

人工智慧財務金融應用



Tamkang
Universit
淡江大學

AI in Financial Application

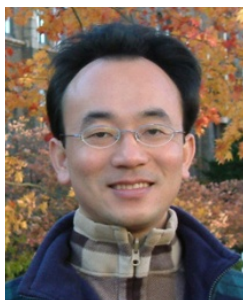
金融科技對話式商務與 智慧型交談機器人

(Conversational Commerce and
Intelligent Chatbots for Fintech)

1081AIFA03

EMBA, IMTKU (M2457) (8413) (Fall 2019)

Fri 12,13,14 (19:20-22:10) (D301)



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2019-10-04



課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
1	2019/09/13	中秋節 (Mid-Autumn Festival) 放假一天 (Day off)
2	2019/09/20	人工智慧財務金融應用課程介紹 (Course Orientation for AI in Financial Application)
3	2019/09/27	人工智慧投資分析與機器人理財顧問 (Artificial Intelligence for Investment Analysis and Robo-Advisors)
4	2019/10/04	金融科技對話式商務與智慧型交談機器人 (Conversational Commerce and Intelligent Chatbots for Fintech)
5	2019/10/11	國慶日補假 (Bridge Holiday for National Day, Extra Day Off)
6	2019/10/18	財務金融事件研究法 (Event Studies in Finance)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
7	2019/10/25	人工智慧財務金融應用個案研究 I (Case Study on AI in Financial Application I)
8	2019/11/01	Python AI智慧金融分析基礎 (Foundations of AI in Finance Big Data Analytics with Python)
9	2019/11/08	Python Pandas 量化投資分析 (Quantitative Investing with Pandas in Python)
10	2019/11/15	期中報告 (Midterm Project Report)
11	2019/11/22	Python Scikit-Learn 機器學習財務金融應用 (Machine Learning in Finance Application with Scikit-Learn In Python)
12	2019/11/29	TensorFlow 深度學習財務金融應用 I (Deep Learning for Finance Application with TensorFlow I)

課程大綱 (Syllabus)

週次 (Week)	日期 (Date)	內容 (Subject/Topics)
13	2019/12/06	人工智慧財務金融應用個案研究 II (Case Study on AI in Financial Application II)
14	2019/12/13	TensorFlow 深度學習財務金融應用 II (Deep Learning for Finance Application with TensorFlow II)
15	2019/12/20	TensorFlow 深度學習財務金融應用 III (Deep Learning for Finance Application with TensorFlow III)
16	2019/12/27	社會網絡分析財務金融應用 (Social Network Analysis for Finance Application)
17	2020/01/03	期末報告 I (Final Project Presentation I)
18	2020/01/10	期末報告 II (Final Project Presentation II)

Conversational Commerce and Intelligent Chatbots for Fintech

Conversational Commerce

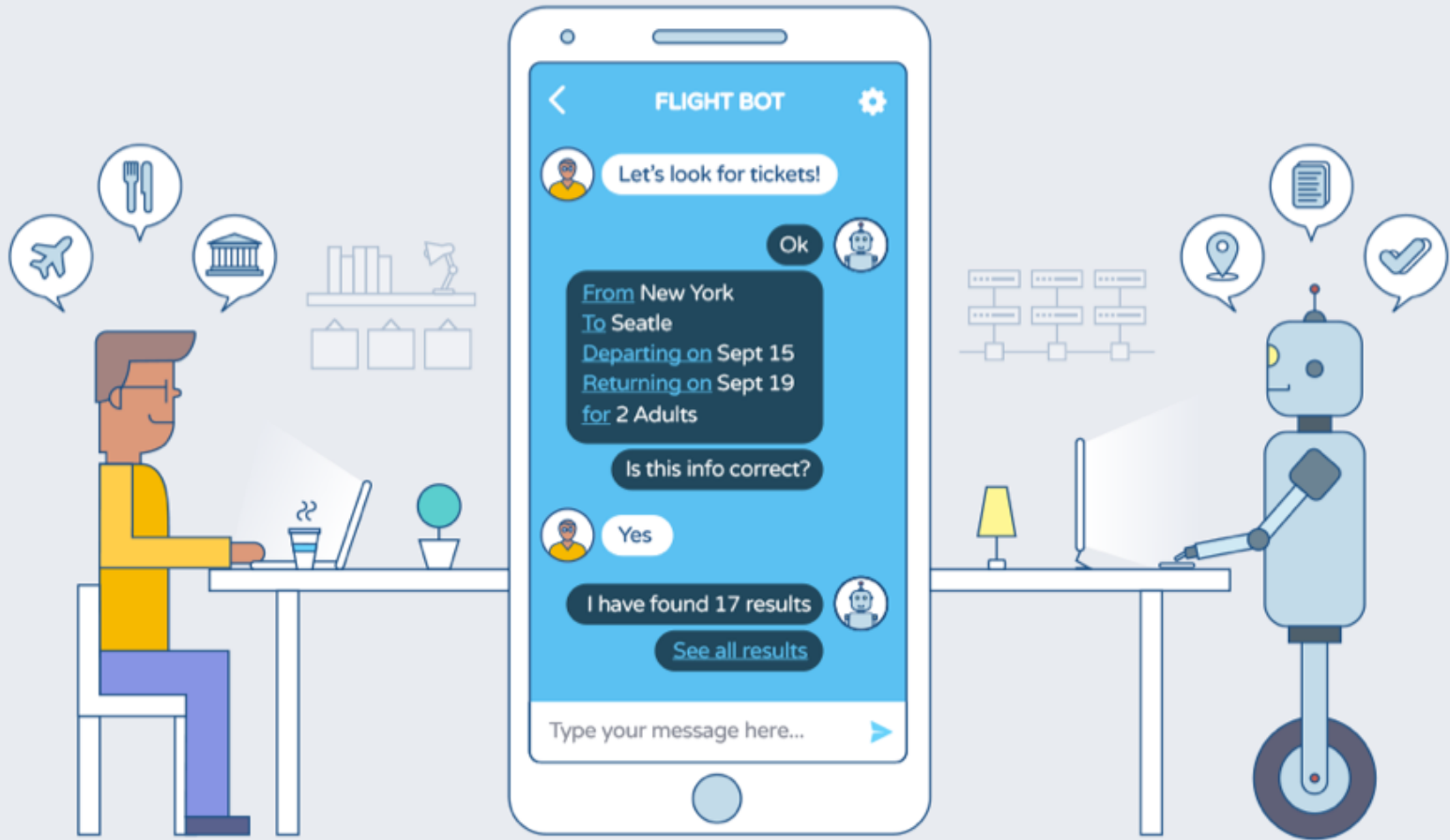
AI Chatbot for Conversational Commerce

Chatbots: Evolution of UI/UX

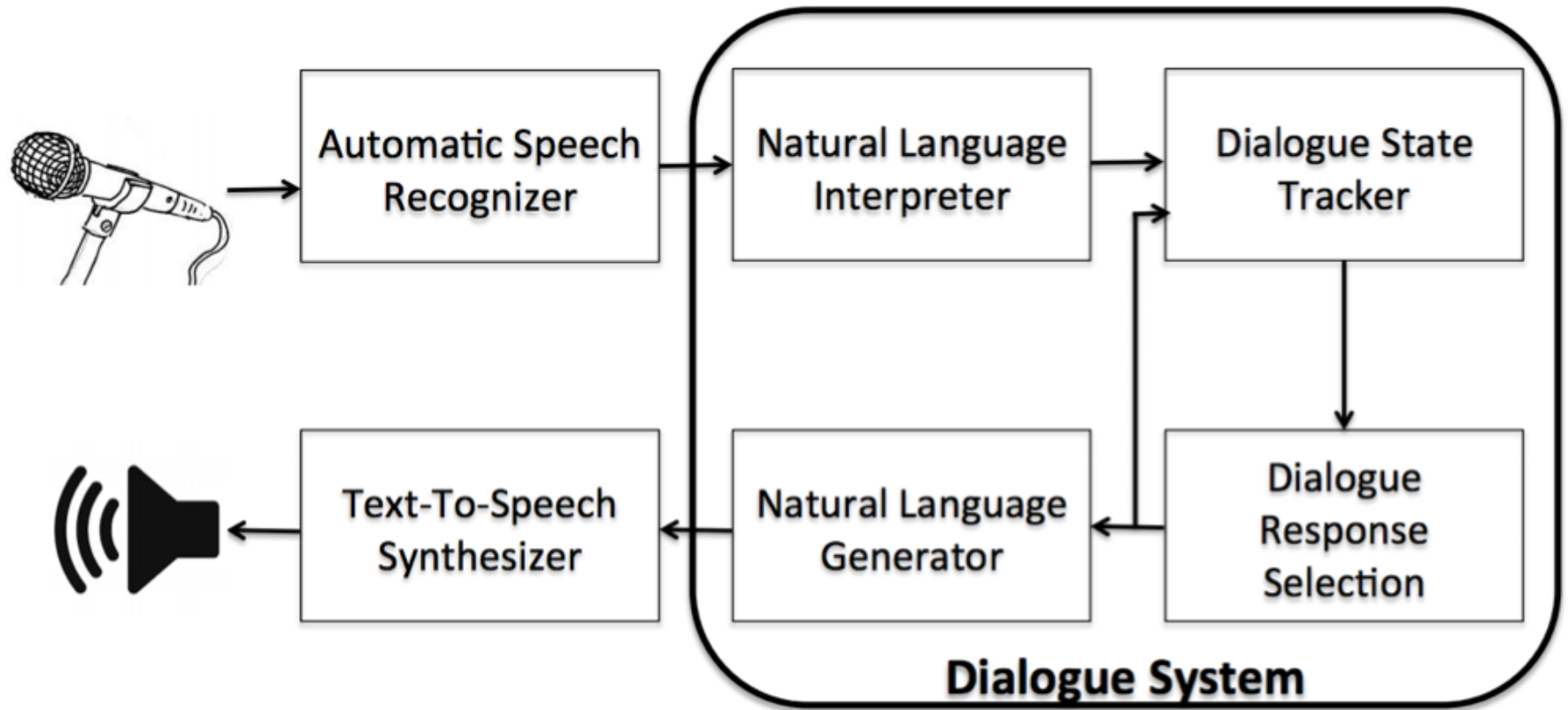
Paradigm	mid - 80s PC	mid - 90s Web	mid - 00s Smartphone	mid - 10s Messaging
Platform Examples	Desktop DOS, Windows, Mac OS	Browser Mosaic, Explorer, Chrome	Mobile OS iOS, Android	Messaging Apps WhatsApp, Messenger, Slack
Applications Examples	Clients Excel, PPT, Lotus	Website Yahoo, Amazon	Apps Angry Birds, Instagram	Bots Weather, Travel
UI/UX	Native Screens	Web Pages	Native Mobile Screens	Message
S/w Dev	Client-side	Server-side	Client-side	Server-side

