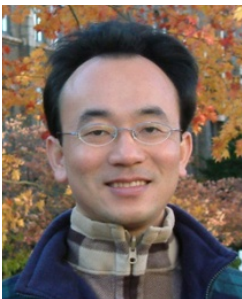


AI Dialogue System for Conversational Commerce in FinTech

Host: Prof. Cheng-Zen Yang
Yuan Ze University

Time: 14:00-16:00, 2019/12/04 (Wednesday)
Place: 1309, Building 1, Yuan Ze University (YZU)
Address: 135 Yuan-Tung Road, Chung-Li, Taiwan



Min-Yuh Day
Associate Professor
Dept. of Information Management,
Tamkang University

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

2019-12-04





Min-Yuh Day, Ph.D.

Associate Professor, Information Management, TKU

Visiting Scholar, IIS, Academia Sinica

Ph.D., Information Management, NTU

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

- **AI Dialogue System**
- **Conversational Commerce**
- **FinTech**

AI Dialogue System

AIWISFIN

AI Conversational Robo-Advisor (人工智慧對話式理財機器人)

First Place, InnoServe Awards 2018



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

2018 The 23th International ICT Innovative Services Awards (InnoServe Awards 2018)



- Annual ICT application competition held for university and college students
- The largest and the most significant contest in Taiwan.
- More than **ten thousand teachers and students** from over **one hundred universities and colleges** have participated in the Contest.

2018 International ICT Innovative Services Awards (InnoServe Awards 2018)

(2018第23屆大專校院資訊應用服務創新競賽)



第23屆 大專校院
2018 資訊應用服務創新競賽
International ICT Innovative Services Awards 2018

創意噴發!

InnoServe Awards

總獎金 > 200 萬

■ 報名日期: 2018/10/2(二)~
2018/10/9(二)pm6 點截止

■ 參賽對象: 大專校院學生、
碩博士生及高中職學生

■ 決賽時間: 2018/11/3(六)
■ 決賽地點: 國立臺灣大學
綜合體育館

☰ 最新消息 ▾

活動訊息

媒體轉載

🌀 競賽緣起

📄 競賽辦法 ▾

👤 競賽報名

💬 活動成果 ▾

🔗 產學媒合 ▾

🔗 媒合

📞 聯絡我們

🗨️ 榮譽榜

屆別 23 ▾ 查詢

第23屆

顯示 30 ▾ 筆資料

表格內全文檢索: AIWISFIN

組別	名次	組別編號	學校名稱	專題名稱	指導教授	學生
資訊應用組一	第一名	IP1-06	淡江大學	AIWISFIN 人工智慧對話式理財機器人	戴敏育老師	陳元致、鄧旭廷、王慶宇、邱少文
玉山銀行金融科技趨勢應用組	第一名	E.SUN FINTECH-01	淡江大學	AIWISFIN 人工智慧對話式理財機器人	戴敏育老師	陳元致、鄧旭廷、王慶宇、邱少文

<https://innoserve.tca.org.tw/award.aspx>



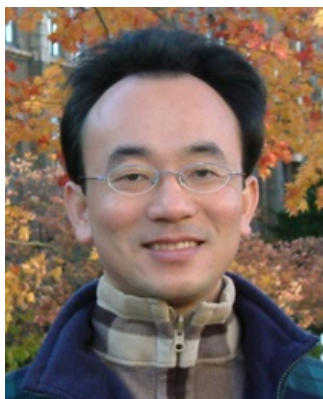
IMTKU

**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

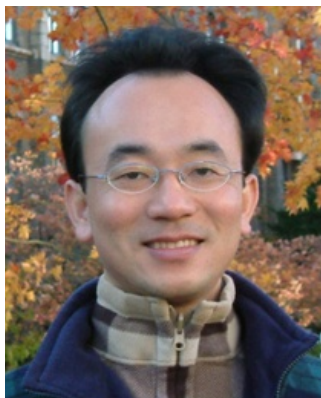
myday@mail.tku.edu.tw



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



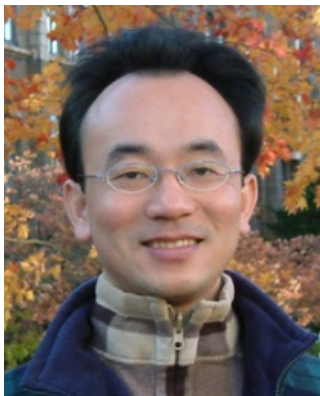
Shih-Jhen Huang

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



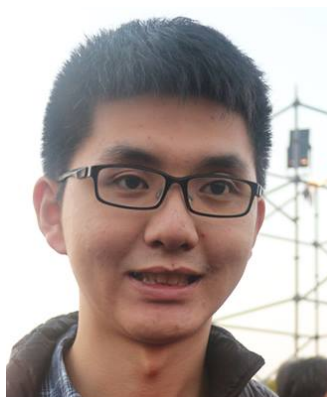
Che-Wei Hsu



En-Chun Tu



Huai-Wen Hsu



Yu-An Lin



Shang-Yu Wu



Yu-Hsuan Tai



Cheng-Chia Tsai

2016

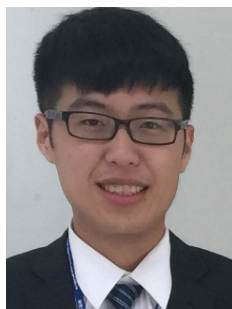
IMTKU Question Answering System for World History Exams at **NTCIR-12** QA Lab2

