | | | | 8 | 4 | |
| Short Text Conversation (STC) (12, 13) | | | | | | | | | | | 22 | 27 | |
| Open Live Test for Question Retrieval (OpenLiveQ) (13) | | | | | | | | | | | | 7 | |
| Actionable Knowledge Graph (AKG) (13) | | | | | | | | | | | | 3 | |
| Emotion Cause Analysis (ECA) (13) | | | | | | | | | | | | 3 | |
| Neurally Augmented Image Labelling Strategies (NAILS) (13) | | | | | | | | | | | | 2 | |
| We Want Web (WWW) (13) | | | | | | | | | | | | 5 | |

Number of participants (from NTCIR-1 to NTCIR-13) (1999-2017)

| Year | 1999 | 2001 | 2002 | 2004 | 2005 | 2007 | 2008 | 2010 | 2011 | 2013 | 2014 | 2016 | 2017 |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|
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| Web Retrieval (WEB) (3-5) | | | 7 | 11 | 7 | | | | | | | | |
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| IR for Spoken Documents (SpokenDoc) (9, 10) → Spoken Query and Spoken Document Retrieval (SpokenQuery&Doc) (11, 12) | | | | | | | | 10 | 12 | 11 | 7 | | |
| Mathematical Information Access (Math) (10, 11) → MatIR (12) | | | | | | | | | 6 | 8 | 6 | | |
| Medical Information Access (MedIR) (10, 11) → MedIR (12) | | | | | | | | | 12 | 12 | 12 | | |
| → WeWantWeb (13) | | | | | | | | | | | | | |

QA Lab for Entrance Exam (QALab) (11, 12, 13) (11 12 11)

| | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|----|----|----|--|--|--|
| QA Lab for Entrance Exam (QALab) (11, 12, 13) | | | | | | | | 11 | 12 | 11 | | | |
| Temporal Information Access (Temporalia) (11, 12) | | | | | | | | | 8 | 14 | | | |
| Cooking Recipe Search (RecipeSearch) (11) | | | | | | | | | 4 | | | | |
| Personal Lifelog Organisation & Retrieval (Lifelog) (12, 13) | | | | | | | | | 8 | 4 | | | |
| Short Text Conversation (STC) (12, 13) | | | | | | | | | 22 | 27 | | | |

Short Text Conversation (STC) (12, 13) (22 27)

| | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|---|--|--|
| Open Live Test for Question Retrieval (OpenLiveQ) (13) | | | | | | | | | | | | | |
| The Knowledge Access (AKA) (13) | | | | | | | | | | | | | |
| Emotion Cause Analysis (ECA) (13) | | | | | | | | | | | | | |
| Neurally Augmented Image Labelling Strategies (NAILS) (13) | | | | | | | | | | | 2 | | |
| We Want Web (WWW) (13) | | | | | | | | | | | 5 | | |

Overview of NTCIR-13 tasks

By understanding **texts**

Answering complex questions

QALab

Replies to tweets

STC

By understanding **intents**

Search for questions

OpenLiveQ

Search for web pages

WWW

Responding to Complex Questions

Mining lifelog data
for search

Lifelog

From **sensor** data

Relevance from brain signals

NAILS

Questions



Answer

Users

Data



Stored

Mining user actions
for search

AKG

From **text** data

Patients from microblogs/blogs

MedWeb

Emotions and causes from news

ECA

Mining Human Generated Data

NTCIR-13 Groups

| Country/Region | #Groups |
|----------------|---------|
| Japan | 27 |
| China | 22 |
| Taiwan | 6 |
| USA | 5 |
| Australia | 2 |
| Portugal | 1 |
| Hong Kong | 1 |
| Singapore | 1 |
| Total | 65 |

NTCIR (1997 -)

Information Access (IA)

- Information Retrieval (IR)
- Text Summarization
- Information Extraction (IE)
- Question Answering (QA)
- Short Text Conversation (STC)

NTCIR-14 (2018-2019)

Topics on IA Technology

- Answering complex questions and queries through deep understanding of text and user intents
- Mining knowledge from a large amount of human generated data
- Application of knowledge extracted from big data to intelligent IA technologies

The 14th NTCIR (2018 - 2019)

Evaluation of Information Access Technologies

January 2018 - June 2019

- CORE TASKS
 - LifeLog-3
 - OpenLiveQ-2
 - **QALab-PoliInfo**
 - **STC-3**
 - WWW-2
- PILOT TASKS
 - CENTRE

Question Answering (QA)

History of QA at NTCIR

| NTCIR | Years | TSC Summarization) | QAC | CLQA | ACLIA | RITE | QA Lab | CLEF QA |
|-------|----------------|-------------------------------|--------------------------|---------|---------|------------|--------|--|
| | | | | | Module | Entailment | | |
| 2 | 2000-2001 feb | Single doc | | | | | | |
| 3 | 2001-2002 oct | Multi-doc | Factoid, List, Series | | | | | |
| 4 | 2003-2004 june | Multi-doc | Factoid, Dialog(IAD) | | | | | |
| 5 | 2004-2005 dec | | Factoid, Dialog(IAD) | Factoid | | | | |
| 6 | 2006-2007 june | TREND Info | Complex | Factoid | | | | |
| 7 | 2007-2008 dec | TREND Info | | | Complex | | | |
| 8 | 2009-2010 june | | | | Complex | | | |
| 9 | 2010-2011 dec | Todai Robot Apri 2011-2016 | | | | RITE | | |
| 10 | 2012-2013 june | | | | | RITE | | Exam - Reading Comprehensi on |
| 11 | 2013-2014 dec | | | | | RITEVAL | Exam | |
| 12 | 2015-2016 june | | | | | | Exam | |
| 13 | 2016-2017dec | | | | | | Exam | |

Can a robot pass a university entrance exam?

Noriko Arai at TED2017

TED Ideas worth spreading

WATCH

DISCOVER

ATT



Share



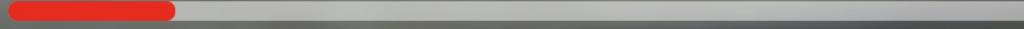
Add to list



Rate

Noriko Arai at TED2017

Can a robot pass a university entrance exam?



11:25



https://www.ted.com/talks/noriko_arai_can_a_robot_pass_a_university_entrance_exam

<https://www.youtube.com/watch?v=XQZjkPyJ8KU>

2017



IMTKU Question Answering System for World History Exams at NTCIR-13 QALab-3

Department of Information Management
Tamkang University, Taiwan



Min-Yuh Day



Chao-Yu Chen



Wanchu Huang



Shi-Ya Zheng



I-Hsuan Huang



Tz-Rung Chen



Min-Chun Kuo



Yue-Da Lin



Yi-Jing Lin

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NTCIR-13 Conference, December 5-8, 2017, Tokyo, Japan

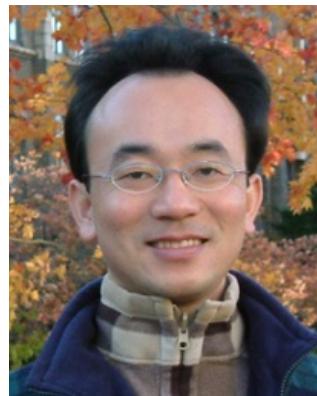


IMTKU Question Answering System for World History Exams at NTCIR-13 QALab-3

2011

IMTKU Textual Entailment System for Recognizing Inference in Text at NTCIR-9 RITE

**Department of Information Management
Tamkang University, Taiwan**



Min-Yuh Day

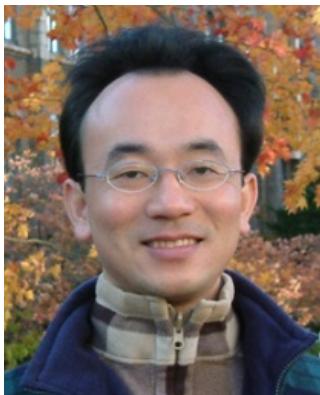
myday@mail.tku.edu.tw



Chun Tu

IMTKU Textual Entailment System for Recognizing Inference in Text at NTCIR-10 RITE-2

**Department of Information Management
Tamkang University, Taiwan**



Min-Yuh Day



Chun Tu



Hou-Cheng Vong

myday@mail.tku.edu.tw



Shih-Wei Wu



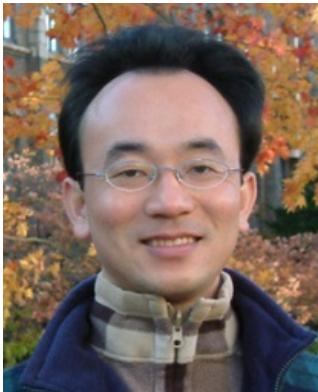
Shih-Jhen Huang

IMTKU Textual Entailment System for Recognizing Inference in Text at NTCIR-11 RITE-VAL

Tamkang University

淡江大學

2014



Min-Yuh Day



Ya-Jung Wang



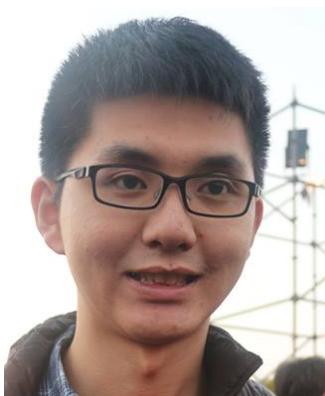
Che-Wei Hsu



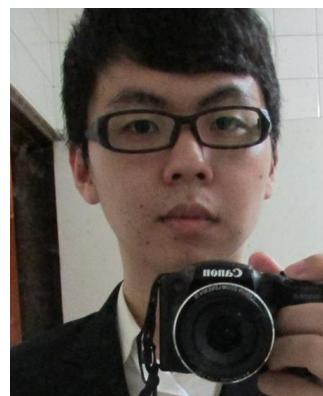
En-Chun Tu



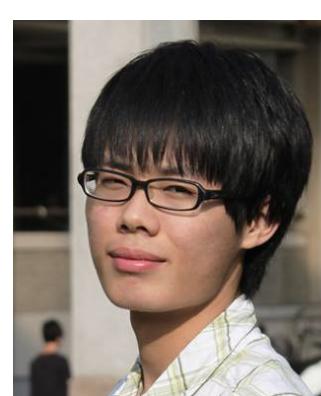
Huai-Wen Hsu



Yu-An Lin



Shang-Yu Wu



Yu-Hsuan Tai



Cheng-Chia Tsai



2016

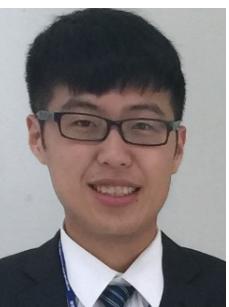
IMTKU Question Answering System for World History Exams at NTCIR-12 QA Lab2

Department of Information Management
Tamkang University, Taiwan

Sagacity Technology



Min-Yuh Day



Cheng-Chia Tsai



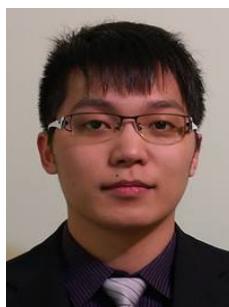
Wei-Chun Chung



Hsiu-Yuan Chang



Tzu-Jui Sun



Yuan-Jie Tsai



Jin-Kun Lin



Cheng-Hung Lee



Yu-Ming Guo



Yue-Da Lin



Wei-Ming Chen



Yun-Da Tsai



Cheng-Jhih Han



Yi-Jing Lin



Yi-Heng Chiang



Ching-Yuan Chien

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NTCIR-12 Conference, June 7-10, 2016, Tokyo, Japan

2017



IMTKU Question Answering System for World History Exams at NTCIR-13 QALab-3

Department of Information Management
Tamkang University, Taiwan



Min-Yuh Day



Chao-Yu Chen



Wanchu Huang



Shi-Ya Zheng



I-Hsuan Huang



Tz-Rung Chen



Min-Chun Kuo



Yue-Da Lin



Yi-Jing Lin

myday@mail.tku.edu.tw

NTCIR-13 Conference, December 5-8, 2017, Tokyo, Japan

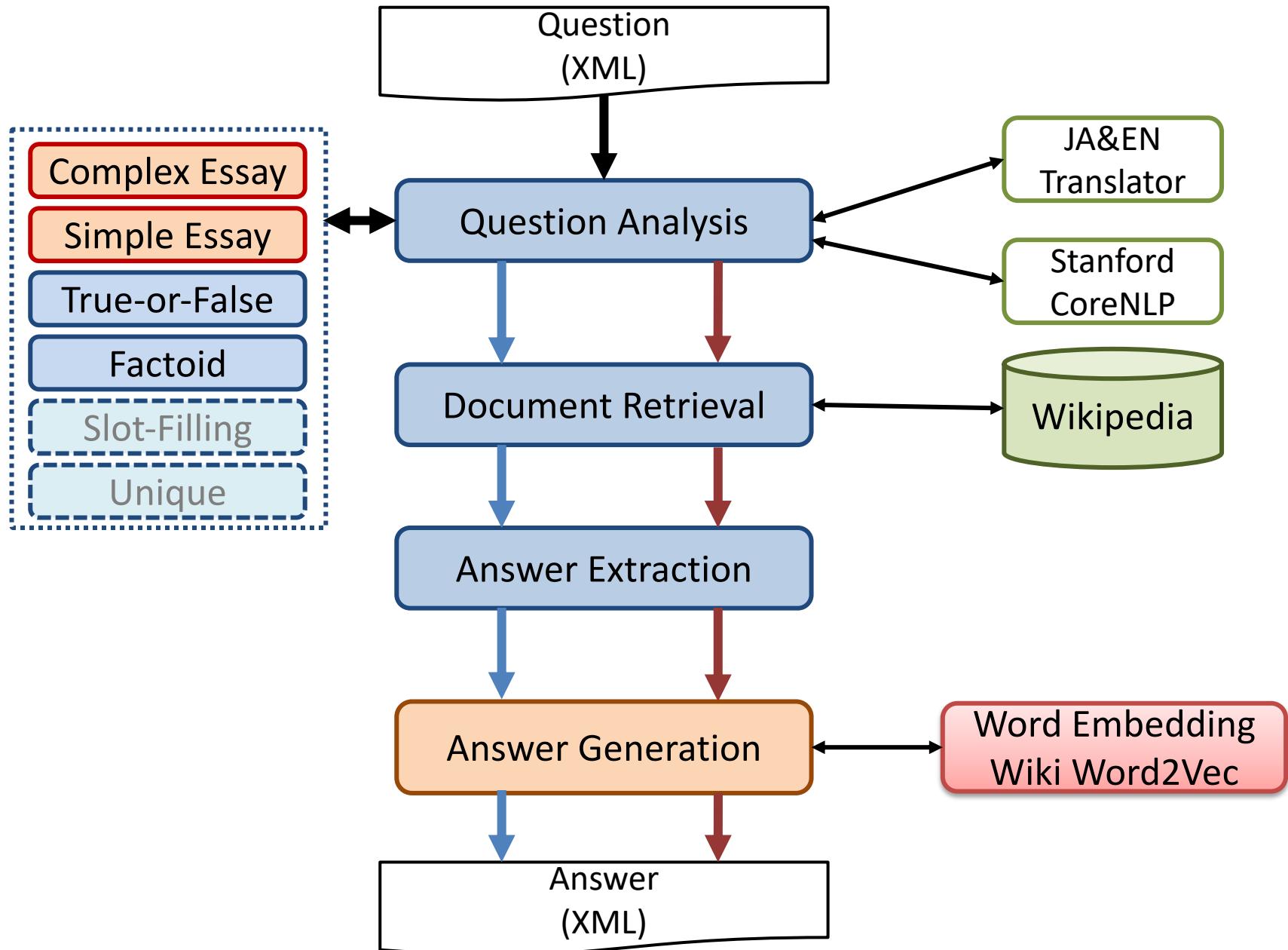
Outline

- IMTKU Question Answering System Architecture
- IMTKU System Description
- Performance
- Discussions and Conclusions