Chatbot
Dialogue System
Intelligent Agent

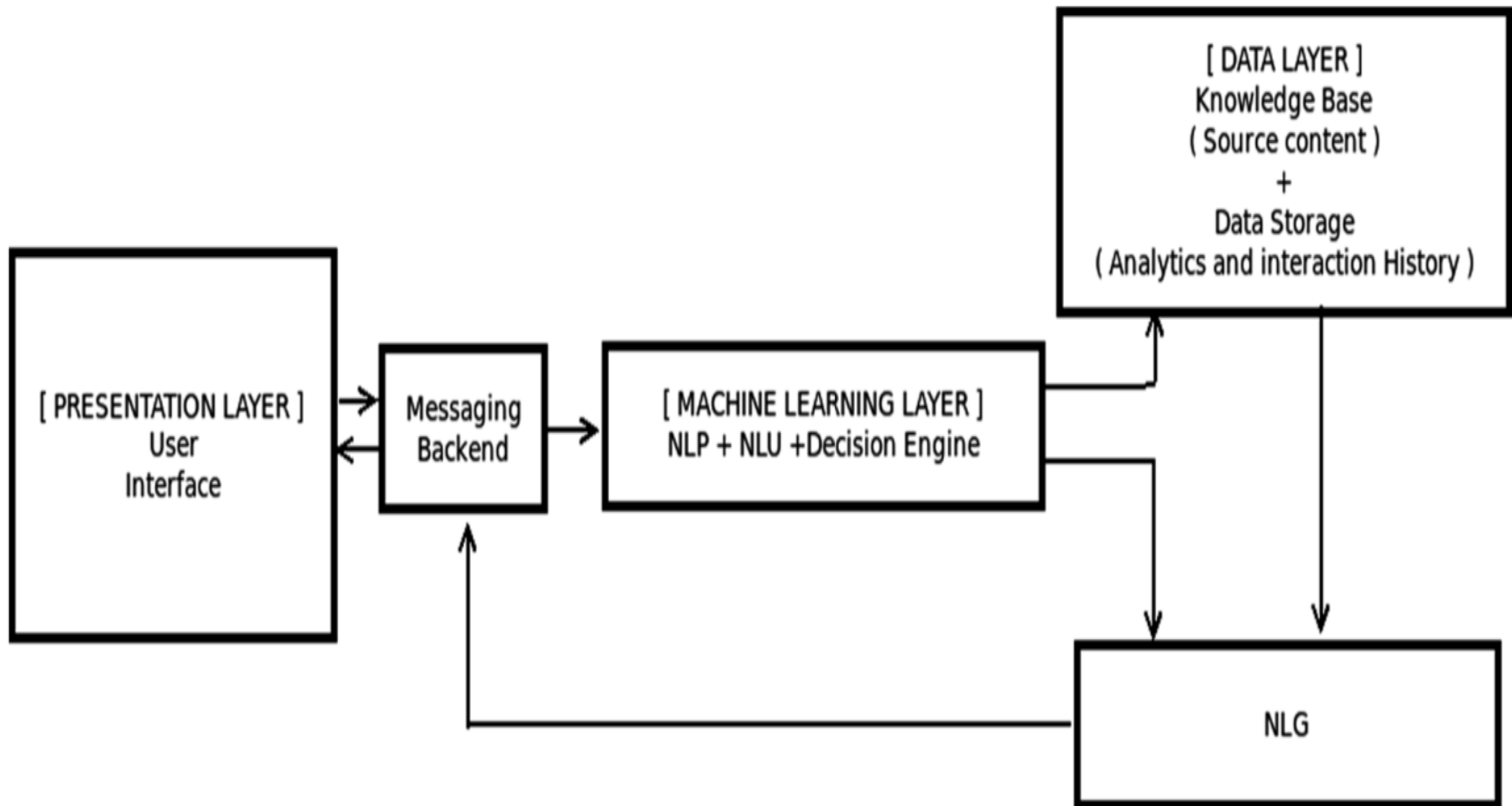
Chatbot



Dialogue System



Overall Architecture of Intelligent Chatbot



Can machines think?

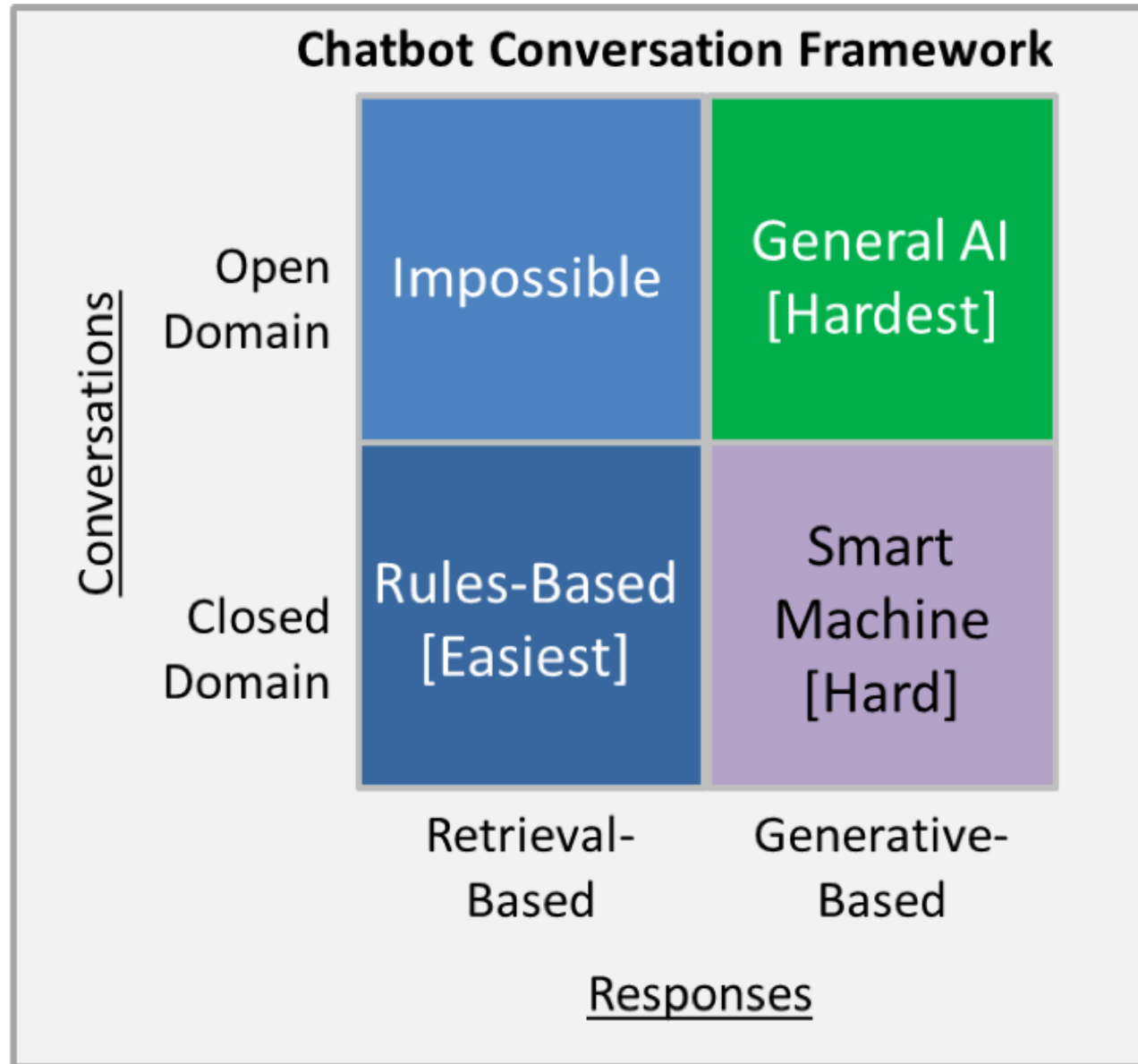
(Alan Turing ,1950)

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

Chatbot

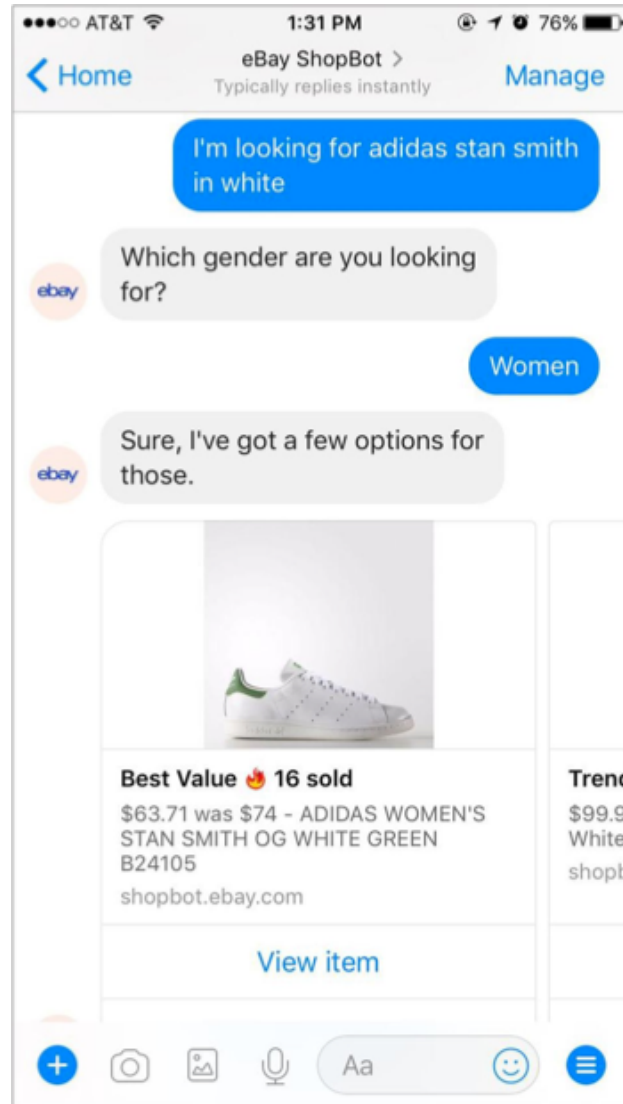
**“online human-computer
dialog system
with
natural language.”**