Department of Information Management
Tamkang University, Taiwan

Sagacity Technology



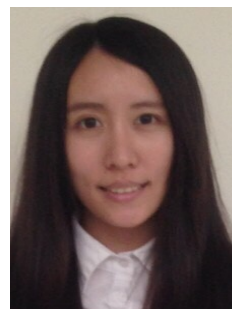
Min-Yuh Day



Cheng-Chia Tsai



Wei-Chun Chung



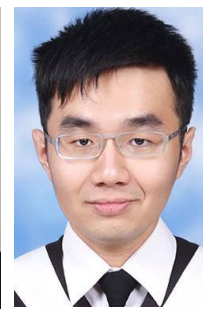
Hsiu-Yuan Chang



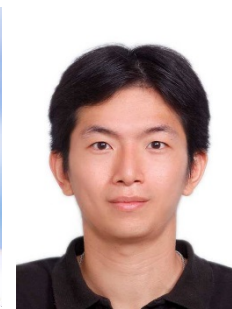
Tzu-Jui Sun



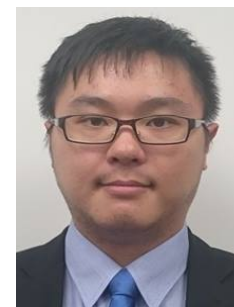
Yuan-Jie Tsai



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