Highlights

- IMTKU (**I**nformation **M**anagement at **T**am**K**ang **U**niversity)
Question **A**nswering **S**ystem for **W**orld **H**istory **E**xams
in Japanese university entrance exams at
NTCIR-13 QALab-3.
- IMTKU Submitted runs for QALab-3 phase-2
 - 3 English End-to-End multiple-choice
 - 2 English and 2 Japanese End-to-End essay
 - 2 English and 2 Japanese extraction essay
 - 1 English and Japanese summarization essay
- MTKU achieved the **best passage precision** and
the **best nugget recall** in **English Extraction task.**

IMTKU System Architecture for NTCIR-13 QALab-3

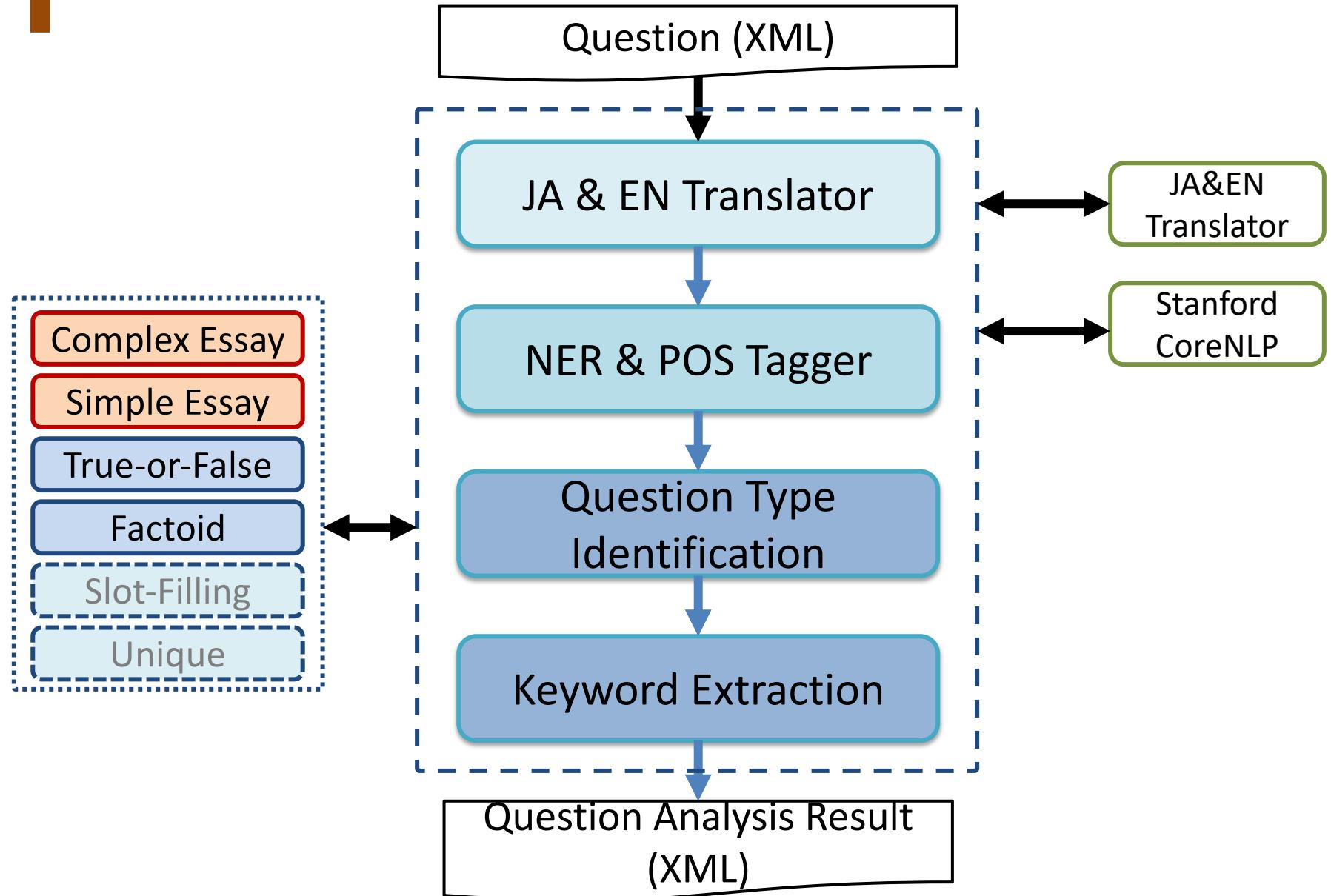




IMTKU

System Description

Question Analysis



JA & EN Translator

JA&EN
Translator

Japanese:

古代メソポタミアと古代エジプトにおける暦とその発達の背景について，3行以内で説明しなさい。

English (JA & EN Translator by Google Translate):

Explain the calendar in ancient Mesopotamia and ancient Egypt and the background of its development within 3 lines.



NER & POS tagger

Stanford
CoreNLP

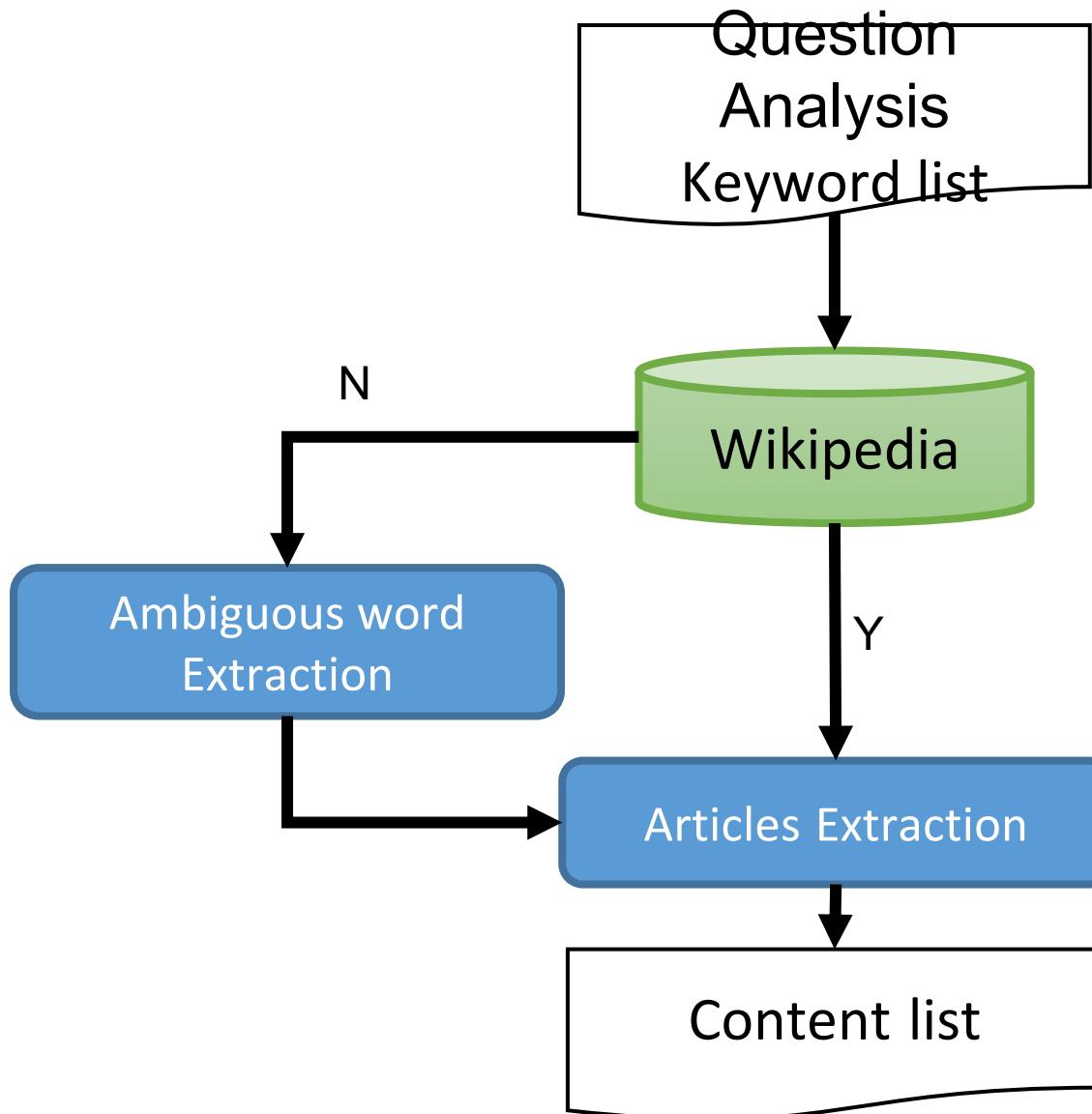
Raw Data:

Wang Anshi, who lived during the Song period, carried out reforms called the New Policies (xin fa).

POS tagger and NER:

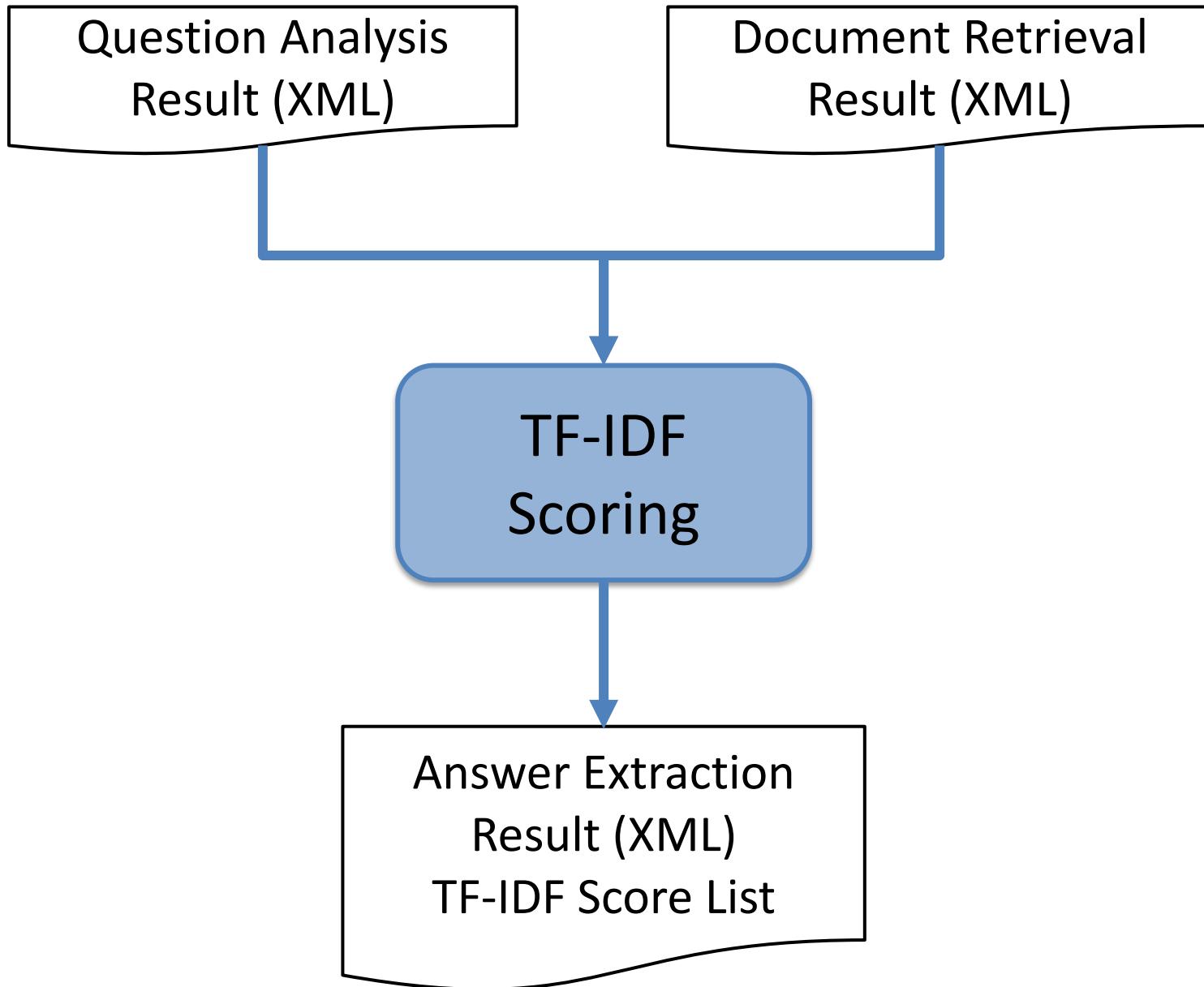
Wang/PERSON/NNP Anshi/PERSON/NNP ,/O/, who/O/WP lived/O/VBD during/O/IN the/O/DT Song/O/NN period/O/NN ,/O/, carried/O/VBD out/O/RP reforms/O/NNS called/O/VBD the/O/DT New/O/JJ Policies/O/NNS -LRB-/O/-LRB- xin/O/FW fa/O/FW -RRB-/O/-RRB- ./O/.