Chatbot Conversation Framework

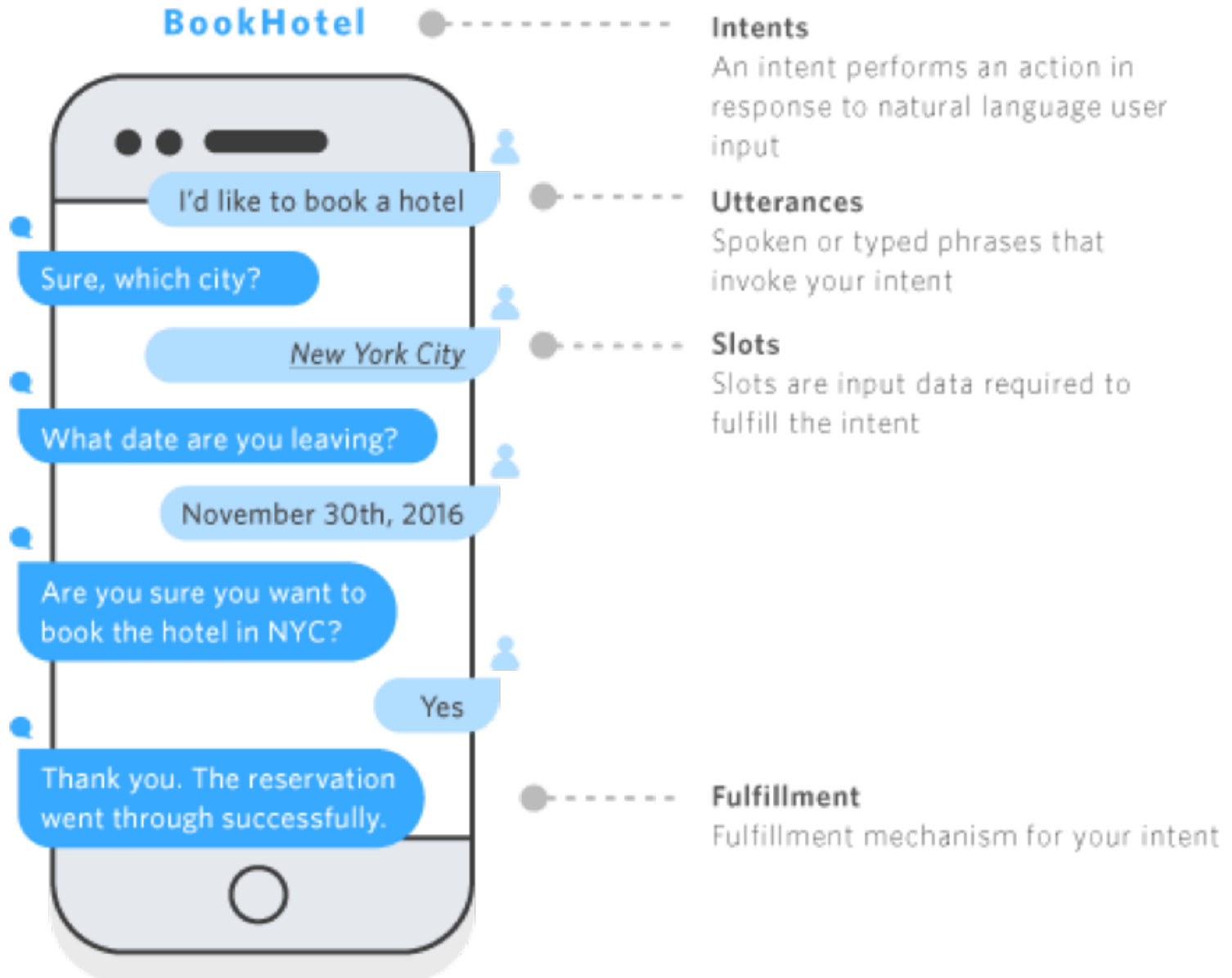


**From
E-Commerce
to
Conversational Commerce:
Chatbots
and
Virtual Assistants**

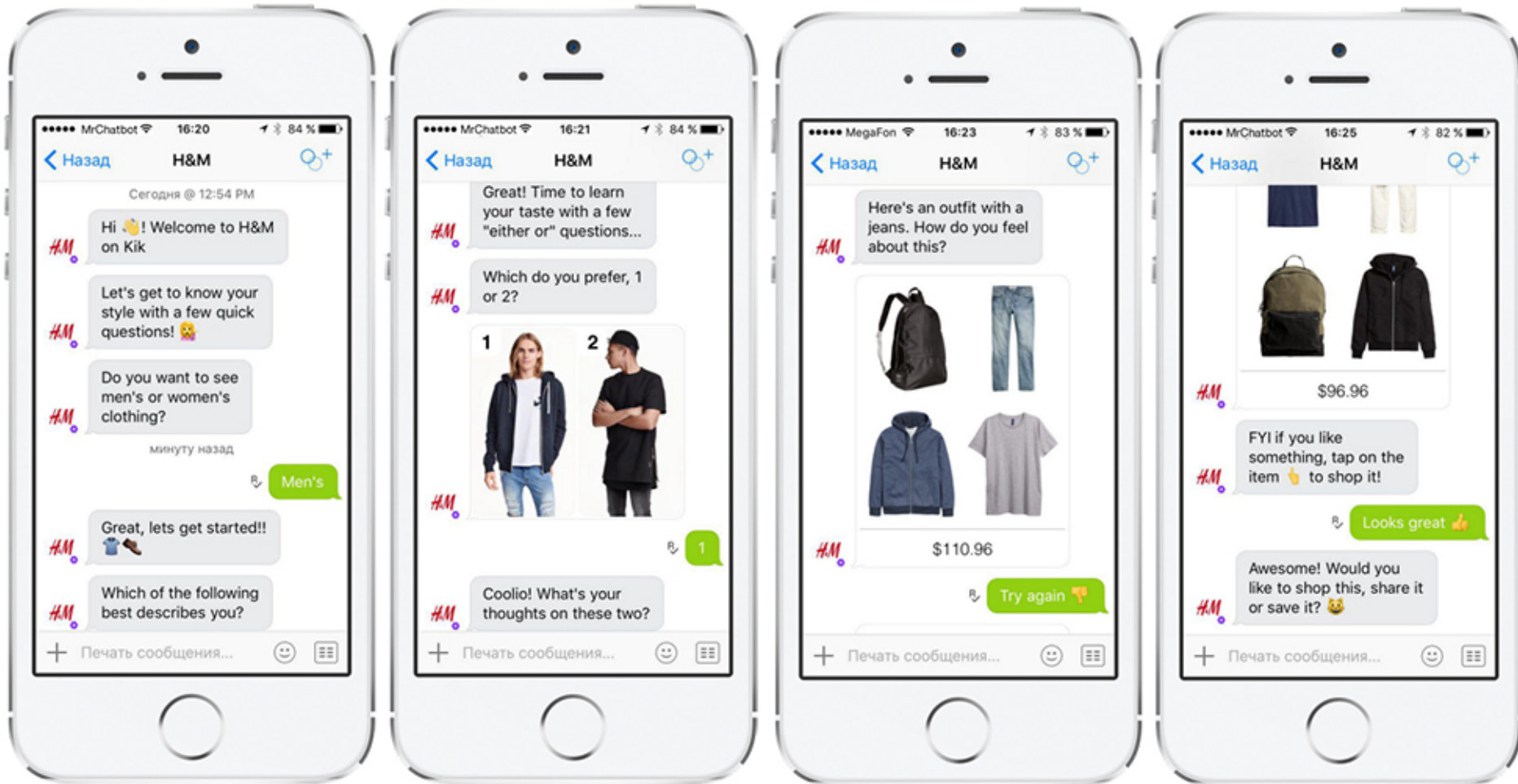
Conversational Commerce: eBay AI Chatbots



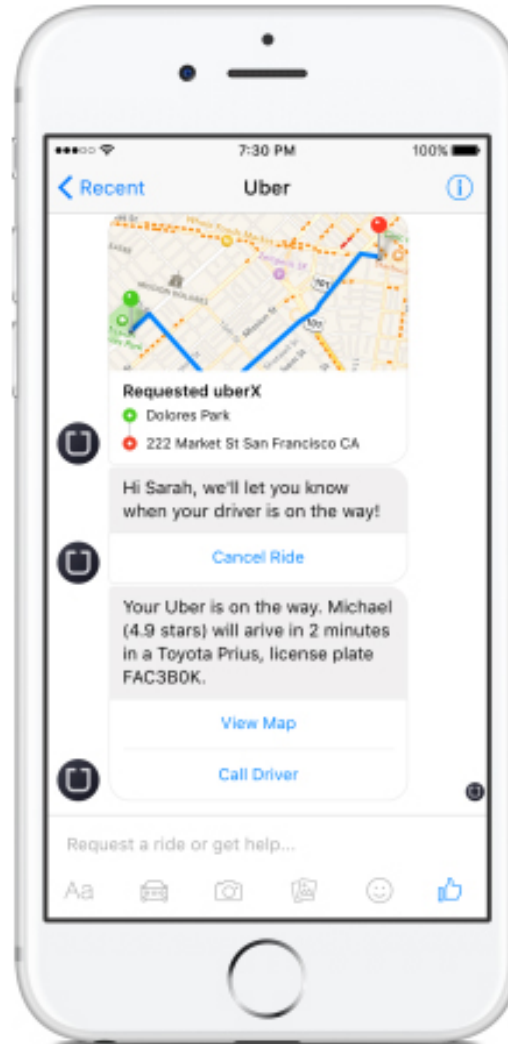
Hotel Chatbot



H&M's Chatbot on Kik



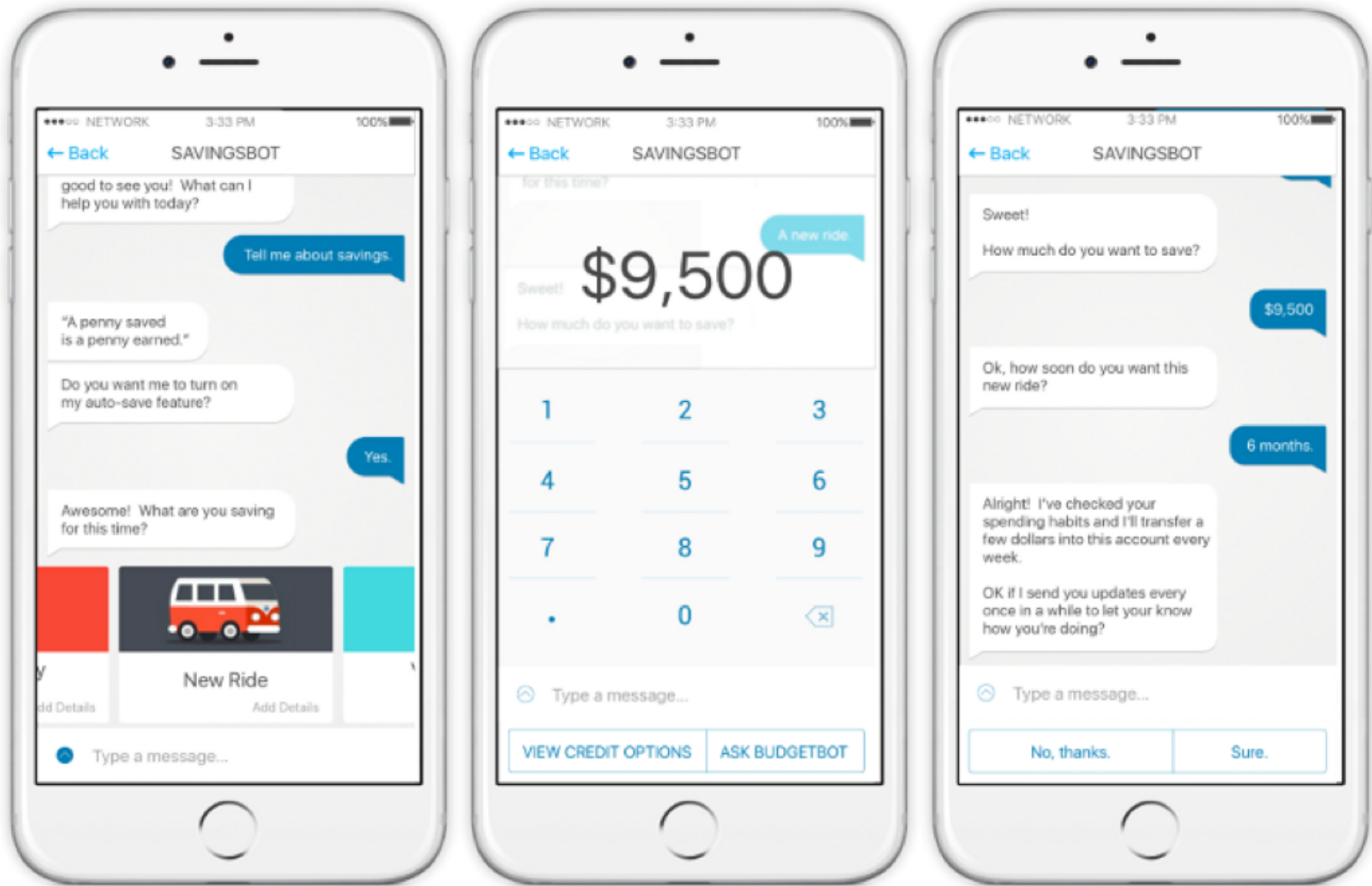
Uber's Chatbot on Facebook's Messenger



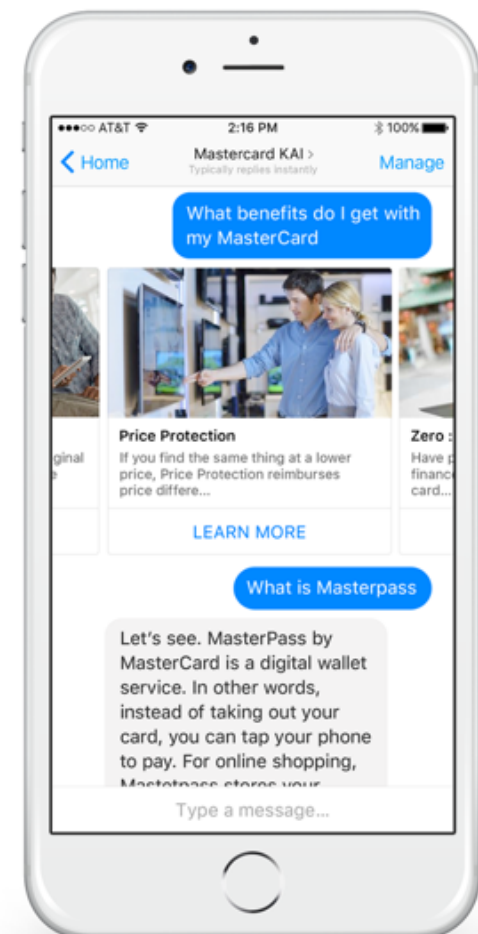
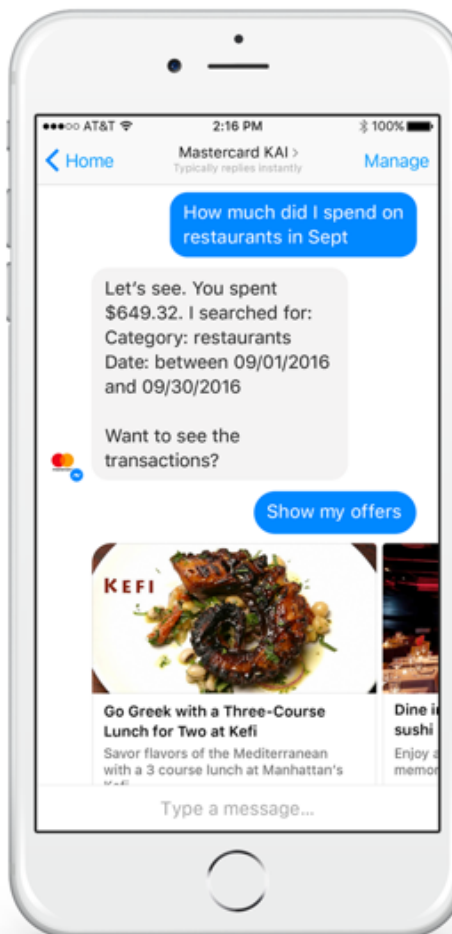
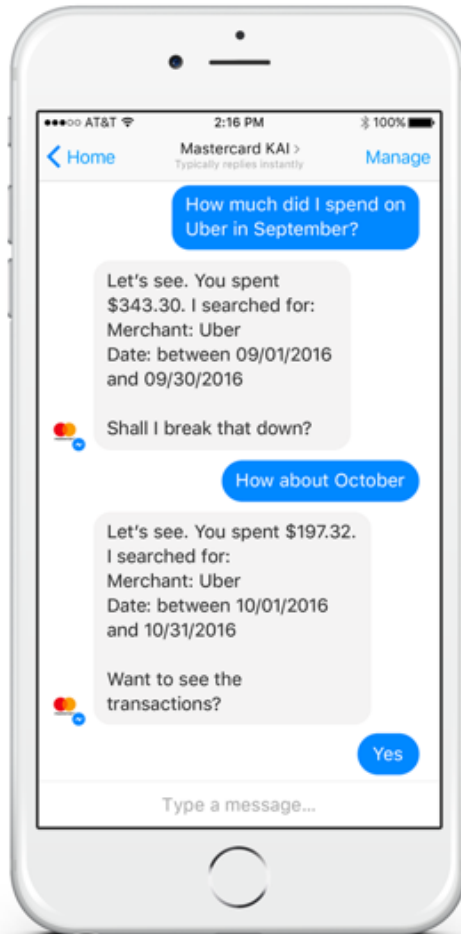
- Uber's chatbot on Facebook's messenger
- one main benefit: it loads much faster than the Uber app