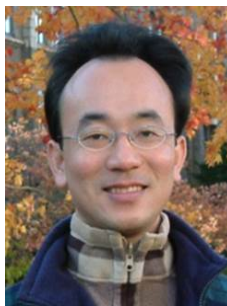
Ching-Yuan Chien

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



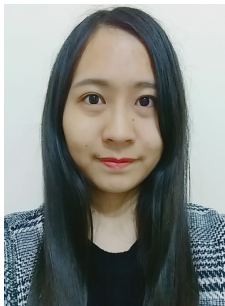
Min-Yuh Day



Chao-Yu Chen



Wanchu Huang



Shi-Ya Zheng



I-Hsuan Huang



Tz-Rung Chen



Min-Chun Kuo



Yue-Da Lin



Yi-Jing Lin

myday@mail.tku.edu.tw

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

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

Department of Information Management
Tamkang University, Taiwan



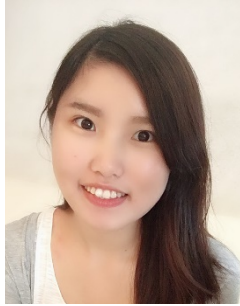
Min-Yuh Day



Chi-Sheng Hung



Yi-Jun Xie



Jhih-Yi Chen



Yu-Ling Kuo

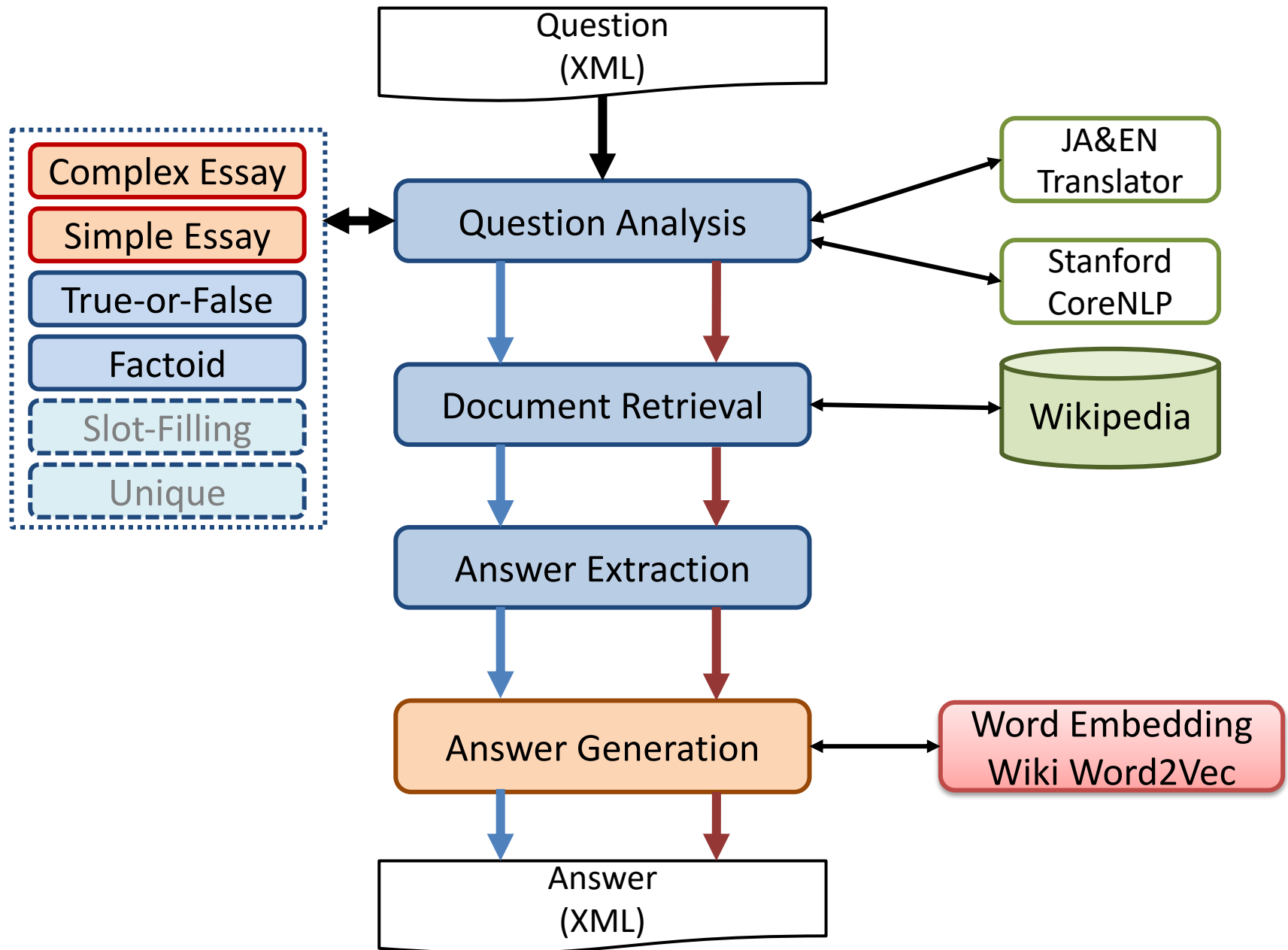


Jian-Ting Lin

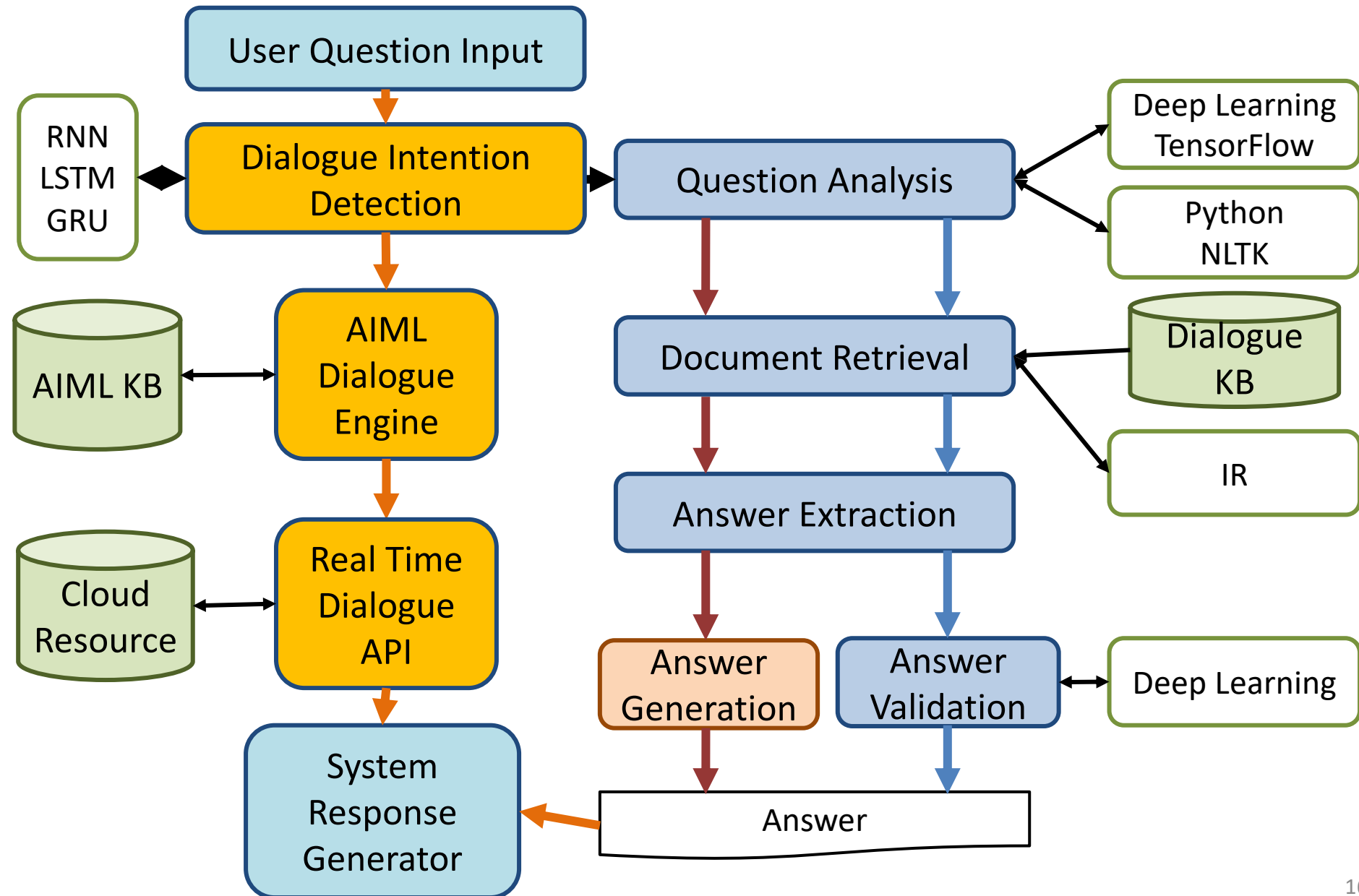
myday@mail.tku.edu.tw

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

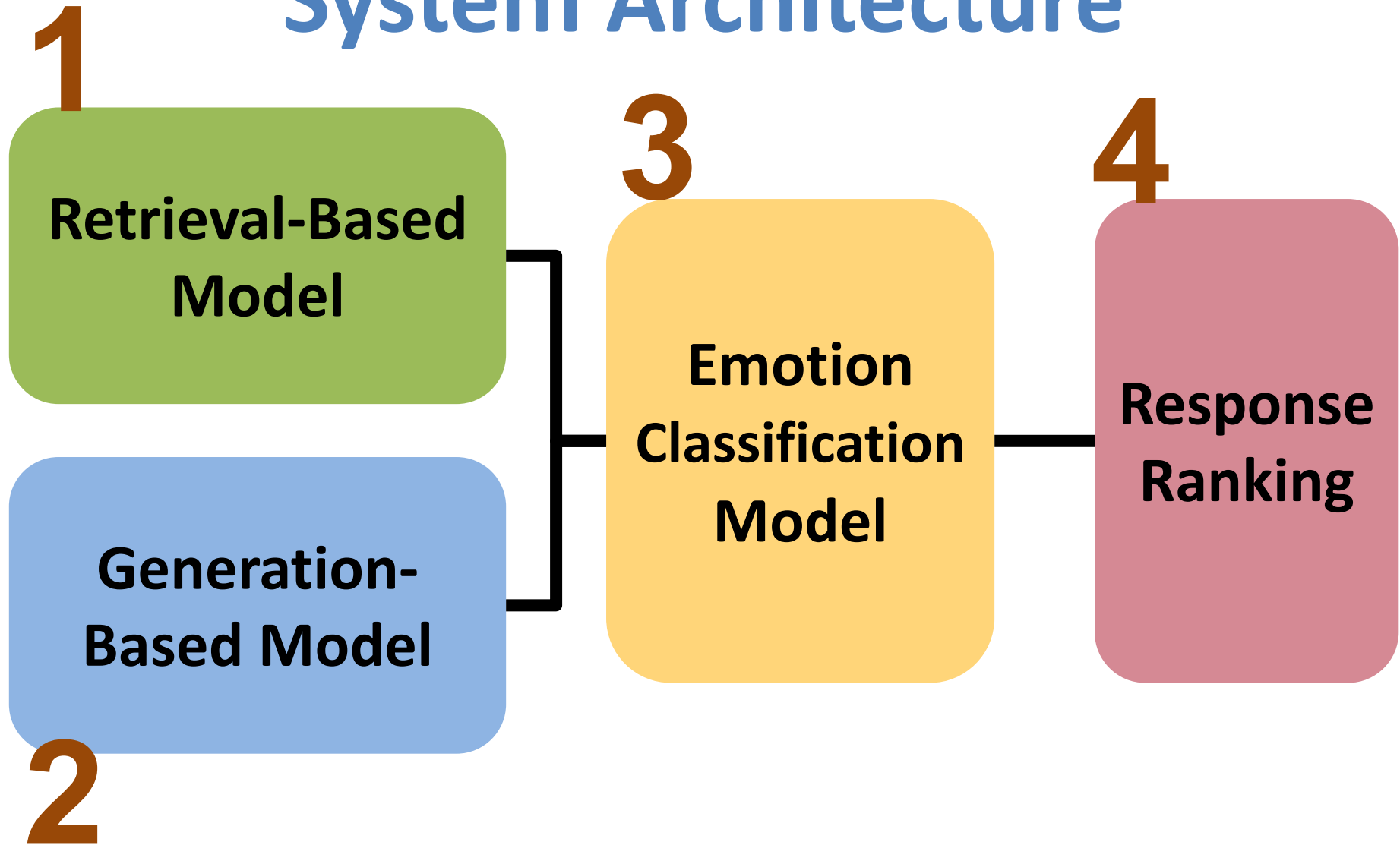
IMTKU System Architecture for NTCIR-13 QALab-3