Document Retrieval

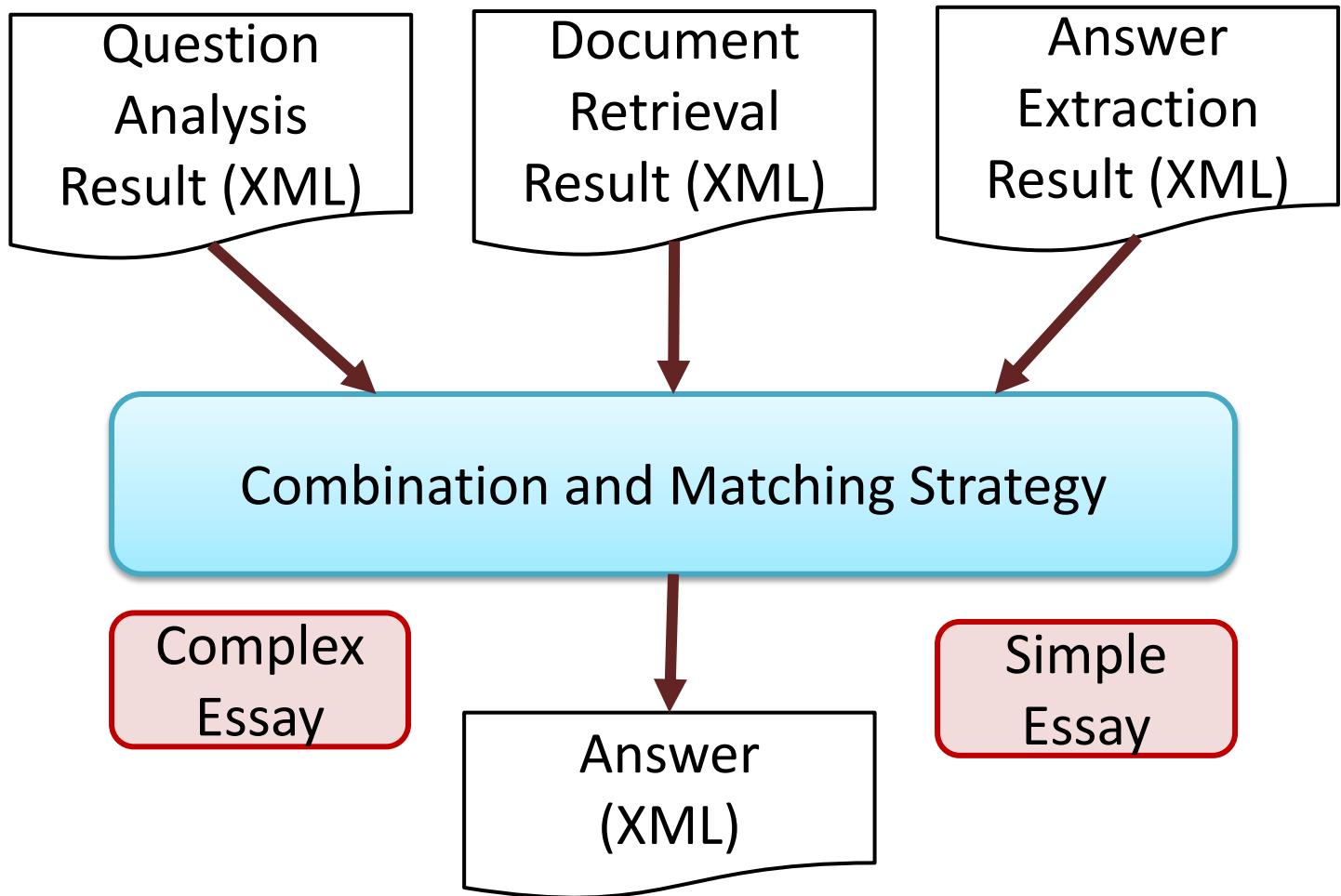


Answer Extraction

3

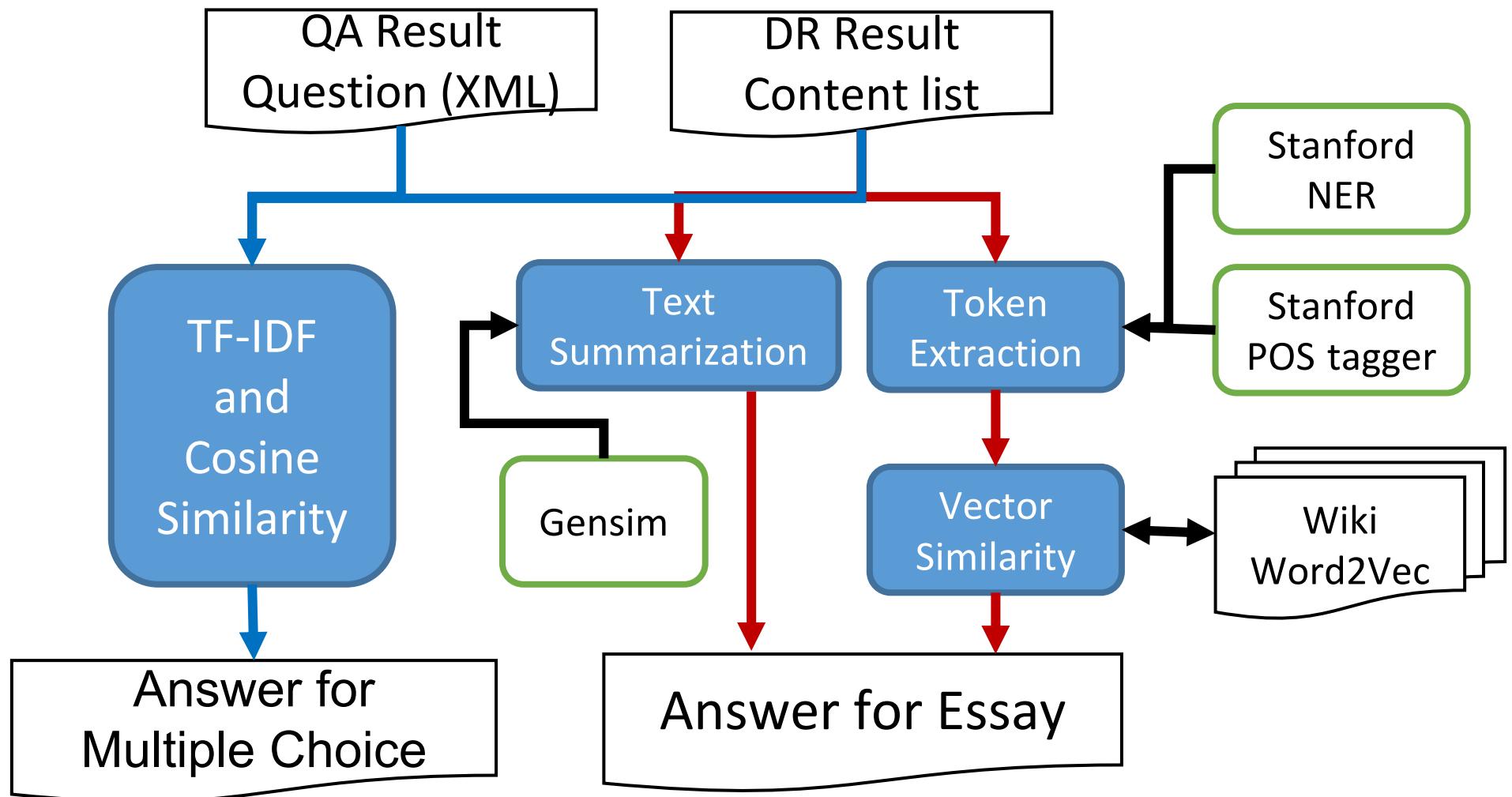


Answer Generation



4

Answer Generation



IMTKU Phase-2 Official Runs

| IMTKU Official Runs | End-to-End (e2e) | extraction | Summarization |
|------------------------|--|---|--|
| Essay | qalab3-en-phase2-answersheet-essay_QALabIMTKU_e2e_01 | qalab3-en-phase2-answersheet-essay_QALabIMTKU_extraction_01 | qalab3-en-phase2-answersheet-essay_QALabIMTKU_summarization_01 |
| | qalab3-en-phase2-answersheet-essay_QALabIMTKU_e2e_02 | qalab3-en-phase2-answersheet-essay_QALabIMTKU_extraction_02 | - |
| | qalab3-ja-phase2-answersheet-essay_QALabIMTKU_e2e_01 | qalab3-ja-phase2-answersheet-essay_QALabIMTKU_extraction_01 | qalab3-ja-phase2-answersheet-essay_QALabIMTKU_summarization_01 |
| | qalab3-ja-phase2-answersheet-essay_QALabIMTKU_e2e_02 | qalab3-ja-phase2-answersheet-essay_QALabIMTKU_extraction_02 | qalab3-ja-phase2-answersheet-essay_QALabIMTKU_summarization_02 |

| IMTKU Official Runs | Multiple Choice | | |
|-------------------------|--|--|--|
| National Center Test | Center-2014--Main-SekaishiB_QALabIMTKU_EN_01 | Center-2014--Main-SekaishiB_QALabIMTKU_EN_02 | Center-2014--Main-SekaishiB_QALabIMTKU_EN_03 |

IMTKU at NTCIR-13 QA-Lab3

Phase-3 Performance

| Run | Lang. | Correct rate | Total | Total score | Average score |
|-------------|-------|--------------|-------|-------------|---------------|
| IMTKU RUN01 | EN | 0.333 | 12/36 | 34 | 0.34 |
| IMTKU RUN02 | EN | 0.389 | 14/36 | 40 | 0.40 |
| IMTKU RUN03 | EN | 0.194 | 7/36 | 18 | 0.18 |

Results of IMTKU **multiple-choice** questions in Phase-2

IMTKU at NTCIR-13 QA-Lab3

Phase-3 Performance

| SYSTEM | IMTKU1QALab3 | | | | | | IMTKU2QALab3 | | | | | |
|--------|--------------|-------|-------|---------|-------|-------|--------------|-------|-------|---------|-------|-------|
| TYPE | SIMPLE | | | COMPLEX | | | SIMPLE | | | COMPLEX | | |
| METHOD | CASE | STEM | STOP | CASE | STEM | STOP | CASE | STEM | STOP | CASE | STEM | STOP |
| R-1 | 0.075 | 0.077 | 0.026 | 0.312 | 0.329 | 0.131 | 0.006 | 0.009 | 0.012 | 0.008 | 0.014 | 0.013 |
| R-2 | 0.005 | 0.007 | 0 | 0.052 | 0.054 | 0.007 | 0 | 0 | 0 | 0 | 0 | 0 |
| R-S* | 0.056 | 0.057 | 0.023 | 0.164 | 0.167 | 0.063 | 0.006 | 0.009 | 0.012 | 0.007 | 0.012 | 0.012 |
| R-S4 | 0.031 | 0.032 | 0.015 | 0.047 | 0.048 | 0.025 | 0.003 | 0.006 | 0.008 | 0.004 | 0.006 | 0.007 |
| R-S9 | 0.007 | 0.007 | 0 | 0.092 | 0.102 | 0.013 | 0 | 0 | 0 | 0 | 0 | 0 |
| R-SU* | 0.007 | 0.008 | 0 | 0.063 | 0.069 | 0.005 | 0 | 0 | 0 | 0 | 0 | 0 |
| R-SU4 | 0.008 | 0.009 | 0 | 0.073 | 0.080 | 0.006 | 0 | 0 | 0 | 0 | 0 | 0 |
| R-SU9 | 0.009 | 0.010 | 0.001 | 0.094 | 0.104 | 0.015 | 0 | 0 | 0 | 0 | 0 | 0 |
| R-L | 0.018 | 0.019 | 0.003 | 0.105 | 0.113 | 0.027 | 0 | 0.001 | 0.001 | 0.001 | 0.002 | 0.003 |
| R-W1.2 | 0.015 | 0.015 | 0.002 | 0.095 | 0.103 | 0.018 | 0 | 0 | 0 | 0.001 | 0.002 | 0.002 |

Results of IMTKU English essay questions in Phase-2

IMTKU at NTCIR-13 QA-Lab3

Phase-3 Performance

| SYSTEM | IMTKU1QALab3 | | | | | | | |
|--------|--------------|-------|-------------------------|--------------------------|---------|--------------|--------------------------|--------------------------|
| TYPE | SIMPLE | | | | COMPLEX | | | |
| METHOD | content | text | shortest unit (stem) | shortes t unit (root) | content | text | shortes t unit (stem) | shortes t unit (root) |
| R-1 | 0.014 | 0.185 | 0.175 | 0.180 | 0.098 | 0.408 | 0.347 | 0.352 |
| R-2 | 0 | 0.052 | 0.040 | 0.041 | 0.002 | 0.164 | 0.109 | 0.113 |
| R-S* | 0.006 | 0.147 | 0.150 | 0.144 | 0.070 | 0.354 | 0.317 | 0.308 |
| R-S4 | 0.005 | 0.075 | 0.082 | 0.079 | 0.038 | 0.129 | 0.119 | 0.117 |
| R-S9 | 0 | 0.041 | 0.038 | 0.039 | 0.006 | 0.139 | 0.105 | 0.108 |
| R-SU* | 0.001 | 0.043 | 0.041 | 0.042 | 0.003 | 0.144 | 0.122 | 0.128 |
| R-SU4 | 0 | 0.048 | 0.049 | 0.051 | 0.005 | 0.158 | 0.136 | 0.143 |
| R-SU9 | 0.001 | 0.043 | 0.041 | 0.042 | 0.007 | 0.140 | 0.106 | 0.108 |
| R-L | 0.003 | 0.066 | 0.062 | 0.064 | 0.019 | 0.188 | 0.160 | 0.165 |
| R-W1.2 | 0.002 | 0.060 | 0.060 | 0.062 | 0.013 | 0.181 | 0.155 | 0.162 |