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

Savings Bot



Mastercard Makes Commerce More Conversational

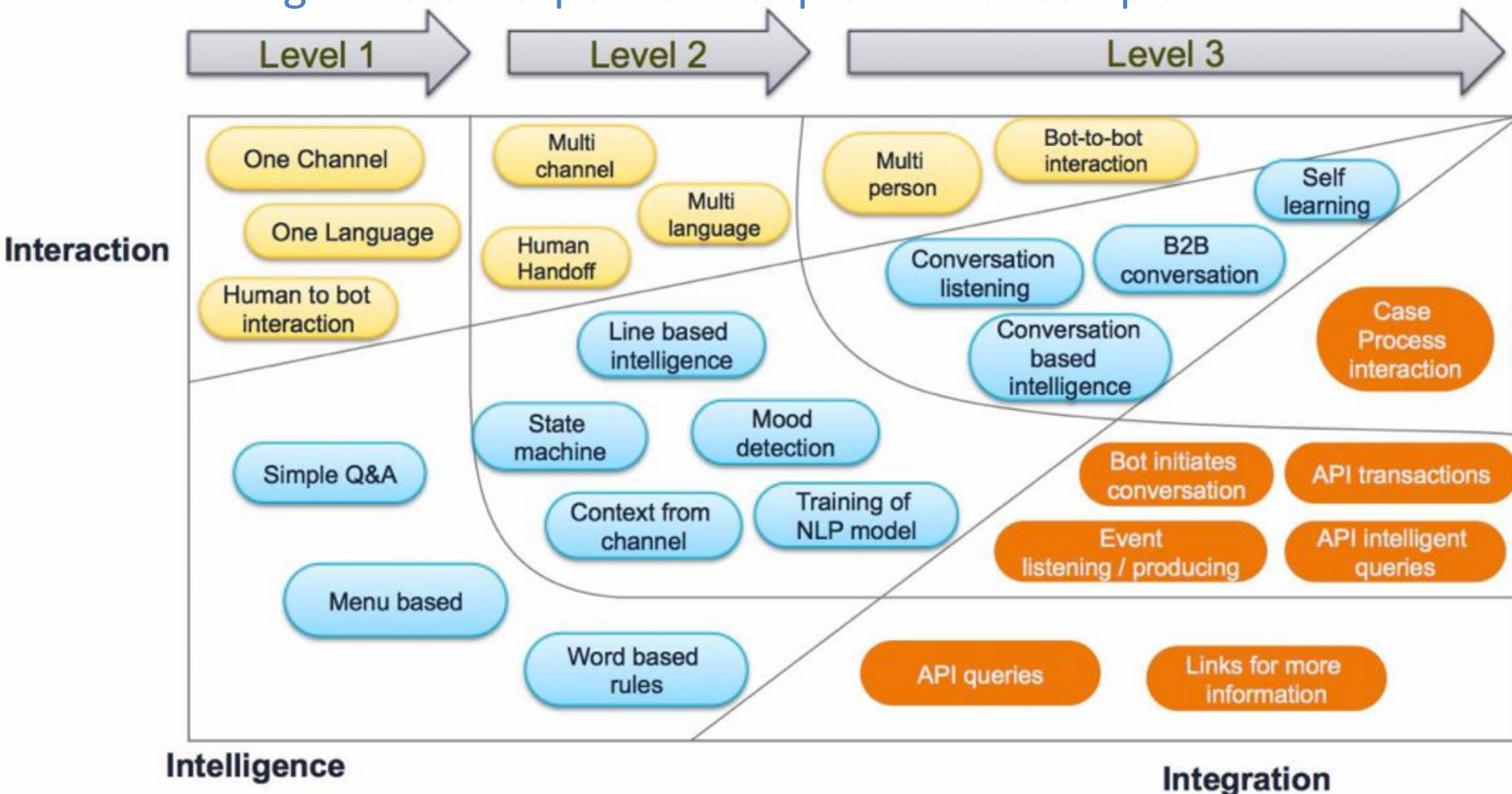


POWERED BY
Kasisto

Chatbots

Bot Maturity Model

Customers want to have simpler means to interact with businesses and get faster response to a question or complaint.



Question Answering (QA)

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



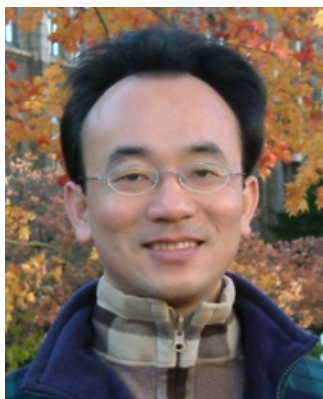
IMTKU

**Emotional Dialogue System
for
Short Text Conversation
at**

NTCIR-14 STC-3 (CECG) Task

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

Department of Information Management
Tamkang University, Taiwan



Min-Yuh Day

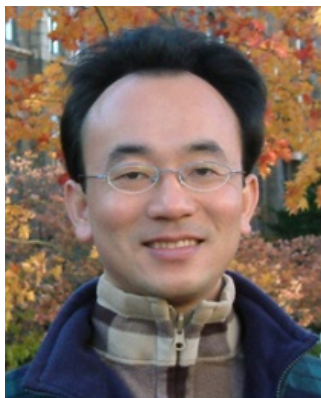
myday@mail.tku.edu.tw



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



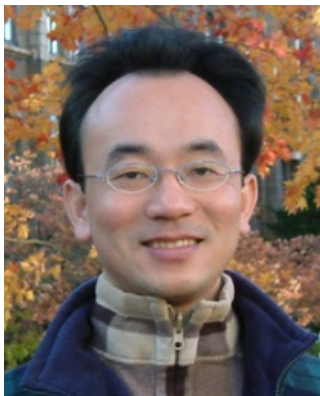
Shih-Jhen Huang

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



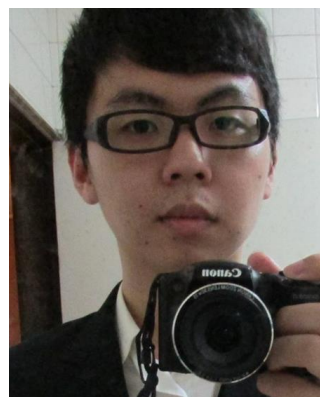
En-Chun Tu



Huai-Wen Hsu



Yu-An Lin



Shang-Yu Wu



Yu-Hsuan Tai



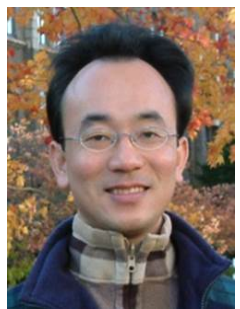
Cheng-Chia Tsai

2016

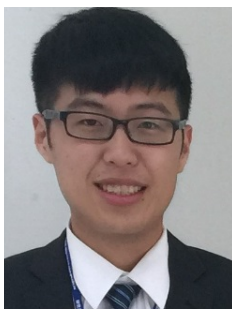
IMTKU Question Answering System for World History Exams at **NTCIR-12** QA Lab2

Department of Information Management
Tamkang University, Taiwan

Sagacity Technology



Min-Yuh Day



Cheng-Chia Tsai



Wei-Chun Chung



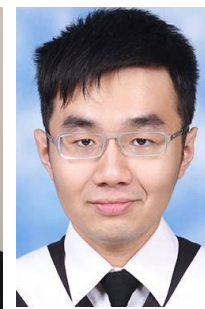
Hsiu-Yuan Chang



Tzu-Jui Sun



Yuan-Jie Tsai



Jin-Kun Lin



Cheng-Hung Lee



Yu-Ming Guo



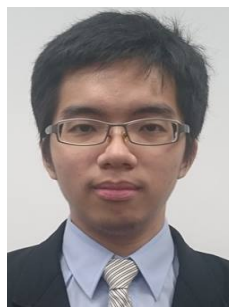
Yue-Da Lin



Wei-Ming Chen



Yun-Da Tsai



Cheng-Jhih Han



Yi-Jing Lin



Yi-Heng Chiang



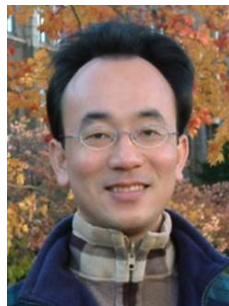
Ching-Yuan Chien

myday@mail.tku.edu.tw

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

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

Department of Information Management
Tamkang University, Taiwan



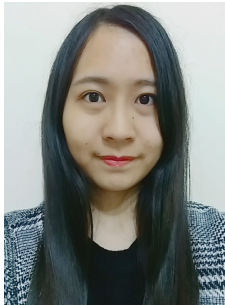
Min-Yuh Day



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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IMTKU Emotional Dialogue System for Short Text Conversation at **NTCIR-14** STC-3 (CECG) Task