System Architecture of Intelligent Dialogue and Question Answering System



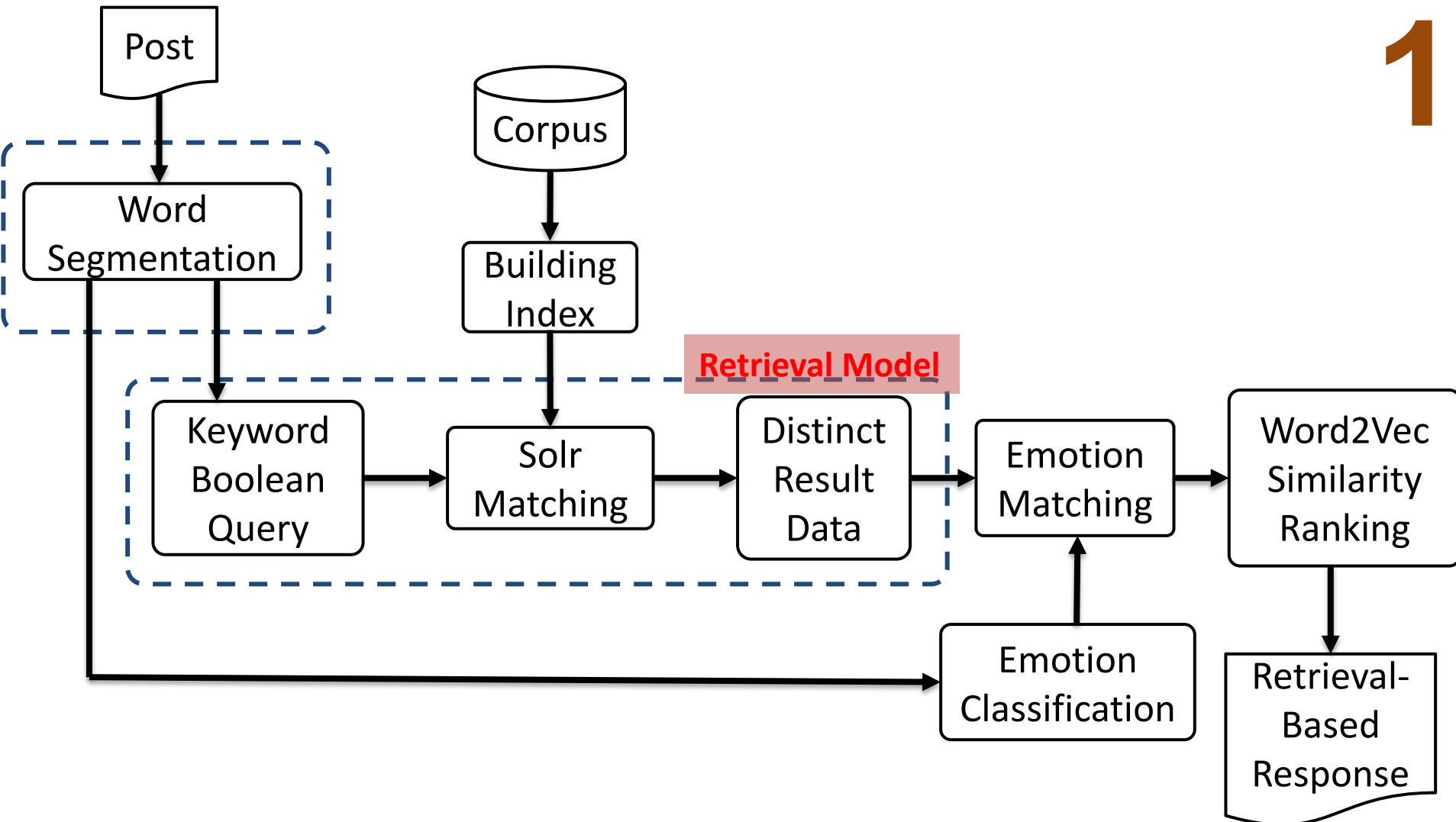
IMTKU Emotional Dialogue System Architecture