Results of IMTKU Japanese essay questions in Phase-2

IMTKU at NTCIR-13 QA-Lab3

Phase-3 Performance

| SYSTEM | IMTKU2QALab3 | | | | | | | |
|--------|--------------|-------|-------------------------|--------------------------|---------|--------------|--------------------------|--------------------------|
| TYPE | SIMPLE | | | | COMPLEX | | | |
| METHOD | content | text | shortest unit (stem) | shortes t unit (root) | content | text | shortes t unit (stem) | shortes t unit (root) |
| R-1 | 0.004 | 0.067 | 0.043 | 0.050 | 0.010 | 0.146 | 0.059 | 0.075 |
| R-2 | 0 | 0.007 | 0.003 | 0.003 | 0 | 0.022 | 0.007 | 0.008 |
| R-S* | 0.004 | 0.049 | 0.041 | 0.048 | 0.009 | 0.124 | 0.058 | 0.071 |
| R-S4 | 0.003 | 0.028 | 0.026 | 0.030 | 0.006 | 0.043 | 0.022 | 0.027 |
| R-S9 | 0 | 0.006 | 0.002 | 0.003 | 0 | 0.027 | 0.006 | 0.008 |
| R-SU* | 0 | 0.004 | 0.001 | 0.002 | 0 | 0.016 | 0.003 | 0.005 |
| R-SU4 | 0 | 0.004 | 0.001 | 0.002 | 0 | 0.018 | 0.004 | 0.006 |
| R-SU9 | 0 | 0.007 | 0.003 | 0.004 | 0 | 0.028 | 0.006 | 0.009 |
| R-L | 0.001 | 0.013 | 0.006 | 0.008 | 0.002 | 0.037 | 0.012 | 0.016 |
| R-W1.2 | 0.001 | 0.010 | 0.004 | 0.006 | 0.001 | 0.030 | 0.008 | 0.012 |

Results of IMTKU Japanese essay questions in Phase-2

IMTKU at NTCIR-13 QA-Lab3

Extraction task at Phase 2

(N=5 and N = 10)

| Run | Lang. | Passage Precision | Nugget Recall | Ave. of Tokens |
|----------------|-------|-------------------|---------------|----------------|
| IMTKU RUN01 | EN | 0.260 | 0.061 | 249.2 |
| IMTKU RUN02 | EN | 0.234 | 0.058 | 249.2 |

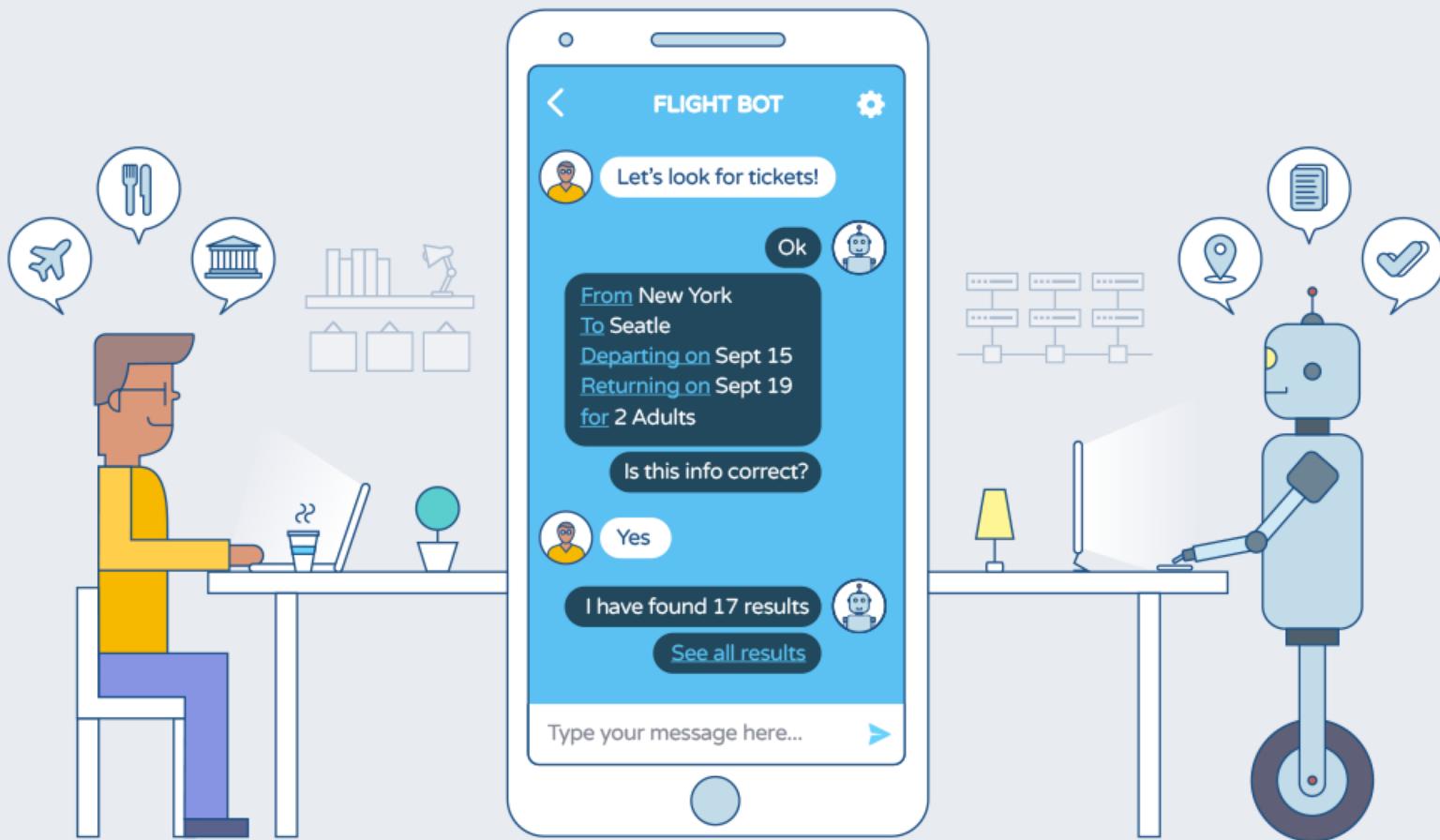
IMTKU at NTCIR-13 QALab-2

- IMTKU Question Answering System for World History Exams at NTCIR-13 QALab-2
- IMTKU Submitted runs for QALab-3 phase-2
 - 3 English End-to-End multiple-choice
 - 2 English and 2 Japanese End-to-End essay
 - 2 English and 2 Japanese extraction essay
 - 1 English and 1 Japanese summarization essay
- MTKU achieved the **best passage precision** and the **best nugget recall** in English Extraction task.

**Short
Text
Conversation
(STC)**

AI
and
Dialogue
System

Chatbot



Can
machines
think?

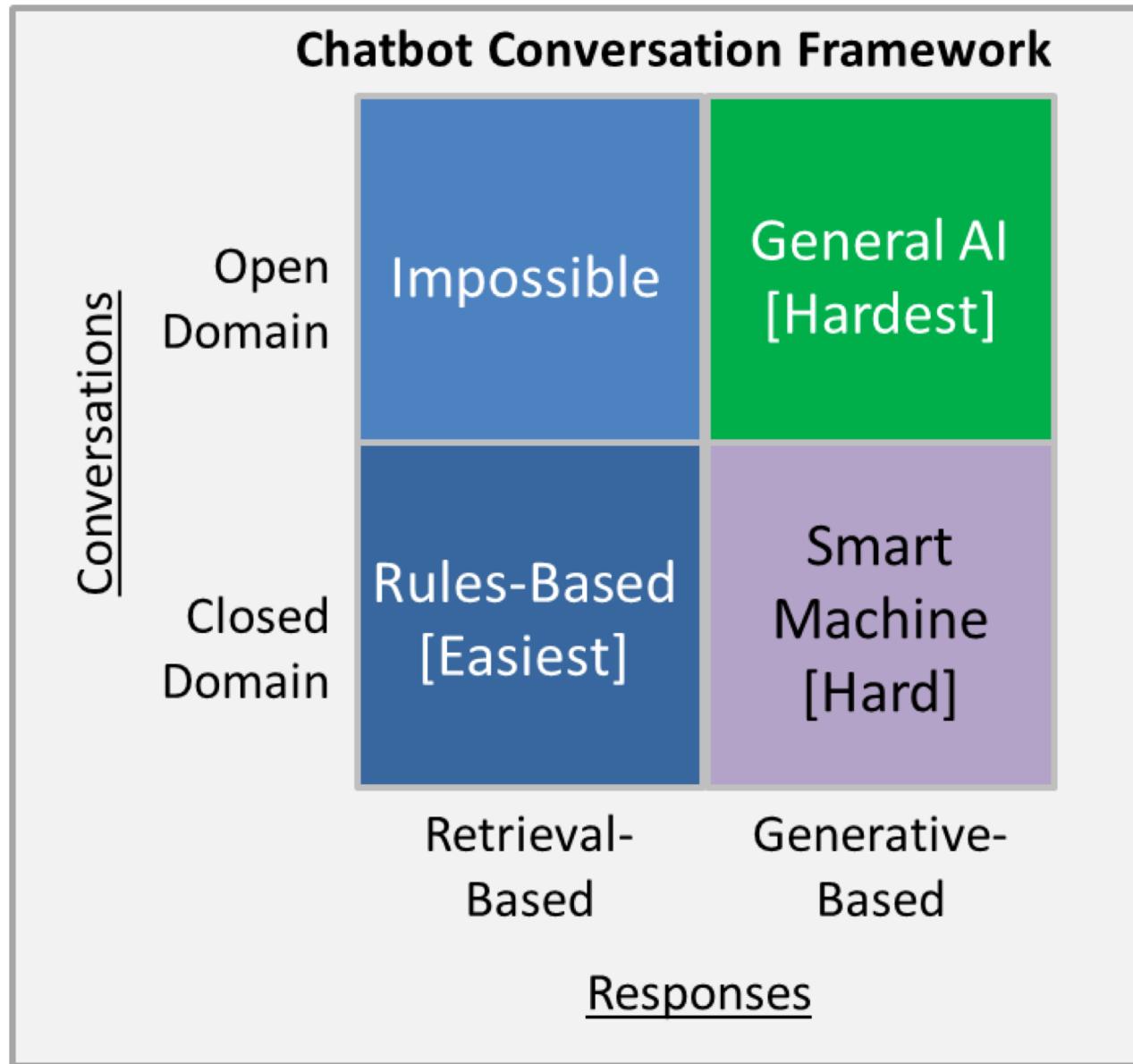
(Alan Turing ,1950)

Source: Cahn, Jack. "CHATBOT: Architecture, Design, & Development."
PhD diss., University of Pennsylvania, 2017.

Chatbot
“online human-computer
dialog system
with
natural language.”

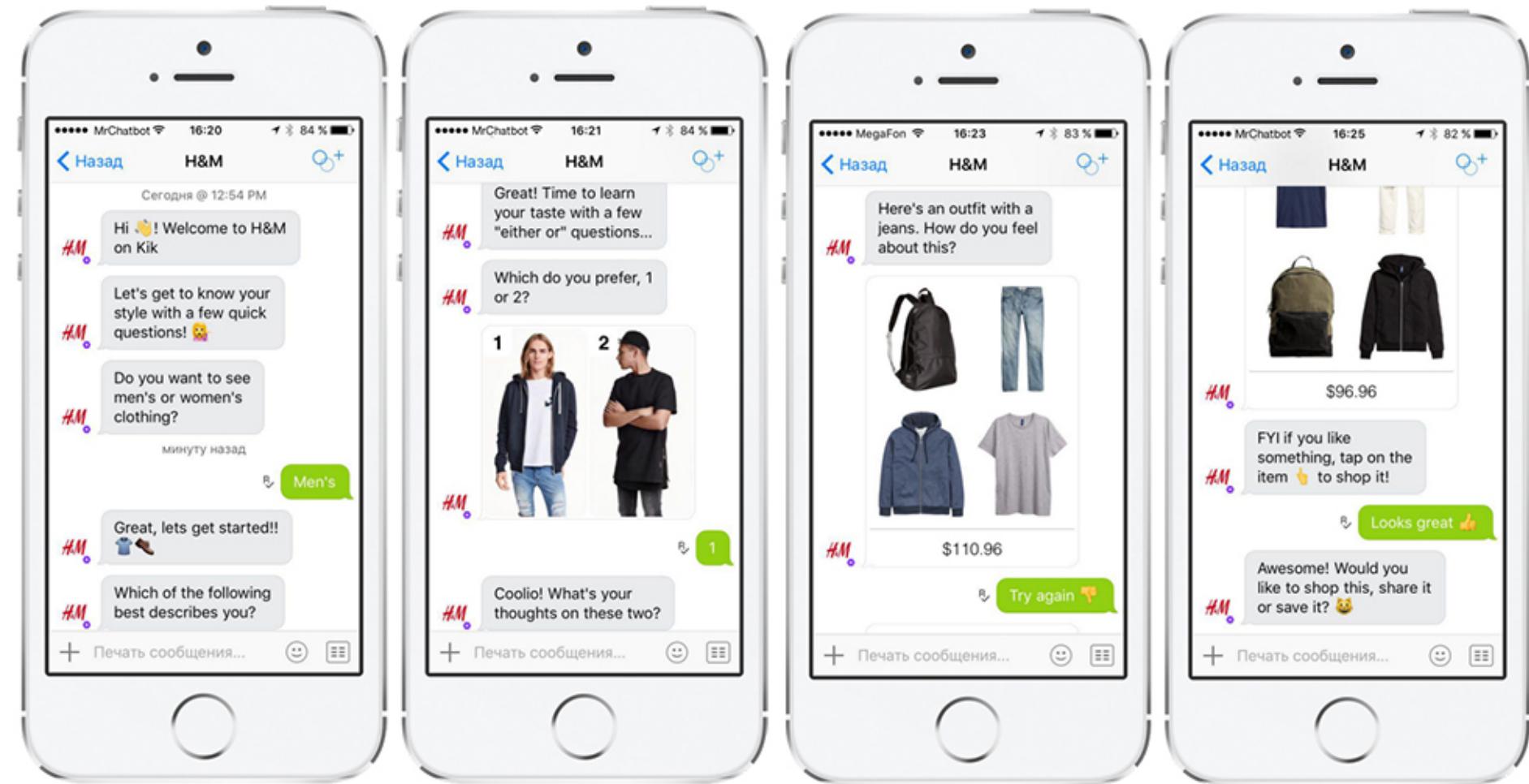
Source: Cahn, Jack. "CHATBOT: Architecture, Design, & Development."
PhD diss., University of Pennsylvania, 2017.