Department of Information Management
Tamkang University, Taiwan



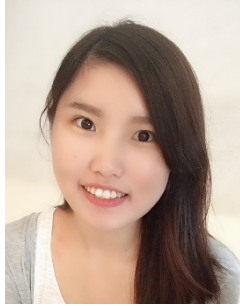
Min-Yuh Day



Chi-Sheng Hung



Yi-Jun Xie



Jhih-Yi Chen



Yu-Ling Kuo

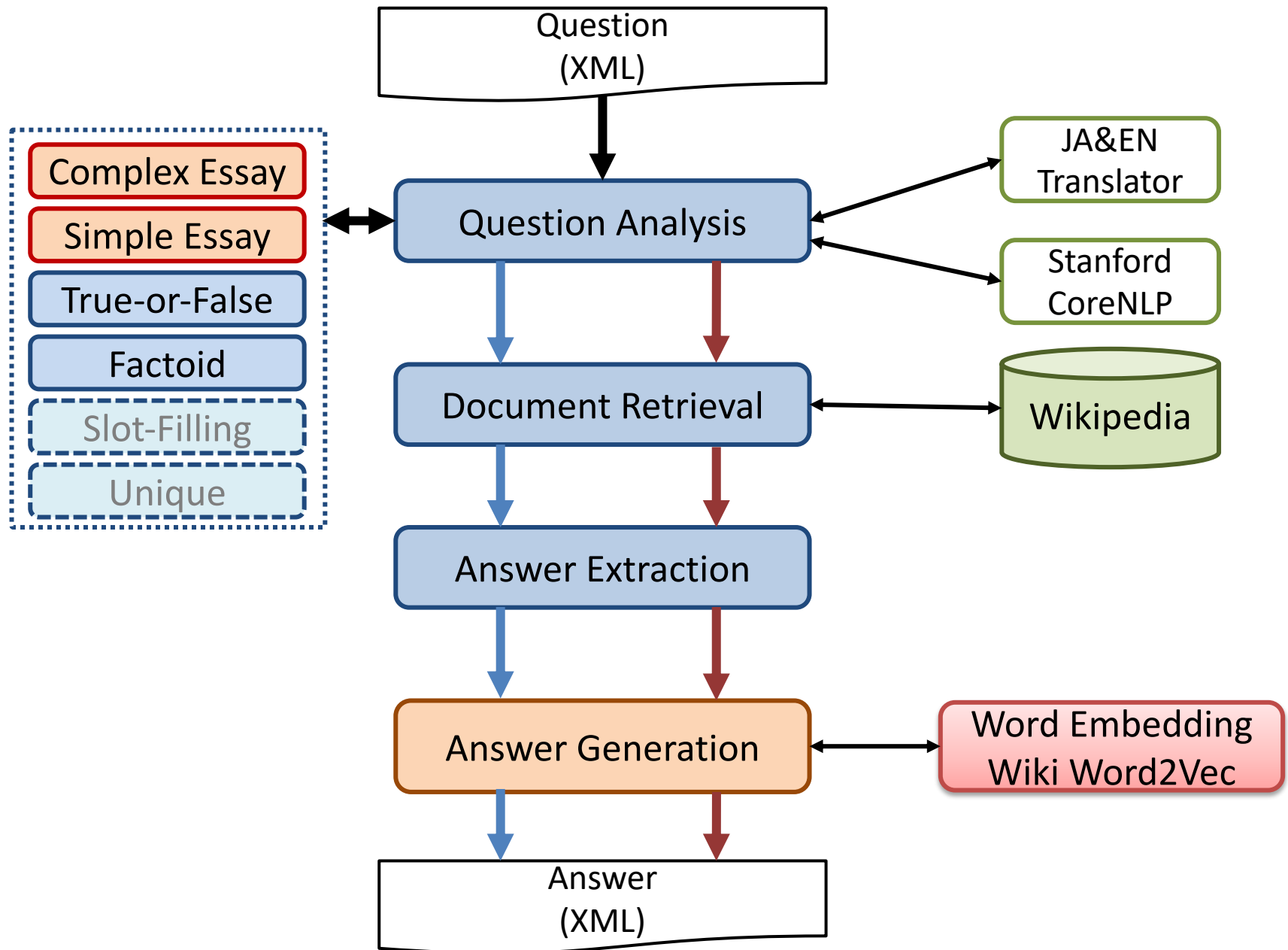


Jian-Ting Lin

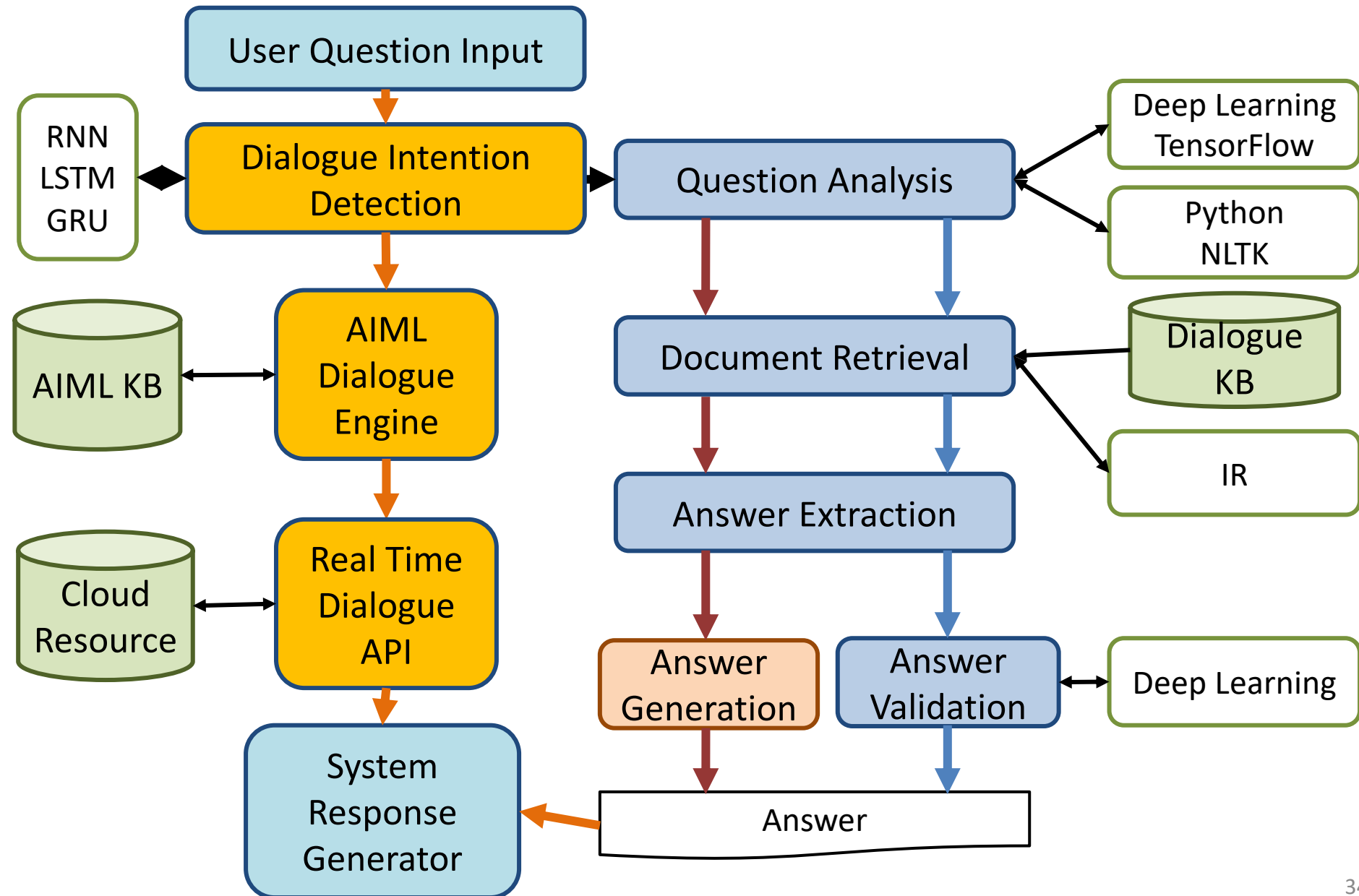
myday@mail.tku.edu.tw

NTCIR-14 Conference, June 10-13, 2019, Tokyo, Japan

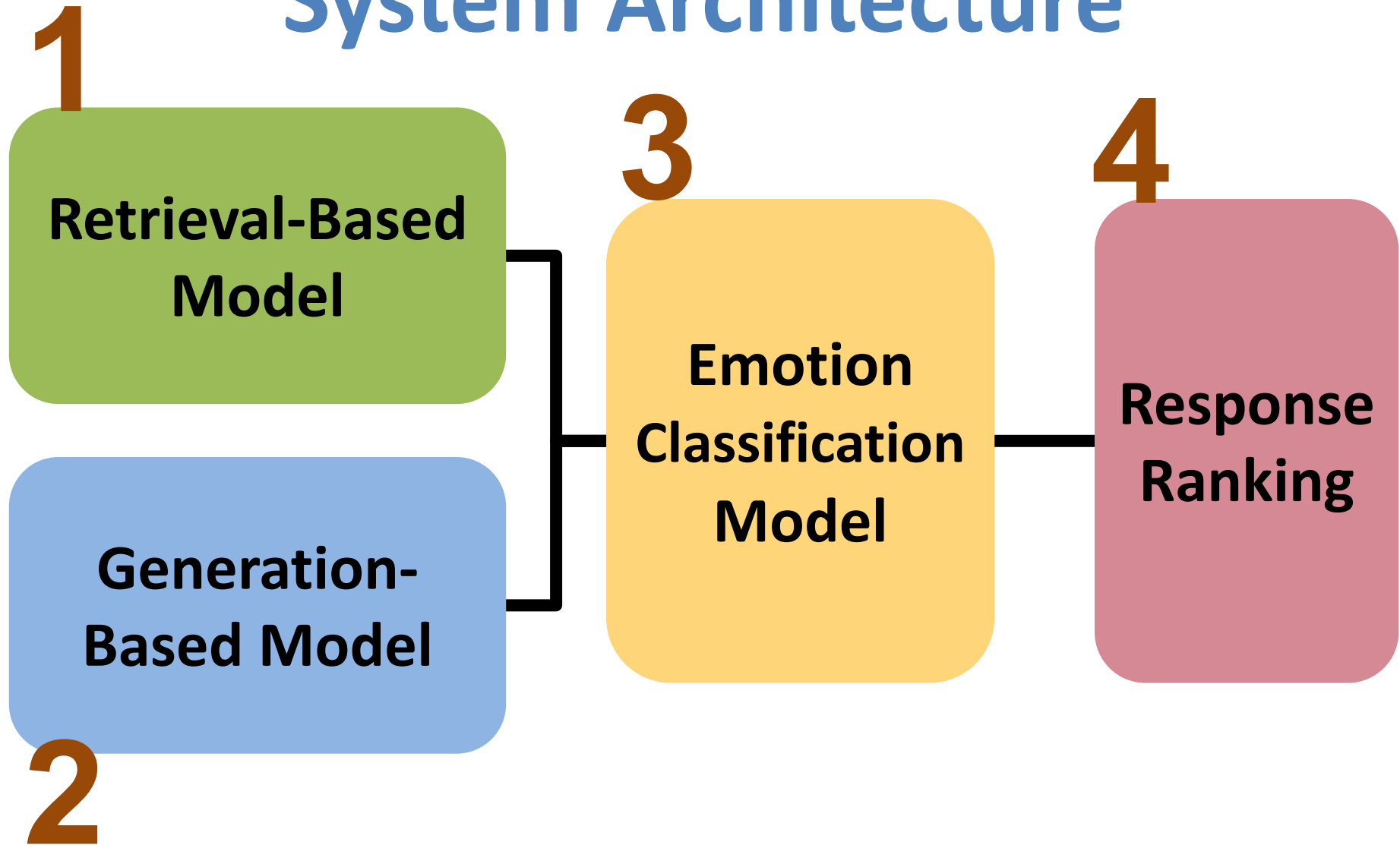
IMTKU System Architecture for NTCIR-13 QALab-3



System Architecture of Intelligent Dialogue and Question Answering System



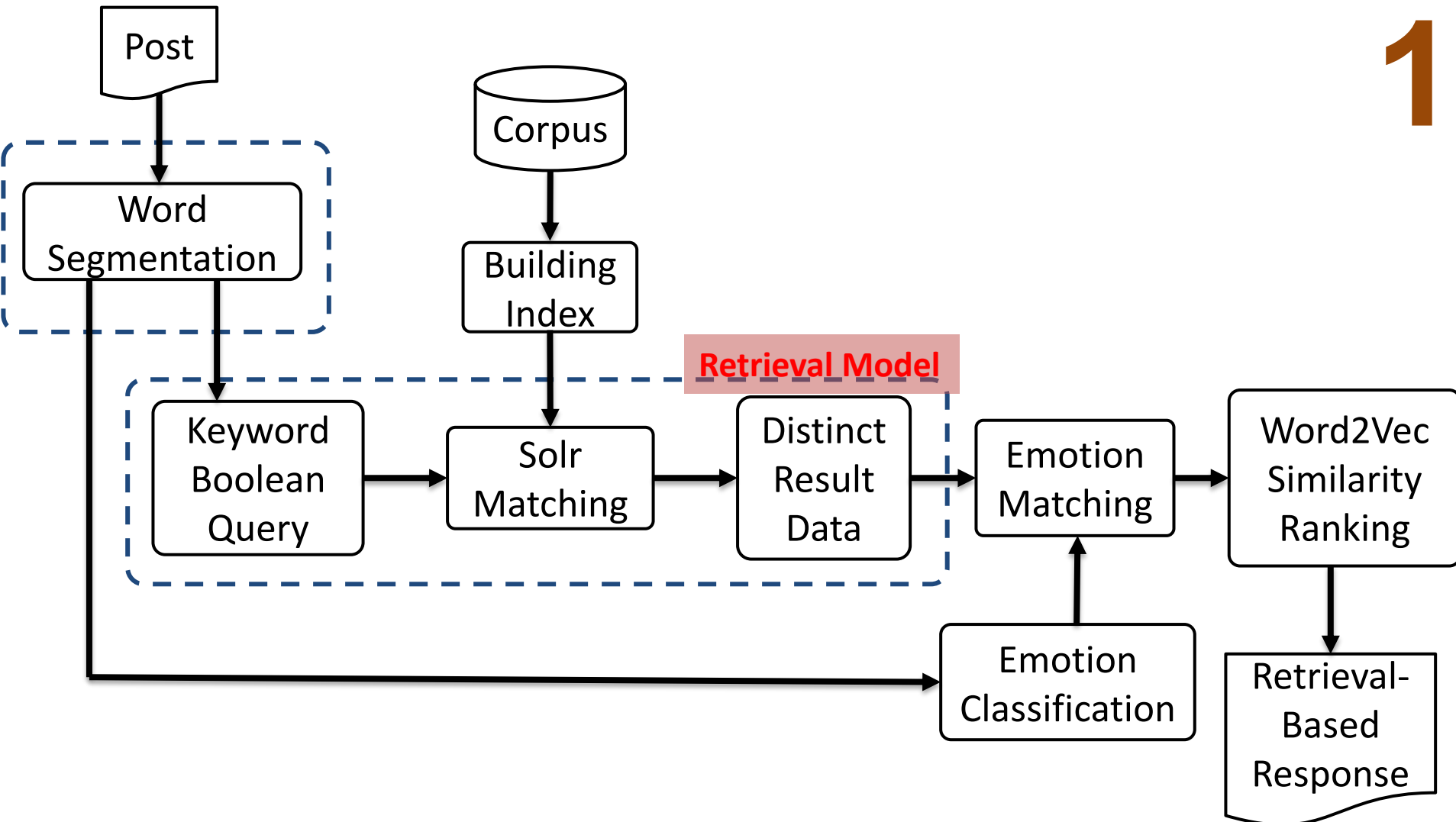
IMTKU Emotional Dialogue System Architecture