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

Retrieval-Based Model

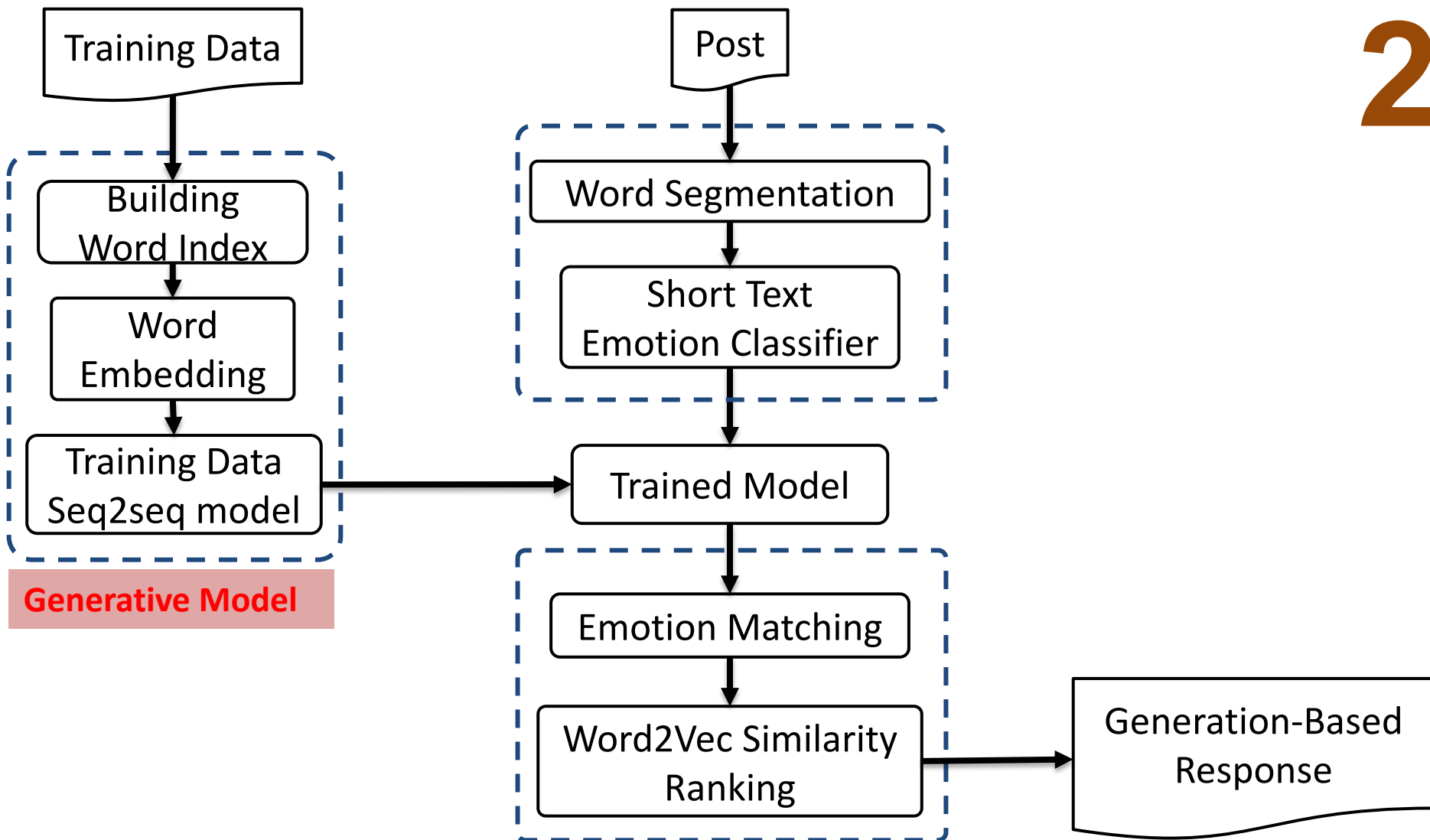
1



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

Generation-Based Model

2

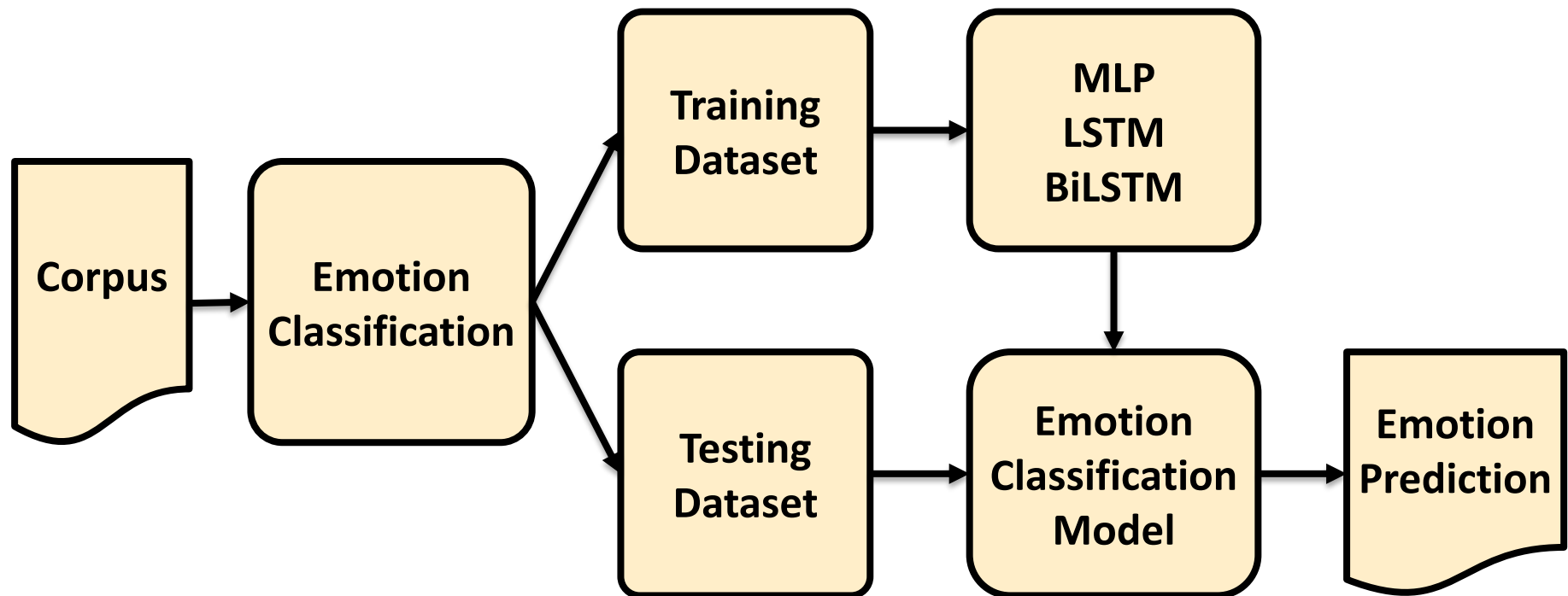


The system architecture of IMTKU emotion classification model for NTCIR-14 STC-3



Emotion Classification Model

3

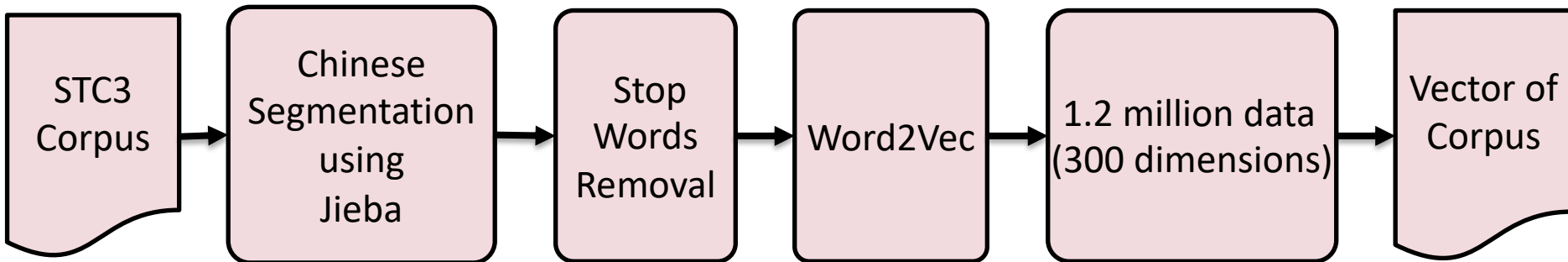


The system architecture of IMTKU Response Ranking for NTCIR-14 STC-3



Response Ranking