Chatbot Conversation Framework

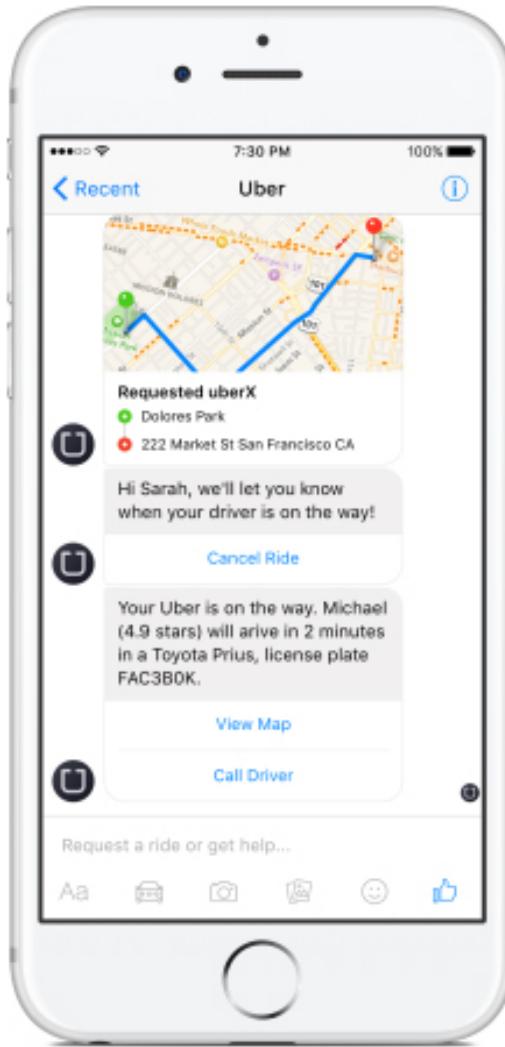


From
E-Commerce
to
Conversational Commerce:
Chatbots
and
Virtual Assistants

H&M's chatbot on Kik



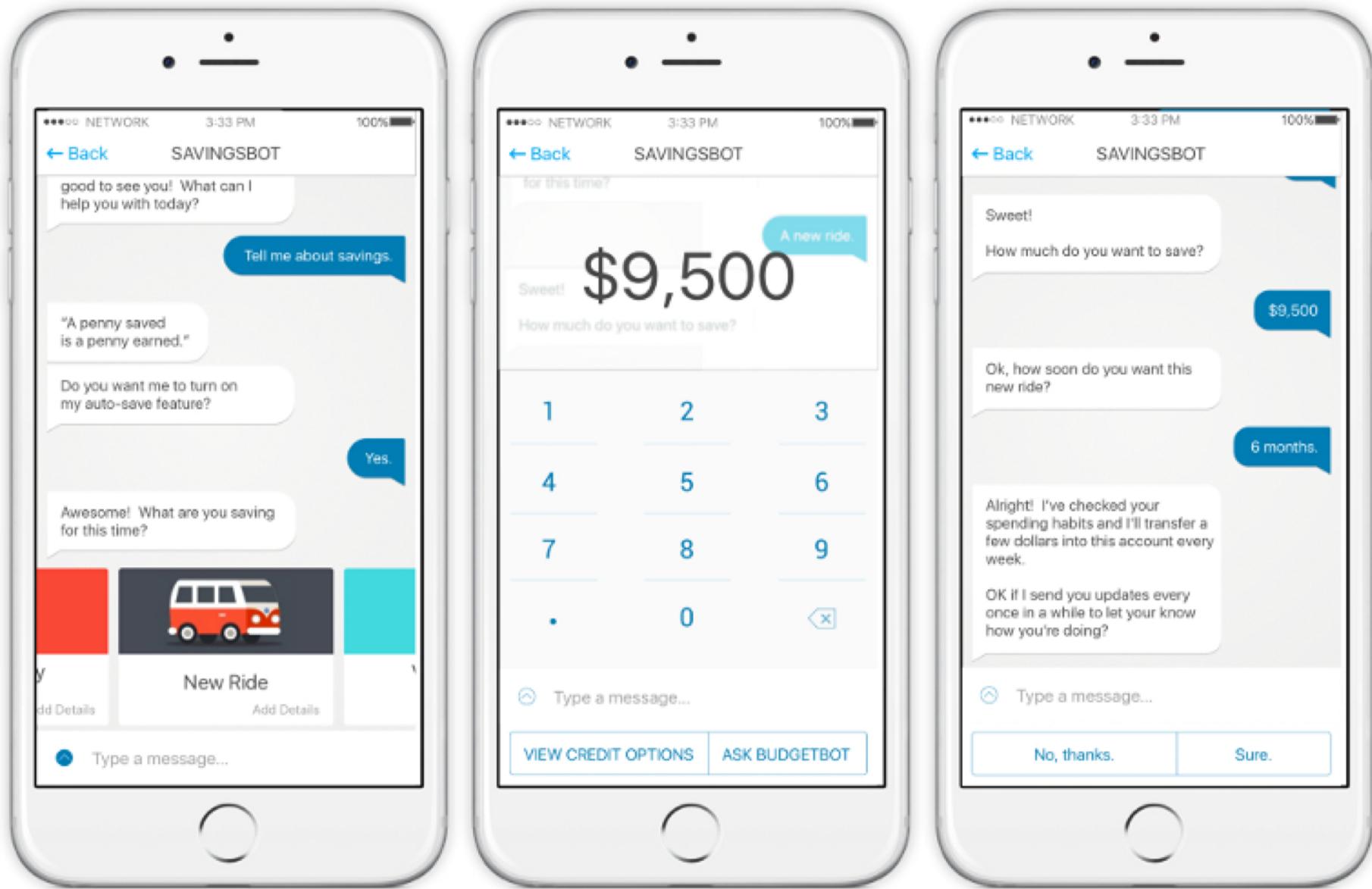
Uber's chatbot on Facebook's messenger



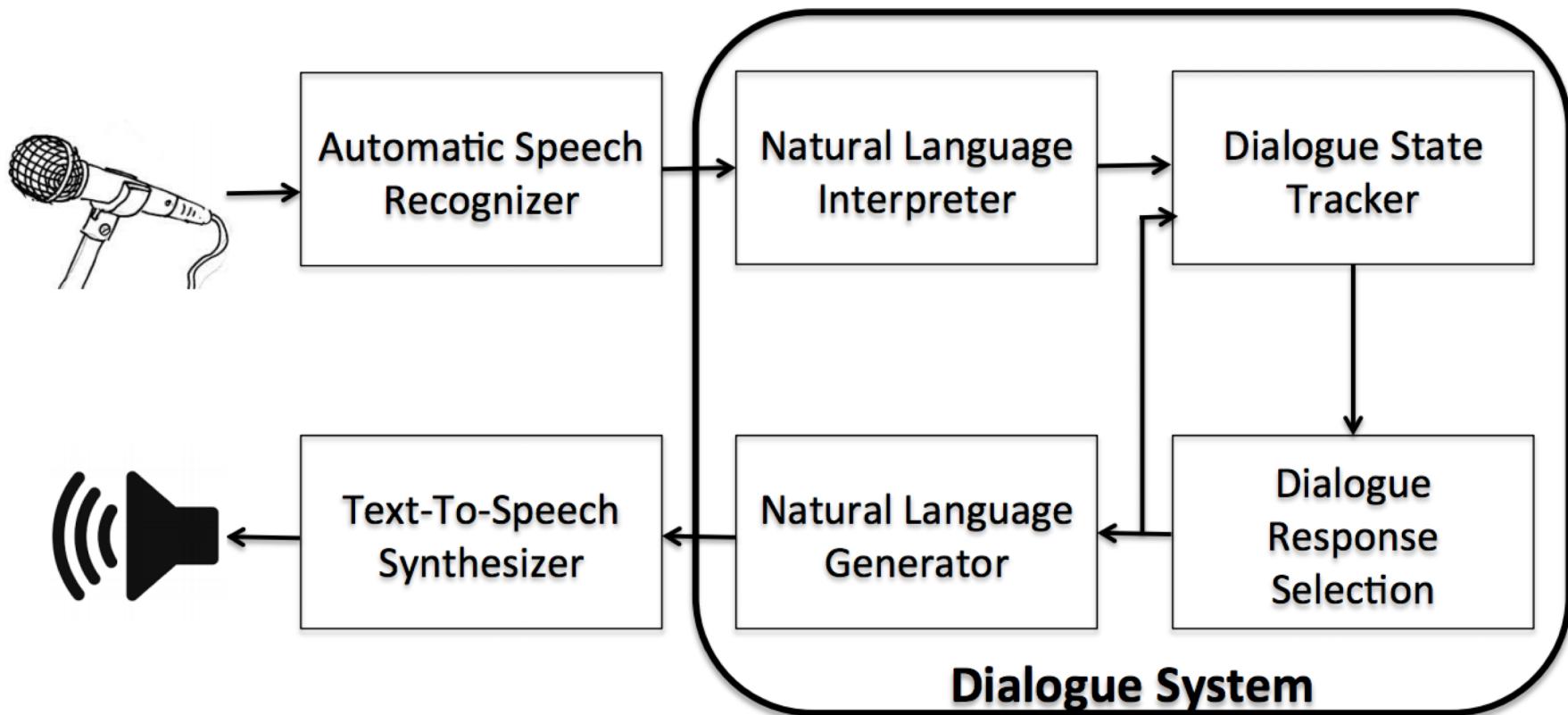
Uber's chatbot on Facebook's messenger
- one main benefit: it loads much faster than the Uber app

Source: <http://www.guided-selling.org/from-e-commerce-to-conversational-commerce/>

Savings Bot



Dialogue System





Short Text Conversation Task (STC-3)

Chinese Emotional Conversation Generation (CECG) Subtask

NTCIR Short Text Conversation

STC-1, STC-2, STC-3

| | Japanese | Chinese | English | |
|--|--|--|---------|--|
| NTCIR-12 STC-1 22 active participants | Twitter, Retrieval | Weibo, Retrieval | | Single-turn, Non task-oriented |
| NTCIR-13 STC-2 27 active participants | Yahoo! News, Retrieval+ Generation | Weibo, Retrieval+ Generation | | |
| NTCIR-14 STC-3 | | Weibo, Generation for given emotion categories | | Multi-turn, task-oriented (helpdesk) |

Chinese Emotional Conversation Generation (CECG) subtask

Dialogue Quality (DQ) and Nugget Detection (ND) subtasks

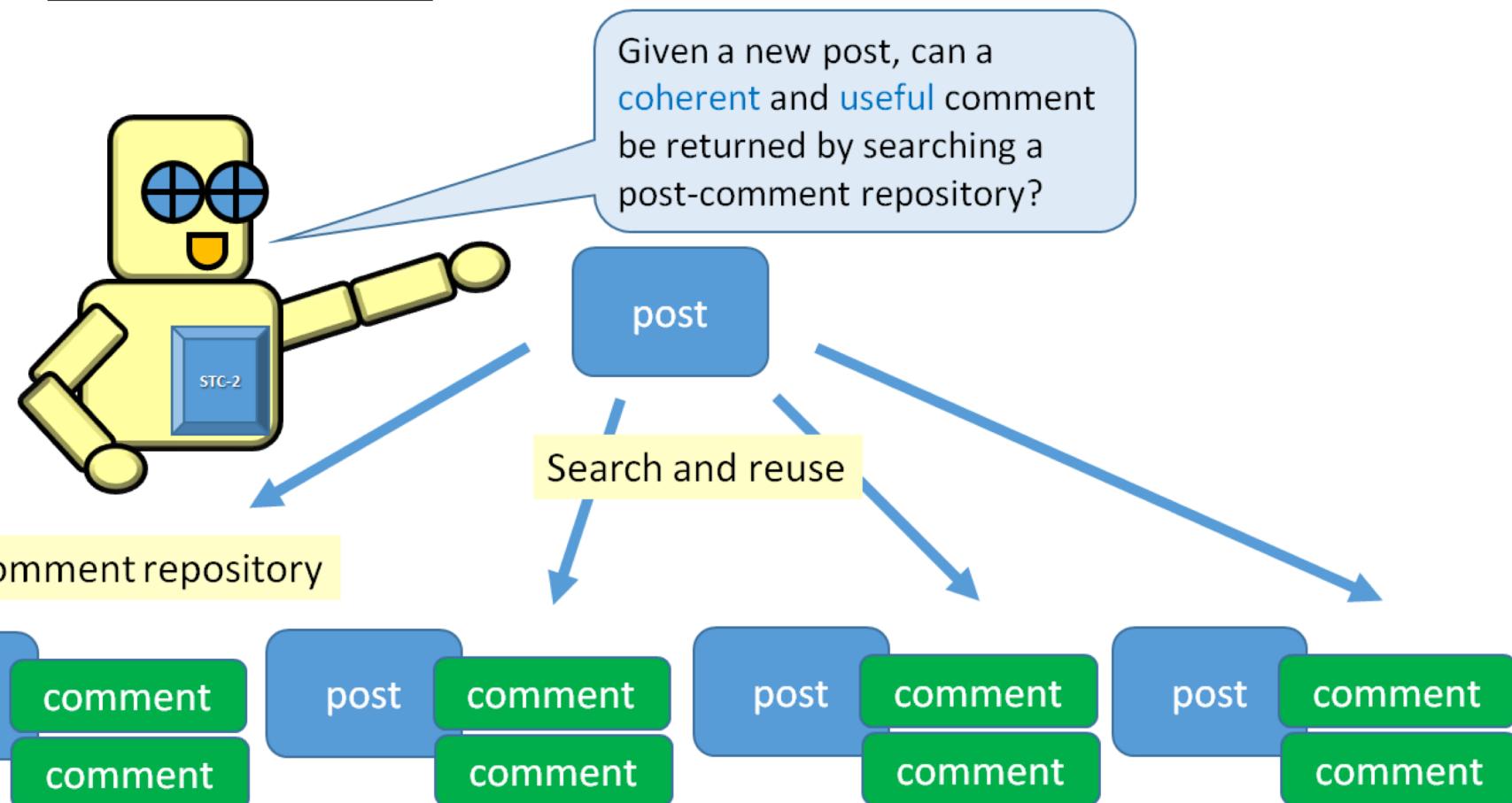
Weibo+English translations, distribution estimation for subjective annotations