The system architecture of IMTKU retrieval-based model for NTCIR-14 STC-3

Retrieval-Based Model

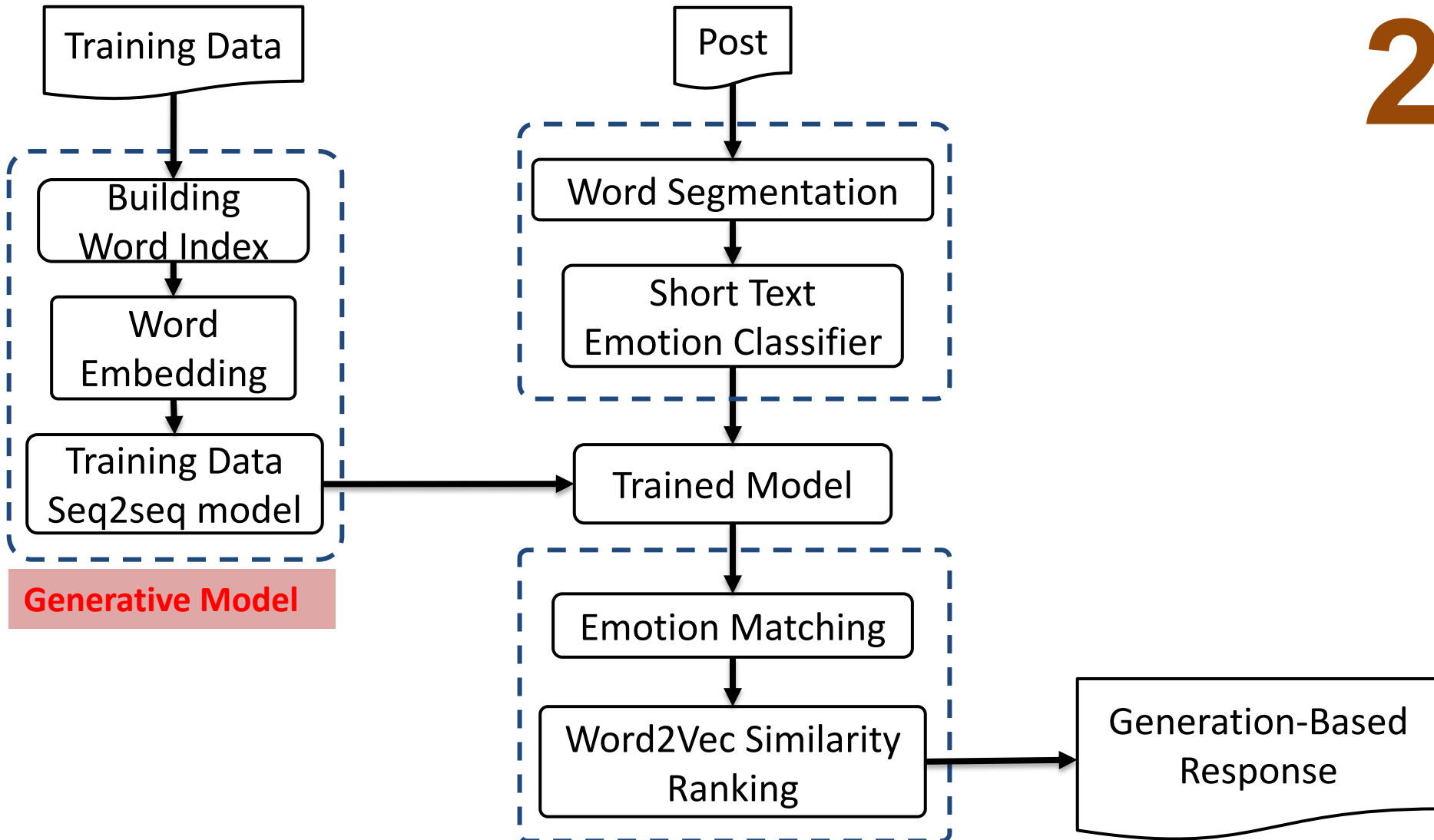
1



The system architecture of IMTKU generation-based model for NTCIR-14 STC-3

Generation-Based Model

2

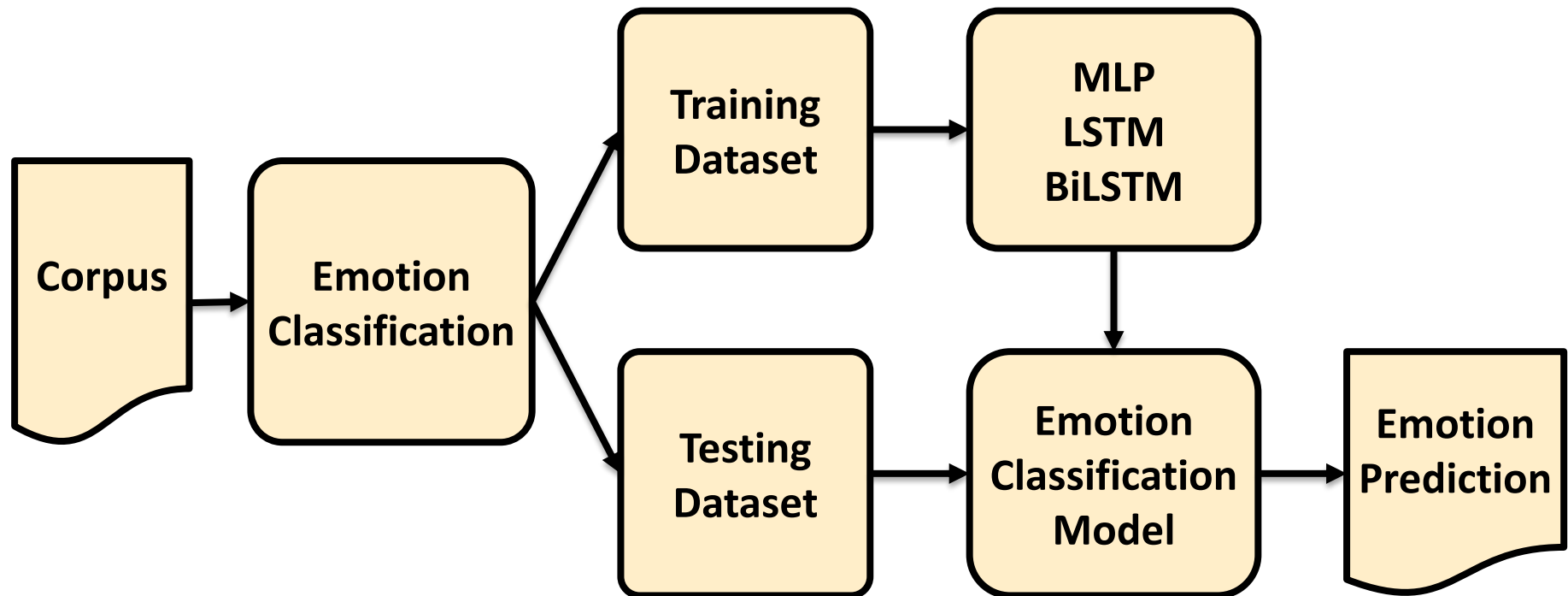


The system architecture of IMTKU emotion classification model for NTCIR-14 STC-3



Emotion Classification Model

3

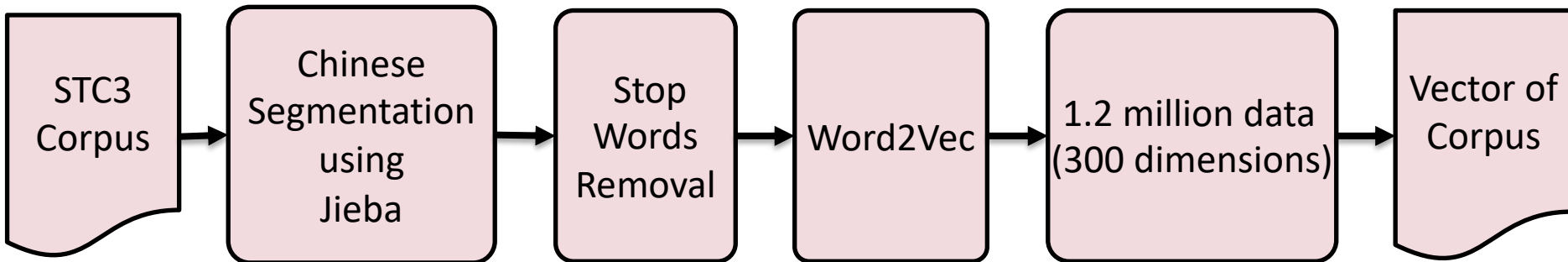


The system architecture of IMTKU Response Ranking for NTCIR-14 STC-3



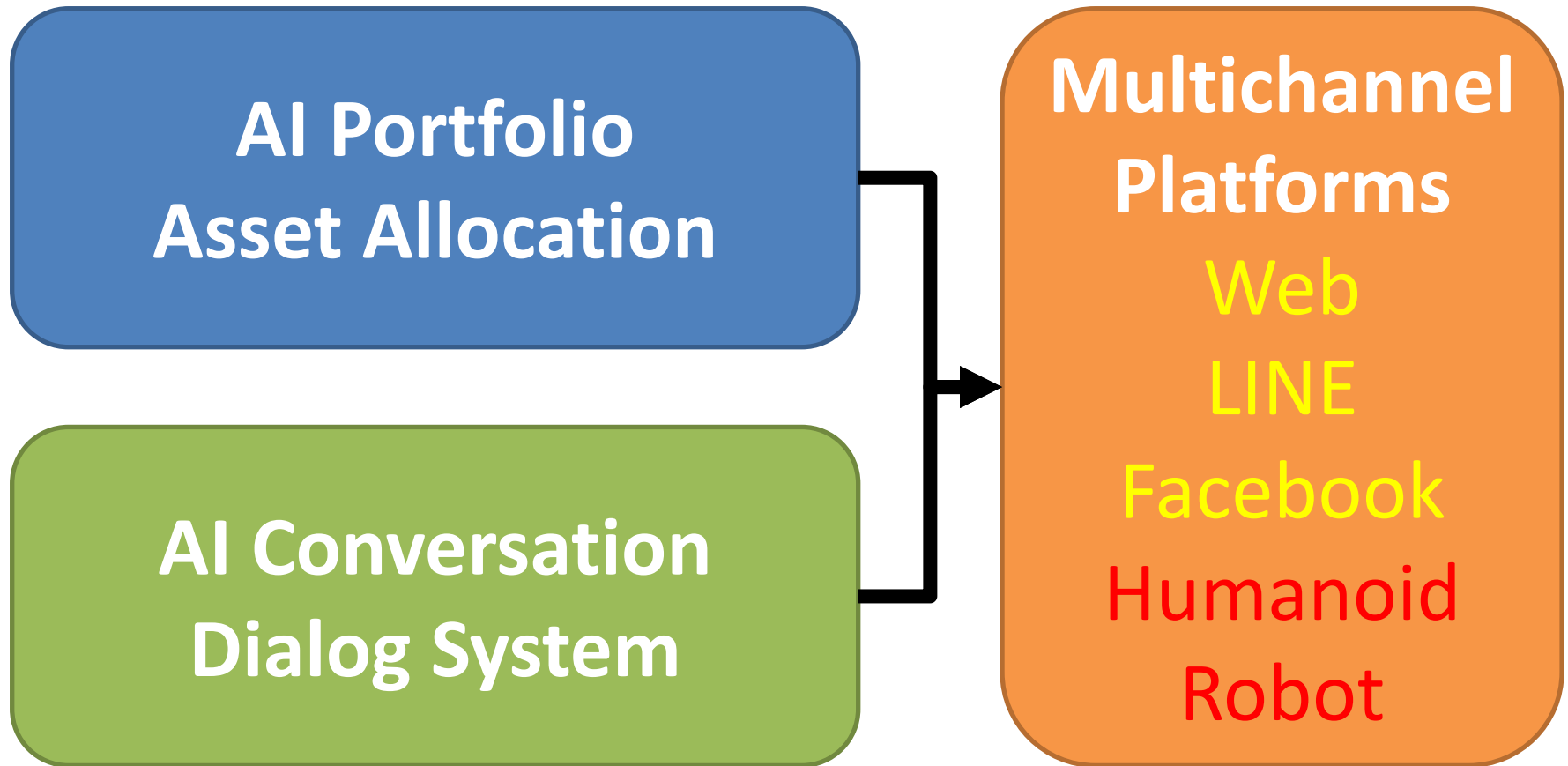
Response Ranking

4

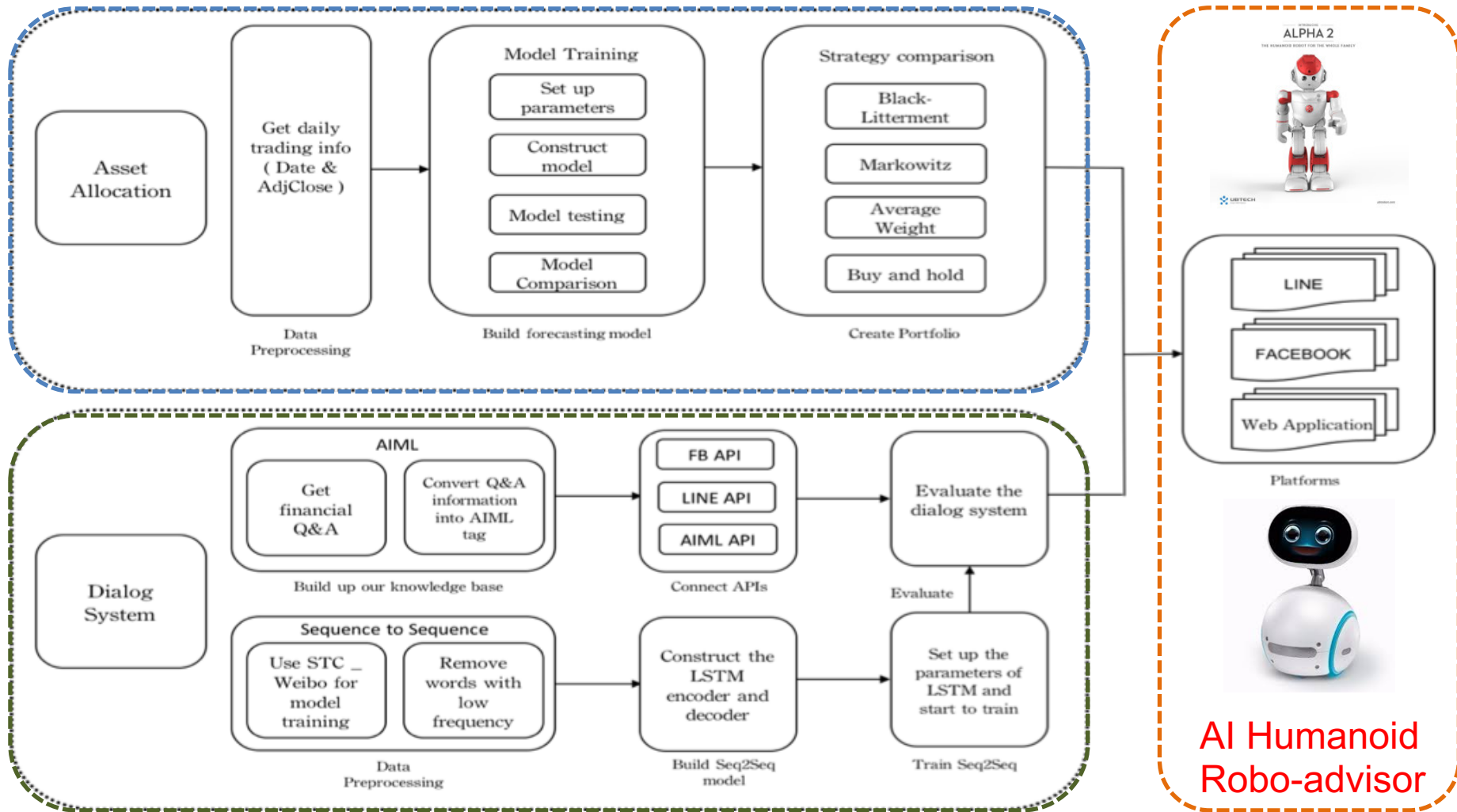


AI Humanoid Robo-Advisor

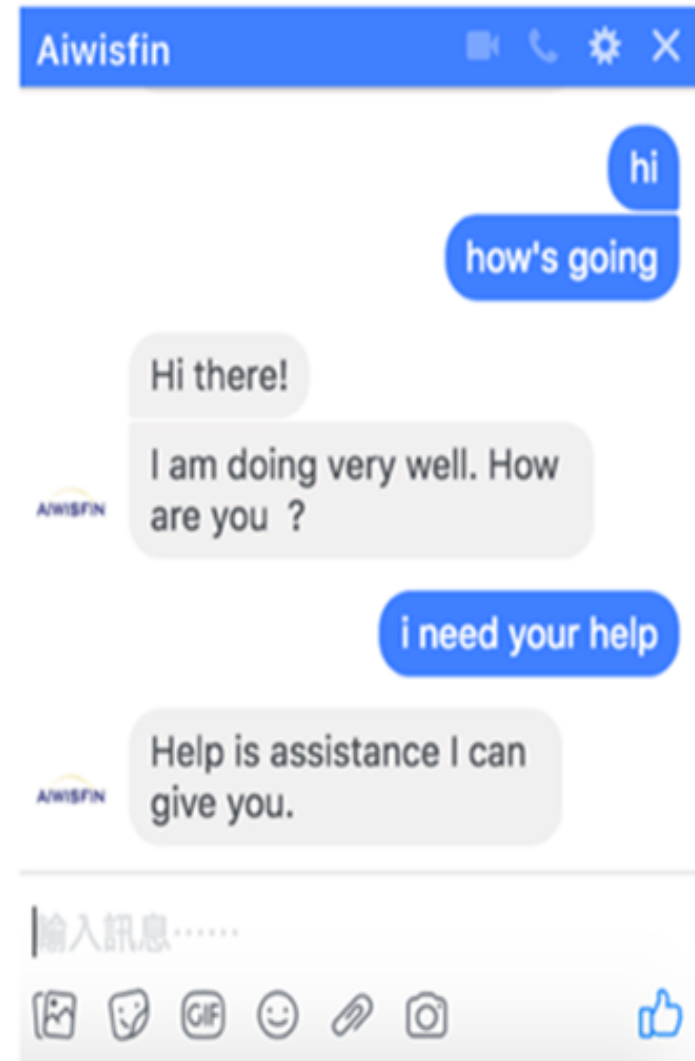
AI Humanoid Robo-Advisor for Multi-channel Conversational Commerce



System Architecture of AI Humanoid Robo-Advisor



Conversational Model (LINE, FB Messenger)



Conversational Robo-Advisor

Multichannel UI/UX

Robots



ALPHA 2

ZENBO





**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		

Source: <https://waseda.app.box.com/v/STC3atNTCIR-14>

The 14th NTCIR (2018 - 2019)

NTCIR (NII Testbeds and Community for Information access Research) Project



Publications/
Online Proceedings

Data/Tools

NTCIR CMS Site

Related URL's

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NTCIR 14

NTCIR-14 Conference

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[Call for Task Proposals](#)

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Task Participation

Task Overview/Call for
Task Participation

User Agreement Forms

[Organization](#)

Important Dates

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NTCIR 13

NTCIR 12

NTCIR-14

The 14th NTCIR (2018 - 2019)

Evaluation of Information Access Technologies

January 2018 - June 2019

What's New

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

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

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

NEW About Proceedings

After the NTCIR-14 conference, a post-proceedings of revised selected papers will be published in [the Springer Lecture Notes on Computer Science \(LNCS\) series.](#)

Lecture Notes in
Computer Science

<http://research.nii.ac.jp/ntcir/ntcir-14/index.html>

NTCIR-14 STC-3

Short Text Conversation Task (STC-3)

Chinese Emotional Conversation Generation (CECG) Subtask



Short Text Conversation Task (STC-3)

Chinese Emotional Conversation Generation (CECG) Subtask

[Home](#)[Task Definition](#)[Dataset Description](#)[Evaluation Metric](#)[Time Schedule](#)[Copy Rights &
Contacts](#)

Call for Participation

In recent years, there has been a rising tendency in AI research to enhance Human-Computer Interaction by humanizing machines. However, to create a robot capable of acting and talking with a user at the human level requires the robot to understand human cognitive behaviors, while one of the most important human behaviors is expressing and understanding emotions and affects. As a vital part of human intelligence, emotional intelligence is defined as the ability to perceive, integrate, understand, and regulate emotions. Though a variety of models have been proposed for conversation generation from large-scale social data, it is still quite challenging (and yet to be addressed) to generate emotional responses.

In this challenge, participants are expected to generate Chinese responses that are not only appropriate in content but also adequate in emotion, which is quite important for building an empathic chatting machine. For instance, if user says “My cat died yesterday”, the most appropriate response may be “It’s so sad, so sorry to hear that” to express sadness, but also could be “Bad things always happen, I hope you will be happy soon” to express comfort.

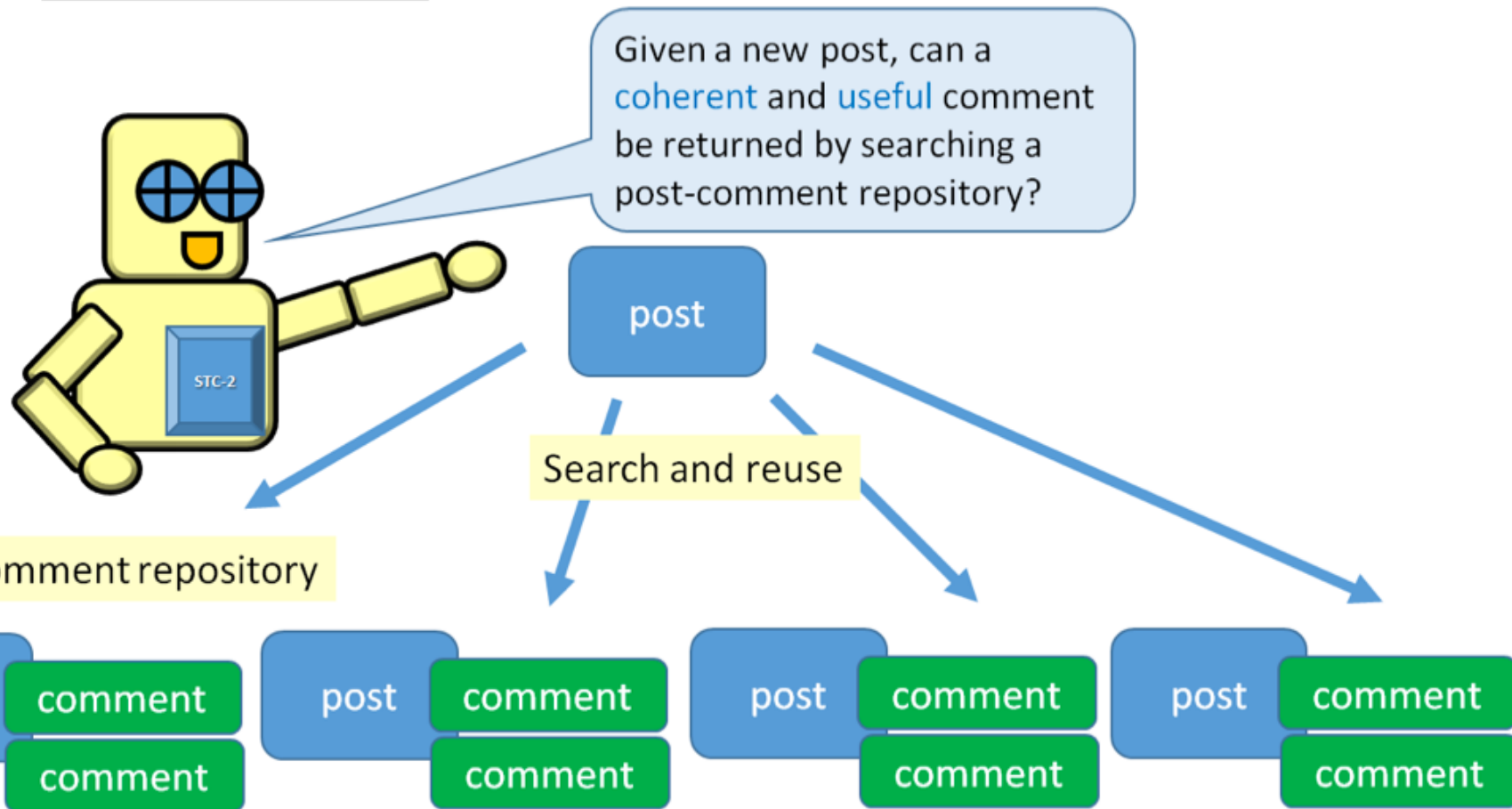
[Previous Evaluation Challenge at NLPCC 2017](#)[Overview of the NLPCC 2017 Shared Task: Emotion Generation Challenge](#)

Links

[NTCIR-14](#)[STC-3 NTCIR-14 STC-3](#)[NLPCC 2017](#)