Short Text Conversation

(NTCIR-13 STC2)

Retrieval-based

retrieval-based method

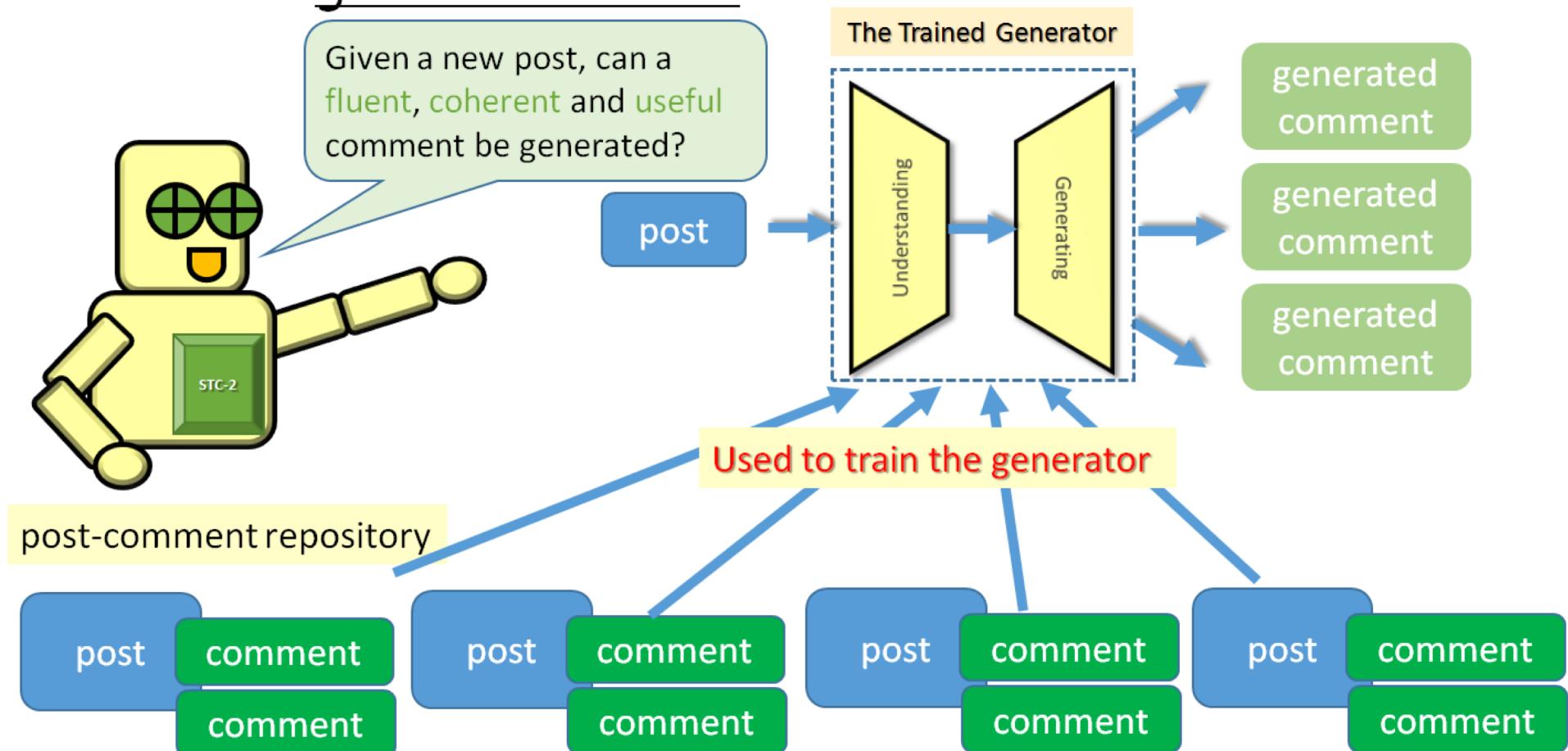


Short Text Conversation

(NTCIR-13 STC2)

Generation-based

generation-based method



Short Text Conversation (STC-3)

- Emotional Conversation Generation
- Dialogue Quality
- Nugget Detection subtasks
using Chinese and English dialogue data

NTCIR-14

Short Text Conversation Task (STC-3)

- Three new subtasks
 - Chinese Emotional Conversation Generation (CECG)
 - Dialogue Quality (DQ)
(for Chinese and English)
 - Nugget Detection (ND)
(for Chinese and English)

NTCIR-14 STC-3 CECG

Time Schedule

- CECG
 - Aug 31, 2018 CECG registration due
 - Sep 15, 2018 Training data released
 - Nov 15, 2018 Test data released
 - Nov 25, 2018 Run submissions due
- ALL
 - Dec 20, 2018 Evaluation results and draft overview released
 - Feb 1, 2019 Participant paper submissions due
 - Mar 1, 2019 Acceptance notification
 - Mar 20, 2019 All camera-ready papers due
 - Jun 2019 NTCIR-14 Conference & EVIA 2019 in NII, Tokyo

Given post:

爱狗还会做饭的男人，最帅了！

The man who cooks and loves dogs is very handsome!

| Response | Chinese / Translated English | Emotion Class | Coherence and Fluency | Emotion Consistency | Label |
|------------|---|---------------|-----------------------|---------------------|-------|
| Response 1 | 会做饭的男人是很帅的啊。 The man who cooks is handsome. | 喜欢 Like | Yes | Yes | 2 |
| Response 2 | 哈哈，我也觉得。 Haha, I feel the same way. | 喜欢 Like | Yes | No | 1 |
| Response 3 | 这是哪部电影里的？ Which movie is this from? | 厌恶 Disgust | No | Yes | 0 |
| Response 4 | 哈哈,你也是。 Haha, the same to you. | 喜欢 Like | No | No | 0 |
| Response 5 | 我爱你会。 I love you, will you. | 厌恶 Disgust | No | Yes | 0 |
| Response 6 | 这是同主义同的道！ This is the same way of the same doctrine! | 厌恶 Disgust | No | No | 0 |

NLPCC

Emotion Classification Challenge

6 classes (64%)

- 0: Other
- 1: Like
- 2: Sadness
- 3: Disgust
- 4: Anger
- 5: Happiness

Chinese Emotional Conversation Generation (CECG)

| Post (Given) | Emotion Category (Given) | Response (to be generated) |
|--|--------------------------------|--|
| 爱狗还会做饭的男人，最帅了！ The man who cooks and loves dogs is very handsome! | 喜欢 Like | 会做饭的男人是很帅的啊。 The man who cooks is handsome. |
| 爸爸，明天是六一啦，带我出去玩吧！ Daddy, tomorrow is June 1th Children's Day. Please take me out to play! | 喜欢 Like | 好，一定带。 Yes, of course. |
| 被特别在乎的人忽略，会很难过，而装做不在乎，会更难过。 It's sad to be ignored by someone that you really care, and it's harder to pretend that you don't care. | 悲伤 Sadness | 因为在乎，所以在乎。 I am concerned with it, because I care about it. |
| 冰天雪地的哈尔滨！你要冻死我咋地？！？！ Harbin is in the snow! Are you going to freeze me to death?!?! | 喜欢 Like | 注意保暖，小心别感冒！ Keep warm. Watch out for getting cold! |
| 本来想学一把沧桑，结果令我更忧伤。 I wanted to learn the vicissitudes of life, but I became sadder. | 悲伤 Sadness | 这是一个悲伤的故事。 It a sad story. |
| 今天一整天都在海边训练。虽然很累，但还是很开心的！ I have been training at the seaside all day. Though very tired, I still very happy! | 快乐 Happiness | 是的呢，开心！ Yeah, happy! |

Chinese Emotional Conversation Generation (CECG) Dataset

- 1,110,000 Weibo post-response pairs
 - [[[post,post_label],[response,response_label]],
[[post,post_label],[response,response_label]],...].

Fluency judgement on responses with repetitive words

Sample responses generated by Seq2Seq and ECM (Emotional Chatting Machine)

| Post | Model | Response(Original) | Response(Translated) |
|---|---------------------|---|--|
| 承诺，就是一个骗子说给一个傻子听的。 A promise is what a cheater says to a fool. | Seq2Seq | 承诺，就是一个骗子说给一个傻子听的。 | A promise is what a cheater says to a fool. |
| | ECM | Like 承诺是一个 专一 的傻子 | Promise is a single-minded fool |
| | | Happy 我就是一个 开心 的傻子 | I'm just a happy fool |
| | | Sad 我就是一个 悲伤 的傻子 | I am a sad fool |
| | | Disgust 一个 骗子 说给一个 傻子 听 | A cheater says to a fool |
| | Angry 不管你信不信，反正我信了！ | Whatever you believe or not, I trust in it! | |
| 知道真相的我眼泪笑下来 Knowing the truth, I laughed myself to tears | Seq2Seq | 知道真相的我眼泪掉下来。 | After knowing the truth, I burst into tears. |
| | ECM | Like 太 可爱 了，太 可爱 了！ | Too lovely , it's too lovely . |
| | | Happy 笑得我眼泪都出来了。 | I can't help laugh myself to tears. |
| | | Sad 知道真相的我眼泪掉下来。 | After knowing the truth, I burst into tears . |
| | | Disgust 这是真的还是假的？ | Is this true? |
| | Angry 什么意思？没看懂。 | What do you mean? I don't understand. | |

Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Sample responses generated by Seq2Seq and ECM (Emotional Chatting Machine)

| Post | Model | Response(Original) |
|---|--------------|----------------------|
| 承诺，就是一个骗子说给一个傻子听的。 A promise is what a cheater says to a fool. | Seq2Seq | 承诺，就是一个骗子说给一个傻子听的。 |
| | ECM | 承诺是一个 专一 的傻子 |
| | | 我就是一个 开心 的傻子 |
| | | 我就是一个 悲伤 的傻子 |
| | | 一个骗子说给一个 傻子 听 |
| | Angry | 不管你信不信，反正我信了！ |

Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Emotional Short Text Conversation (ESTC)

Dataset

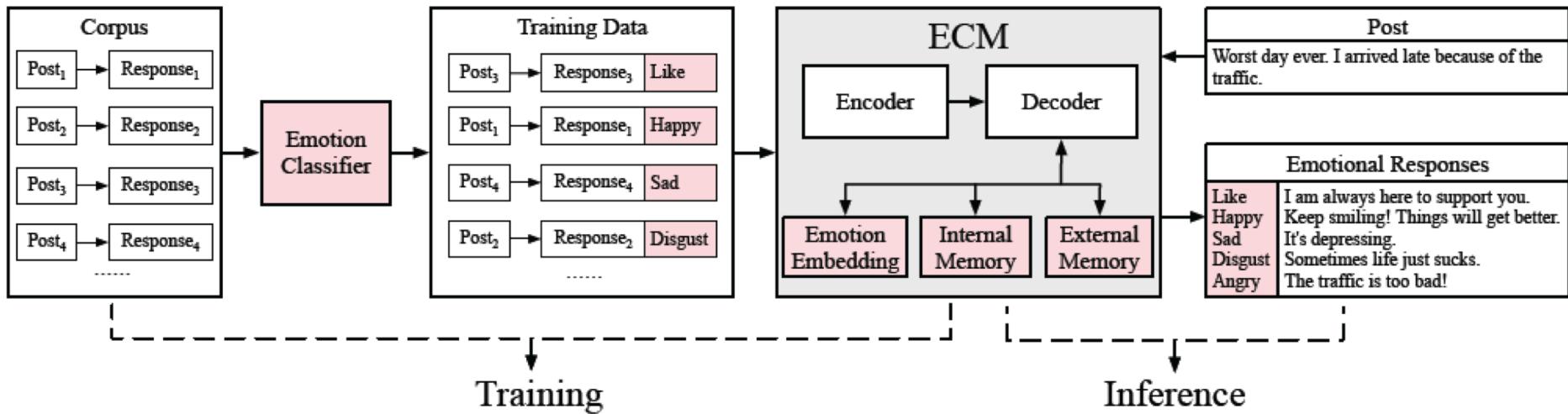
| | | |
|------------|-----------|-----------------|
| Training | Posts | 217,905 |
| | Responses | Angry 234,635 |
| | | Disgust 689,295 |
| | | Happy 306,364 |
| | | Like 1,226,954 |
| | | Sad 537,028 |
| | | Other 1,365,371 |
| Validation | Posts | 1,000 |
| Test | Posts | 1,000 |

Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Conversations with/without considering emotion **Emotional Chatting Machine (ECM)**

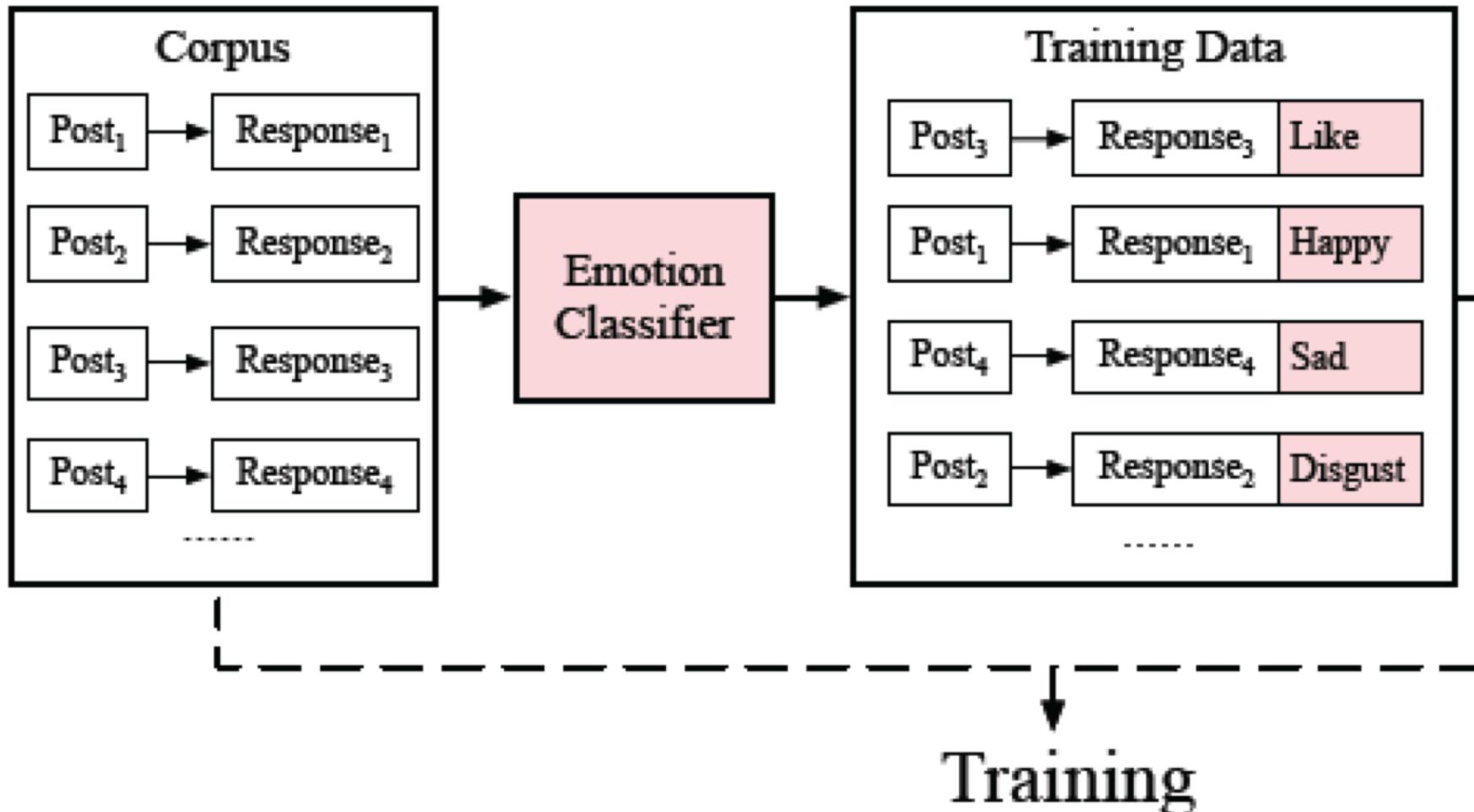
- User: Worst day ever. I arrived late because of the traffic.
 1. Basic Seq2Seq: You were late.
 2. ECM (Like): I am always here to support you.
 3. ECM (Happy): Keep smiling! Things will get better.
 4. ECM (Sad): It's depressing.
 5. ECM (Disgust): Sometimes life just sucks.
 6. ECM (Angry): The traffic is too bad!

Overview of Emotional Chatting Machine (ECM)



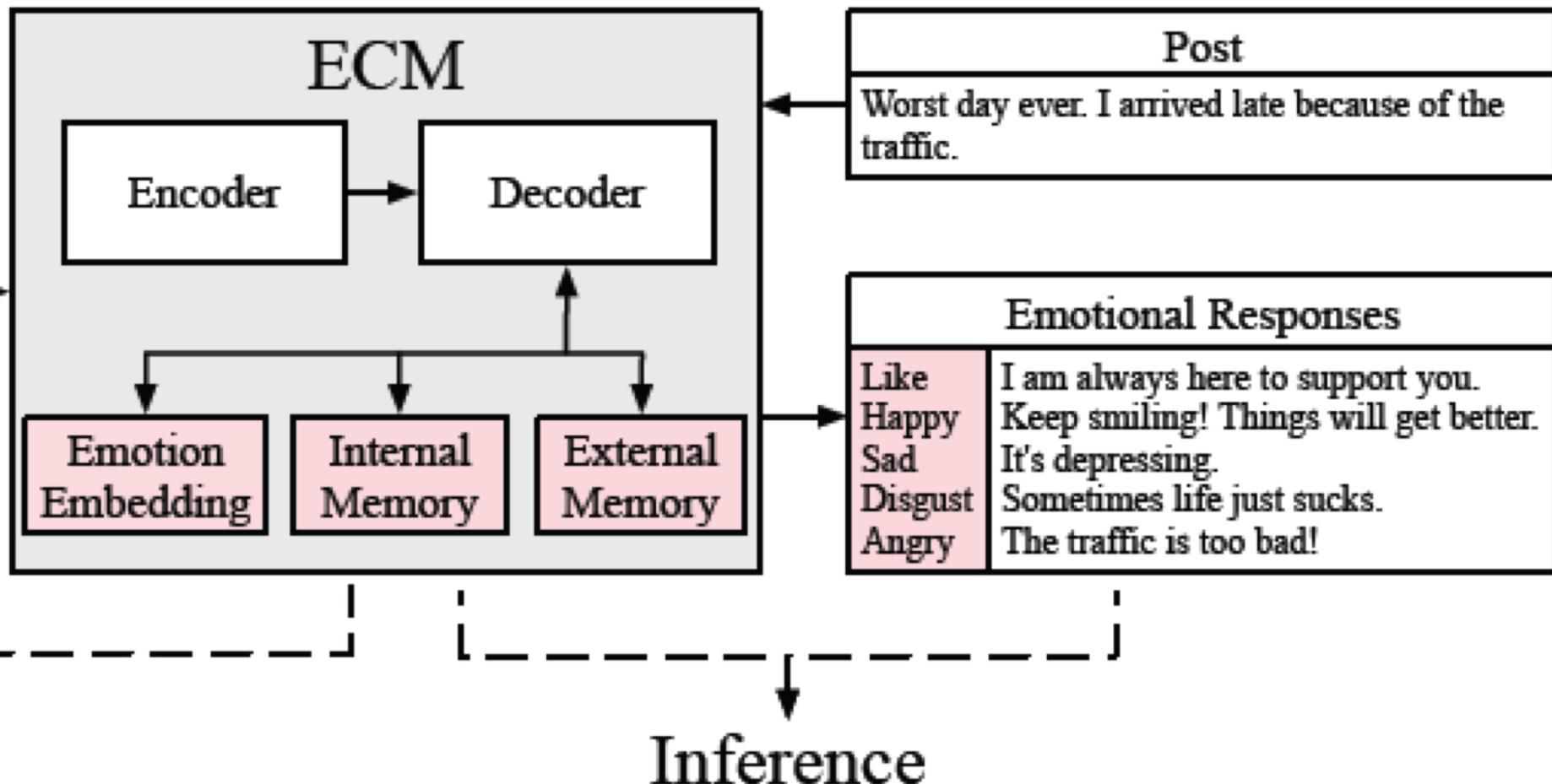
Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Overview of Emotional Chatting Machine (ECM)



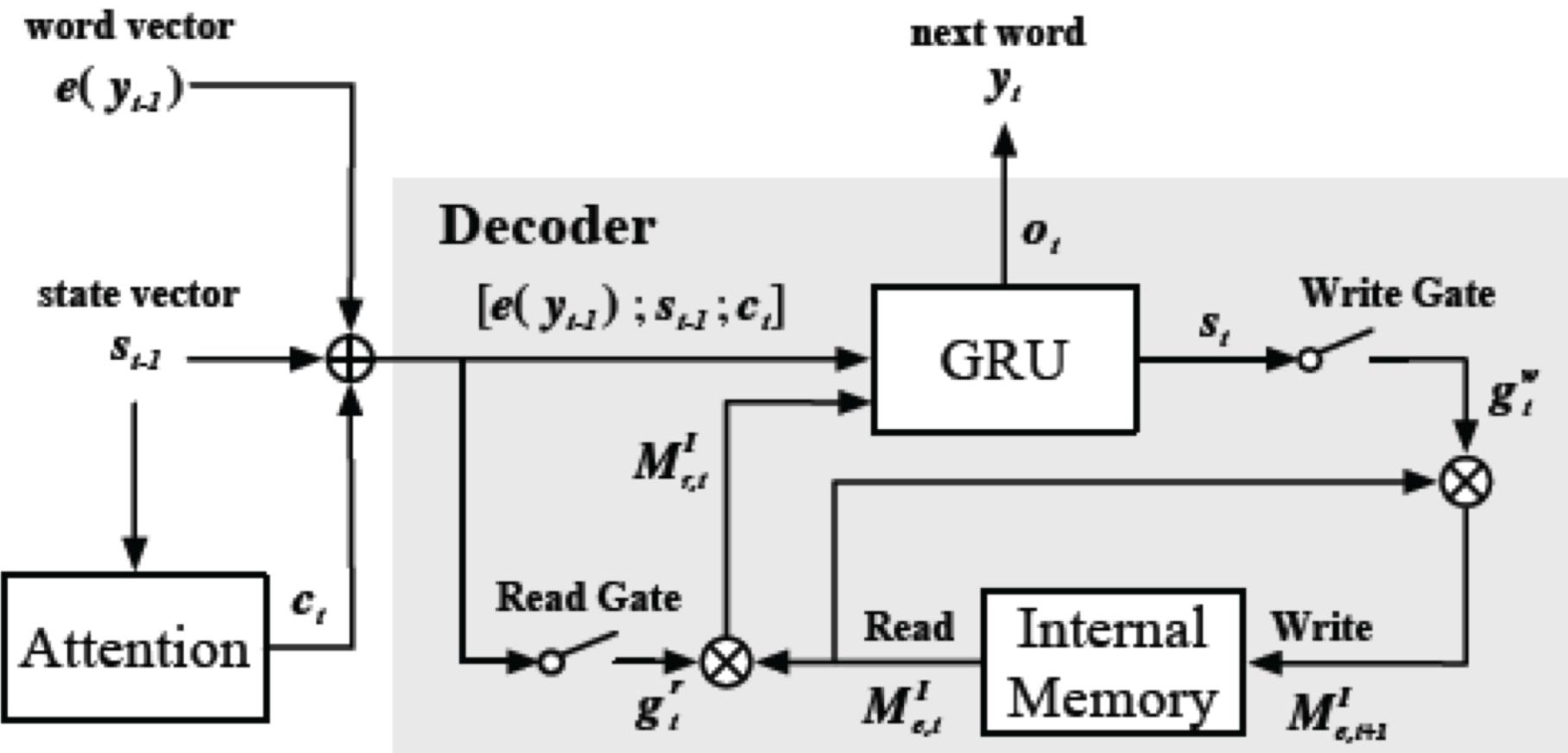
Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Overview of Emotional Chatting Machine (ECM)



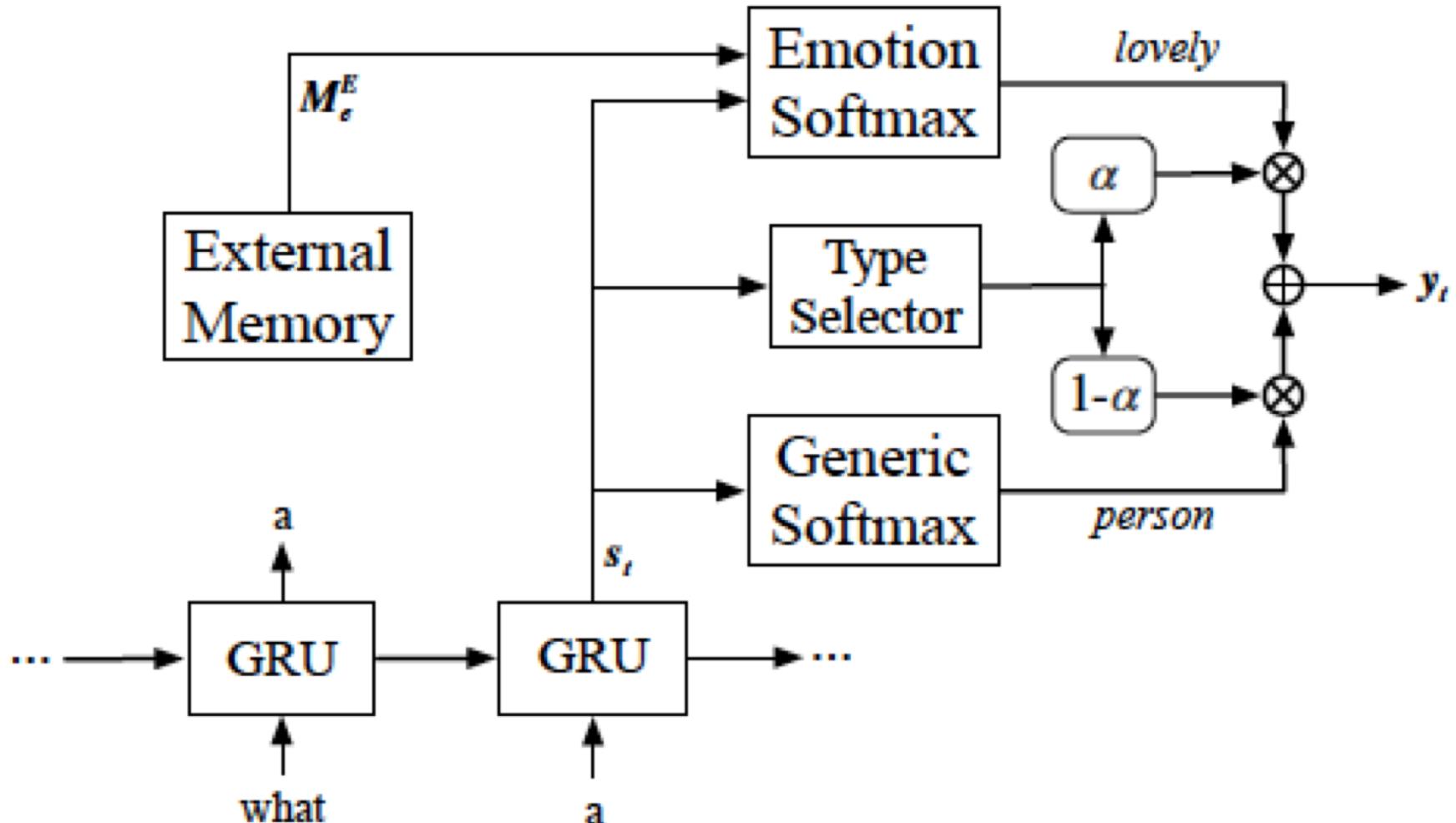
Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Data flow of the decoder with an internal memory



Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Data flow of the decoder with an external memory



Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Sample responses generated by Seq2Seq and ECM (Emotional Chatting Machine)

| Post | Model | Response(Original) |
|---|---------|--------------------|
| 知道真相的我眼泪笑下来 Knowing the truth, I laughed myself to tears | Seq2Seq | 知道真相的我眼泪掉下来。 |
| | ECM | 太可爱了，太可爱了！ |
| | | 笑得我眼泪都出来了。 |
| | | 知道真相的我眼泪掉下来。 |
| | | 这是真的还是假的？ |
| | Angry | 什么意思？没看懂。 |

Source: Zhou, Hao, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu. "Emotional chatting machine: emotional conversation generation with internal and external memory." *arXiv preprint arXiv:1704.01074* (2017).