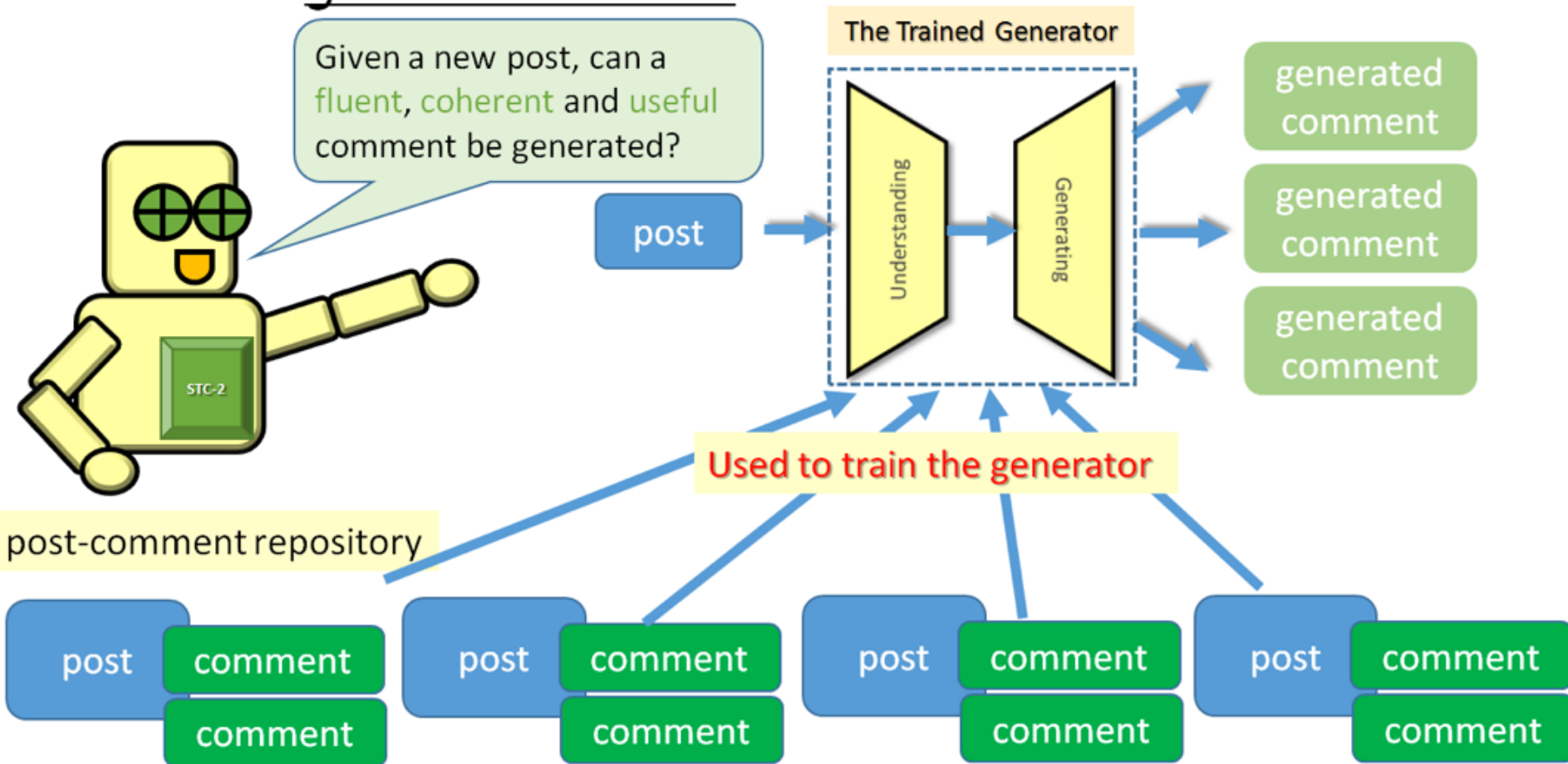
Short Text Conversation (NTCIR-13 STC2) Retrieval-based

retrieval-based method



Short Text Conversation (NTCIR-13 STC2) Generation-based

generation-based method



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!

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	我就是个 开心 的傻子	I'm just a happy fool
		Sad	我就是个 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.

Bot Platform Ecosystem

The bot platform ecosystem and the emerging giants

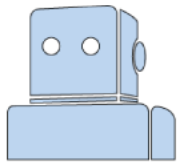
Nearly every large software company has announced some sort of bot strategy in the last year. Here's a look at a handful of leading platforms that developers might use to send messages, interpret natural language, and deploy bots, with the emerging bot-ecosystem giants highlighted.

General AI agents with platforms

Developer access available now or announced



Bot frameworks and deployment platforms



Wit.ai
Facebook



BotKit
Howdy



Chatfuel

AUTOMAT

Automat



Bot Framework
Microsoft



Api.ai
Google



Pandorabots



MindMeld



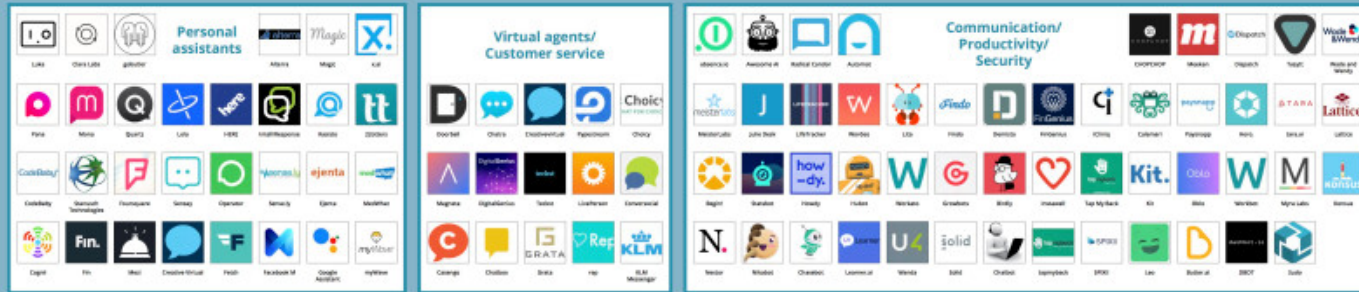
Gupshup



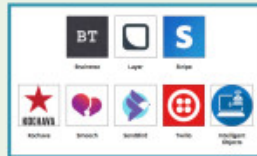
Sequel

Bots Landscape

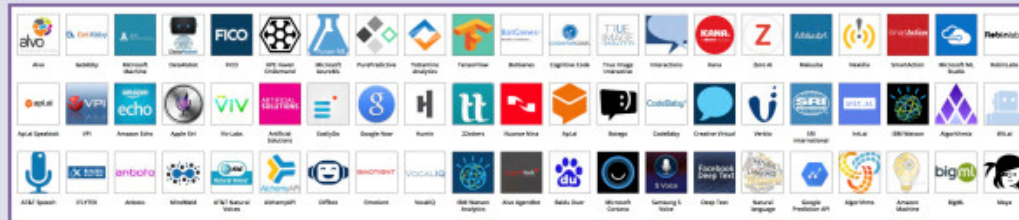
Bots with traction



Connectors/ Shared Services



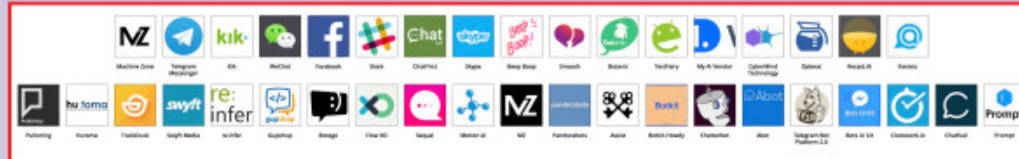
AI Tools: Natural Language Processing, Machine Learning, Speech & Voice Recognition



Bot Discovery



Bot developer frameworks and tools



Analytics



Messaging



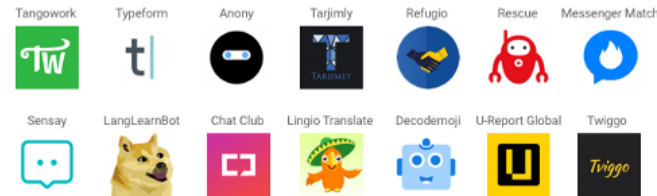
RECAST.AI Messenger Bot Landscape

May 2017

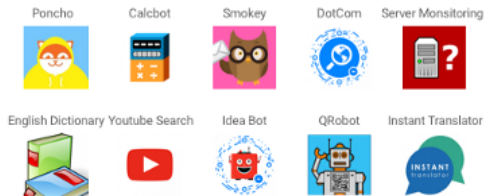
Food



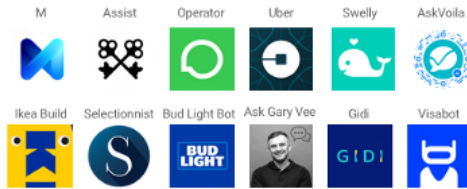
Communication



Utilities



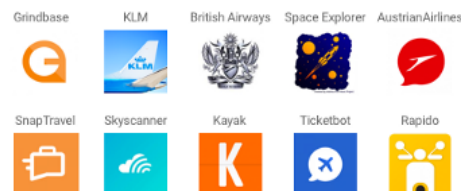
Personal



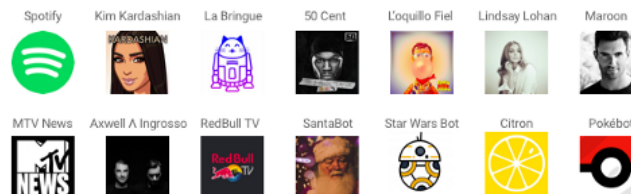
Analytics



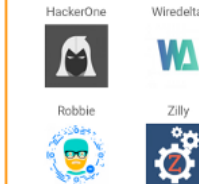
Travel



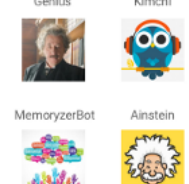
Entertainment



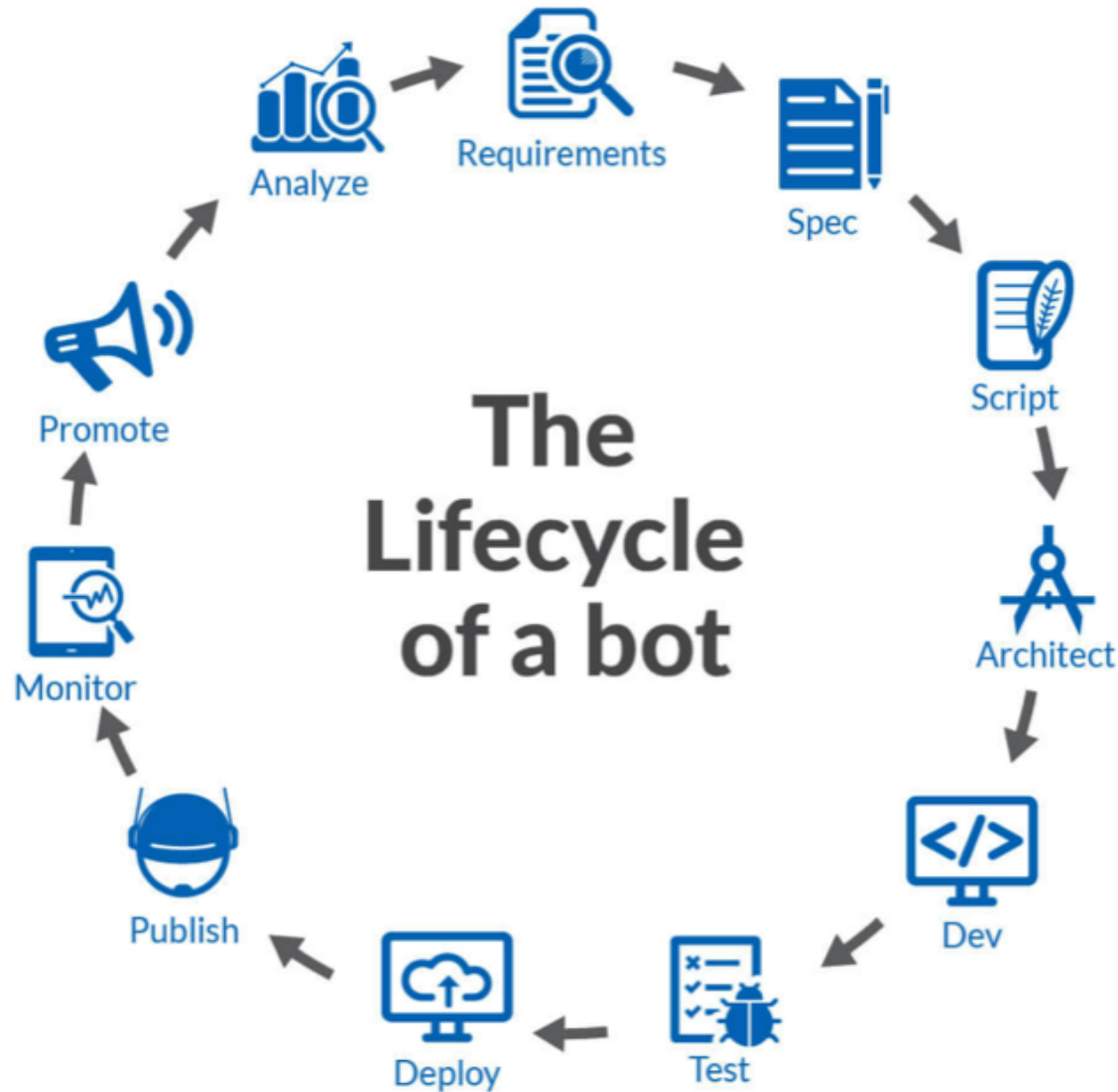
Developer Tools



Education



The Bot Lifecycle



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