Chinese Emotional Conversation Generation (CECG)

Evaluation Metric

- Emotion Consistency
 - whether the emotion class of a generated response is the same as the pre-specified class.
- Coherence
 - whether the response is appropriate in terms of both logically coherent and topic relevant content.
- Fluency
 - whether the response is fluent in grammar and acceptable as a natural language response.

Chinese Emotional Conversation Generation (CECG) Evaluation Metric

IF Coherence and Fluency

IF Emotion Consistency

LABEL 2

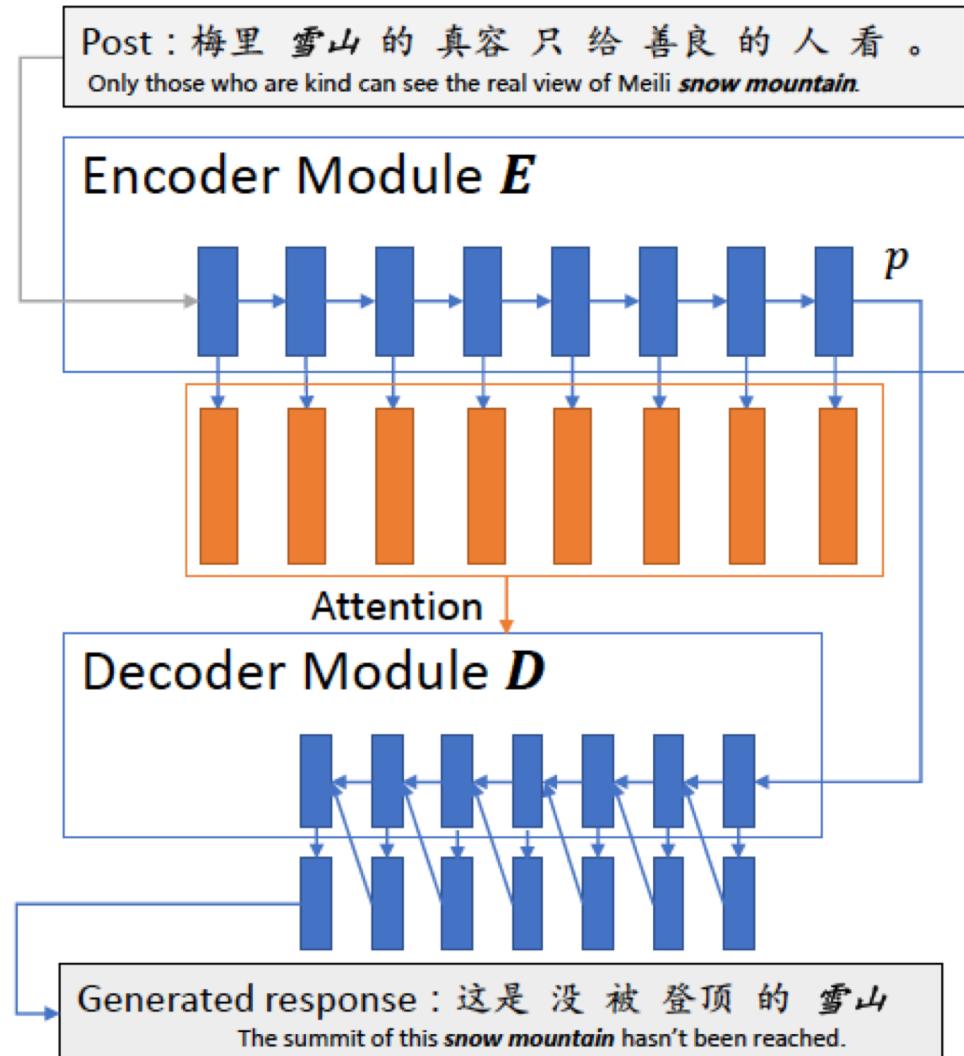
ELSE

LABEL 1

ELSE

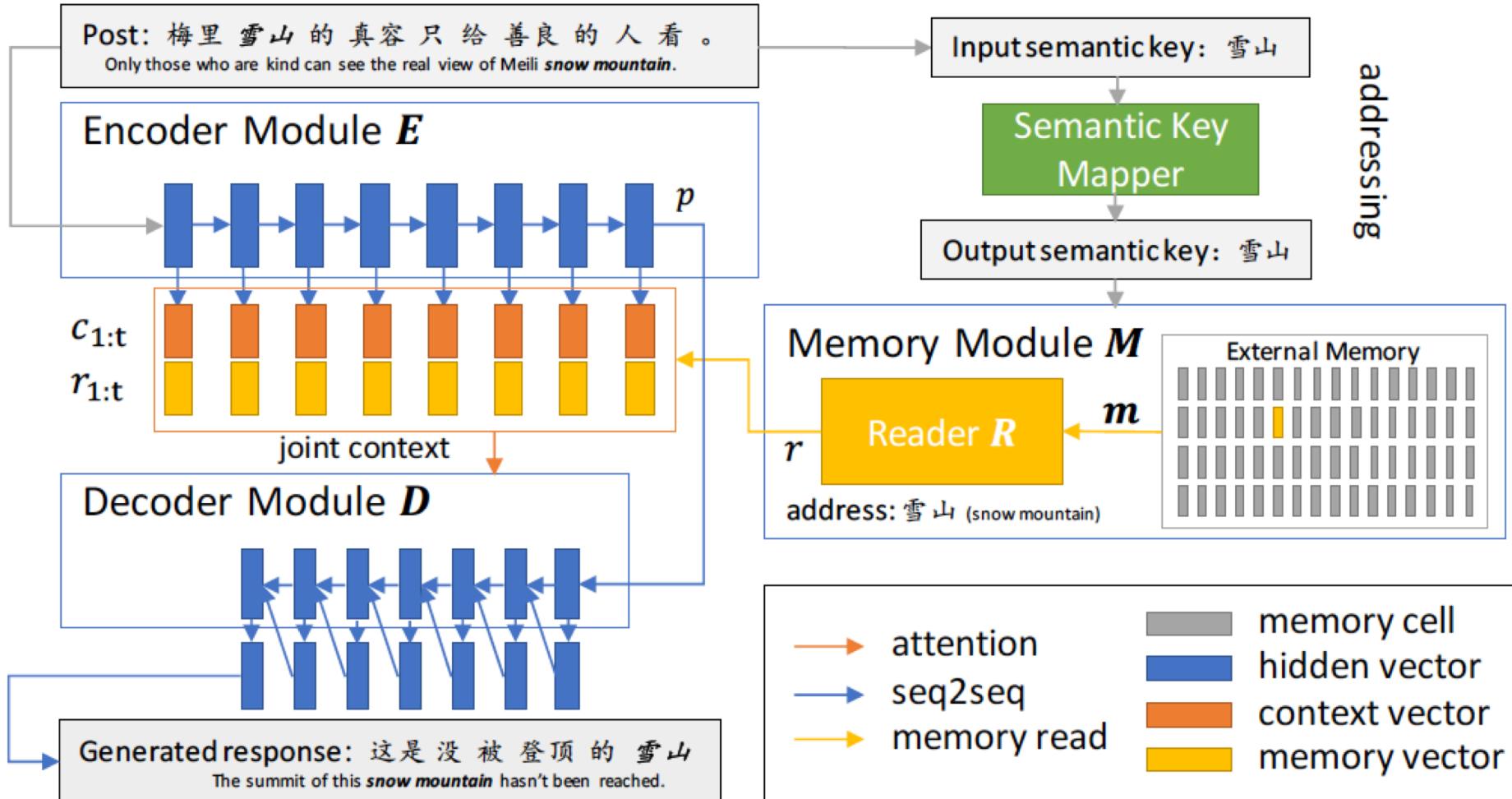
LABEL 0

Sequence-to-sequence Learning with Attention for Generation-based STC



Source: Yu, Kai, Zijian Zhao, Xueyang Wu, Hongtao Lin, and Xuan Liu. "Rich Short Text Conversation Using Semantic Key Controlled Sequence Generation." *IEEE/ACM Transactions on Audio, Speech, and Language Processing* (2018).

General Framework of Controllable Short-Text-Conversation Generation with External Memory



Source: Yu, Kai, Zijian Zhao, Xueyang Wu, Hongtao Lin, and Xuan Liu. "Rich Short Text Conversation Using Semantic Key Controlled Sequence Generation." *IEEE/ACM Transactions on Audio, Speech, and Language Processing* (2018).

Controllable Short Text Conversation Examples

| | | |
|-------|---|--|
| Post | 李娜太牛了!中国第一个世界网球大满贯冠军! Li Na is great! China's first World Tennis Grand Slam champion! | |
| NRM | 李娜是世界冠军! Li Na is the world champion! | |
| MrRNN | 李娜加油,加油! Come on, Li Na. Come on! | |
| ESED | Key-Word | Response |
| | 世界 world | 李娜是世界上最棒的! Li Na is the best in the world! |
| | 中国 China | 李娜是中国的骄傲! Li Na is the pride of China! |
| | 网球 tennis | 中国网球公开赛,加油! China Tennis Open, come on! |
| | | |
| Post | 感人器官捐献广告,请感谢那些给你第二次生命的人。 A touching organ donation advertisement, please thank those who gave you a second life. | |
| NRM | 给我第二次生命的人。 A man who gives me a second life. | |
| MrRNN | 感谢每一个人! Thanks for everyone! | |
| ESED | Key-Word | Response |
| | 生命 life | 感谢生命给予的一切! Thanks for everything given by life! |
| | 器官 organ | 感谢那些器官捐赠者。 Thanks for those organ donors. |
| | 广告 advertisement | 很感人的广告! A very touching advertisement! |

Source: Yu, Kai, Zijian Zhao, Xueyang Wu, Hongtao Lin, and Xuan Liu. "Rich Short Text Conversation Using Semantic Key Controlled Sequence Generation." *IEEE/ACM Transactions on Audio, Speech, and Language Processing* (2018).

Comments Generated Using Different Semantic key Mapping Methods

| Post | 美好的社会应该由善良的人组成。 A good society should be composed of people of kindness. | |
|-----------------|---|--|
| Mapping-Method | Key-Word | Response |
| Identity Mapper | 善良 kindness | 善良是一种信仰。 Kindness is a belief. |
| Synonym | 友善 friendliness | 善良是一种美德。 Kindness is a virtue. |
| Antonym | 丑恶 evil | 没有丑恶的社会,更可怕。 A society without evils is more terrifying. |
| Embedding | 乐观 optimism | 乐观是一种生活态度。 Optimism is an attitude of life. |
| Common-Reply | 真 really | 真的吗? Really? |
| | 对 right | 对的,对的。 Right, right. |
| Random | 人 person | 每个人都有善良的一面。 Every person has a side of kindness. |
| | 中国 China | 中国的贫富差距太大了。 The gap between the wealthy and the poor in China is too big. |

Source: Yu, Kai, Zijian Zhao, Xueyang Wu, Hongtao Lin, and Xuan Liu. "Rich Short Text Conversation Using Semantic Key Controlled Sequence Generation." *IEEE/ACM Transactions on Audio, Speech, and Language Processing* (2018).

Generated Responses of Knowledge Introduction by External Memory

| | | |
|--------------|---|--|
| Post | 你最喜欢那个星座? What is your favorite constellation? | |
| Semantic-Key | Key-Word | Response |
| | 摩羯座 | 我最喜欢摩羯座。 |
| | Capricorn | I love Capricorn. |
| | 射手座 | 我是射手座,我喜欢。 |
| Post | Sagittarius | I am a Sagittarius and I like it. |
| | 今天周杰伦的电影,太好看了。 Jay Chou's movie is so nice today. | |
| Semantic-Key | Key-Word | Response |
| | 歌 | 杰伦的歌也很好听。 |
| Post | song | Jay Chou's songs are nice too. |
| | 梵高的画,很漂亮。 Van Gogh's paintings are very beautiful. | |
| Semantic-Key | Key-Word | Response |
| | 向日葵 | 梵高笔下的向日葵。 |
| | sunflower | The Sunflower by Van Gogh. |
| Post | 荷兰 | 梵高的画,很漂亮。 |
| | Holland | Van Gogh's paintings are very beautiful. |

Source: Yu, Kai, Zijian Zhao, Xueyang Wu, Hongtao Lin, and Xuan Liu. "Rich Short Text Conversation Using Semantic Key Controlled Sequence Generation." *IEEE/ACM Transactions on Audio, Speech, and Language Processing* (2018).

Welcome to NTCIR-14 STC-3

- CECG
 - Aug 31, 2018 CECG registration due
 - Sep 15, 2018 Training data released
 - Nov 15, 2018 Test data released
 - Nov 25, 2018 Run submissions due
- ALL
 - Dec 20, 2018 Evaluation results and draft overview released
 - Feb 1, 2019 Participant paper submissions due
 - Mar 1, 2019 Acceptance notification
 - Mar 20, 2019 All camera-ready papers due
 - Jun 2019 NTCIR-14 Conference & EVIA 2019 in NII, Tokyo

Summary

- NTCIR Evaluation
- Question Answering (QA)
- Short Text Conversation (STC)

References

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Tamkang
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Q & A

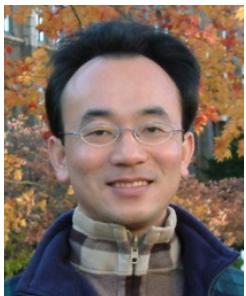
NTCIR Evaluation of Question Answering and Conversation Technologies

Time: 2018/5/1 (Mon) (10:30-12:10)

Place: 國立臺灣師範大學圖書資訊學研究所 正大樓5F

Host: Prof. I-Chin Wu (吳怡瑾 教授)

Graduate Institute of Library and Information Studies, National Taiwan Normal University (NTNU)



Min-Yuh Day

戴敏育

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2018-05-01