4





**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>

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

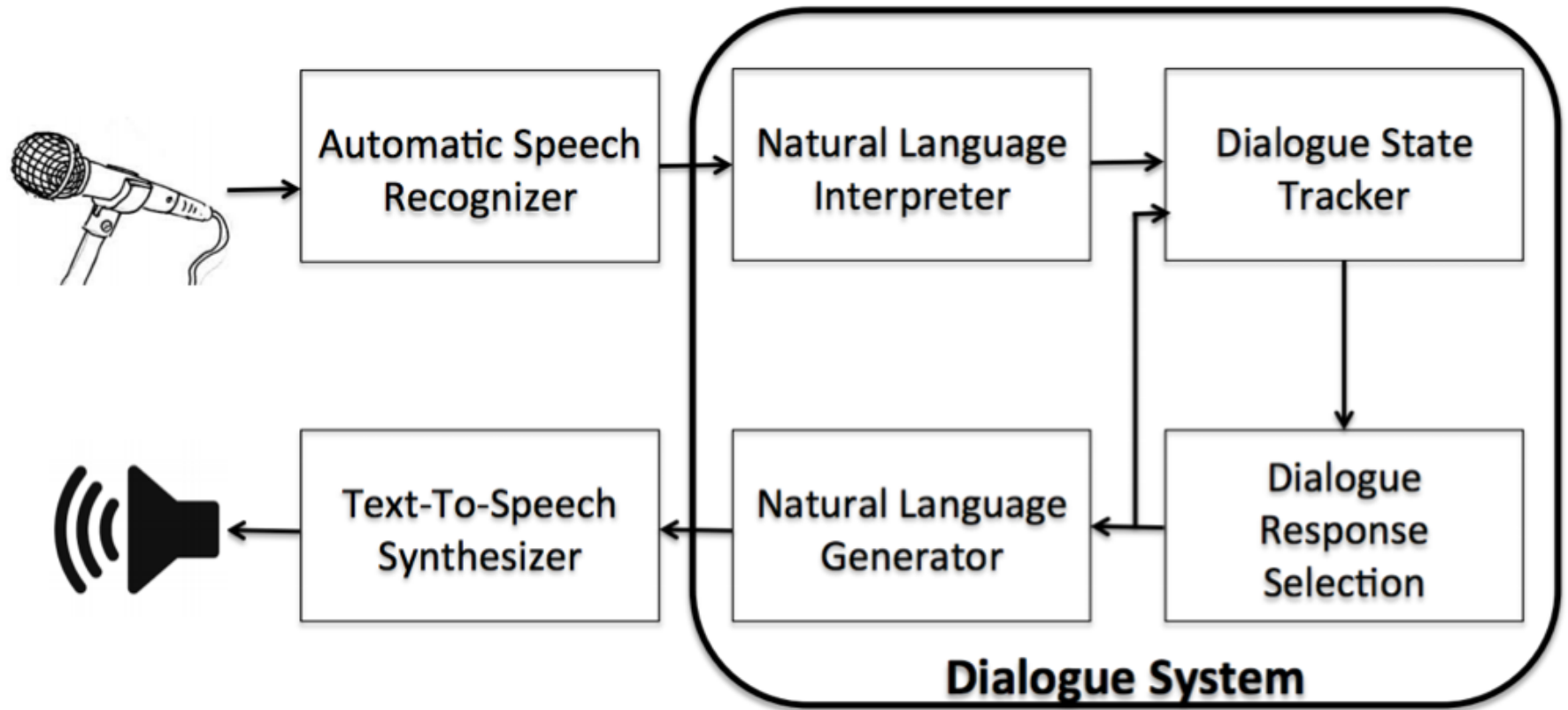
Dialogue System

Intelligent Agent

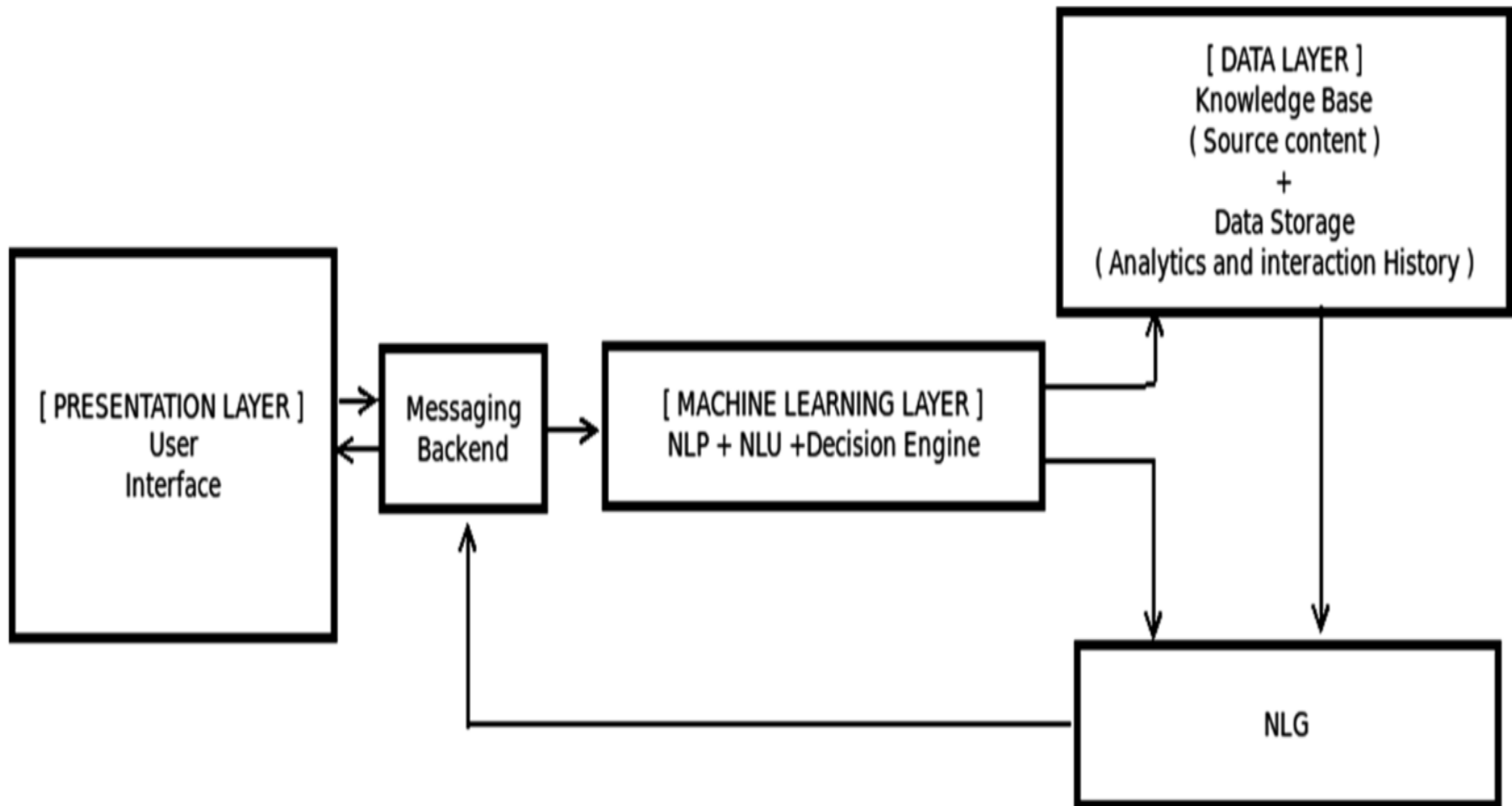
Chatbot



Dialogue System



Overall Architecture of Intelligent Chatbot



Dialogue Subtasks

Browse > Natural Language Processing > Dialogue

Dialogue subtasks

Dialogue Generation

Dialogue Generation

📊 8 leaderboards

27 papers with code



Dialogue State Tracking

📊 2 leaderboards

21 papers with code



Goal-Oriented Dialog

13 papers with code

Task-Oriented Dialogue Systems

Task-Oriented Dialogue Systems

10 papers with code

Dialogue Management

8 papers with code



Dialogue Understanding

5 papers with code

Short-Text Conversation

Short-Text Conversation

4 papers with code



Goal-Oriented Dialogue Systems

2 papers with code



Task-Completion Dialogue Policy Learning



Visual Dialogue

2 papers with code

Can machines think?

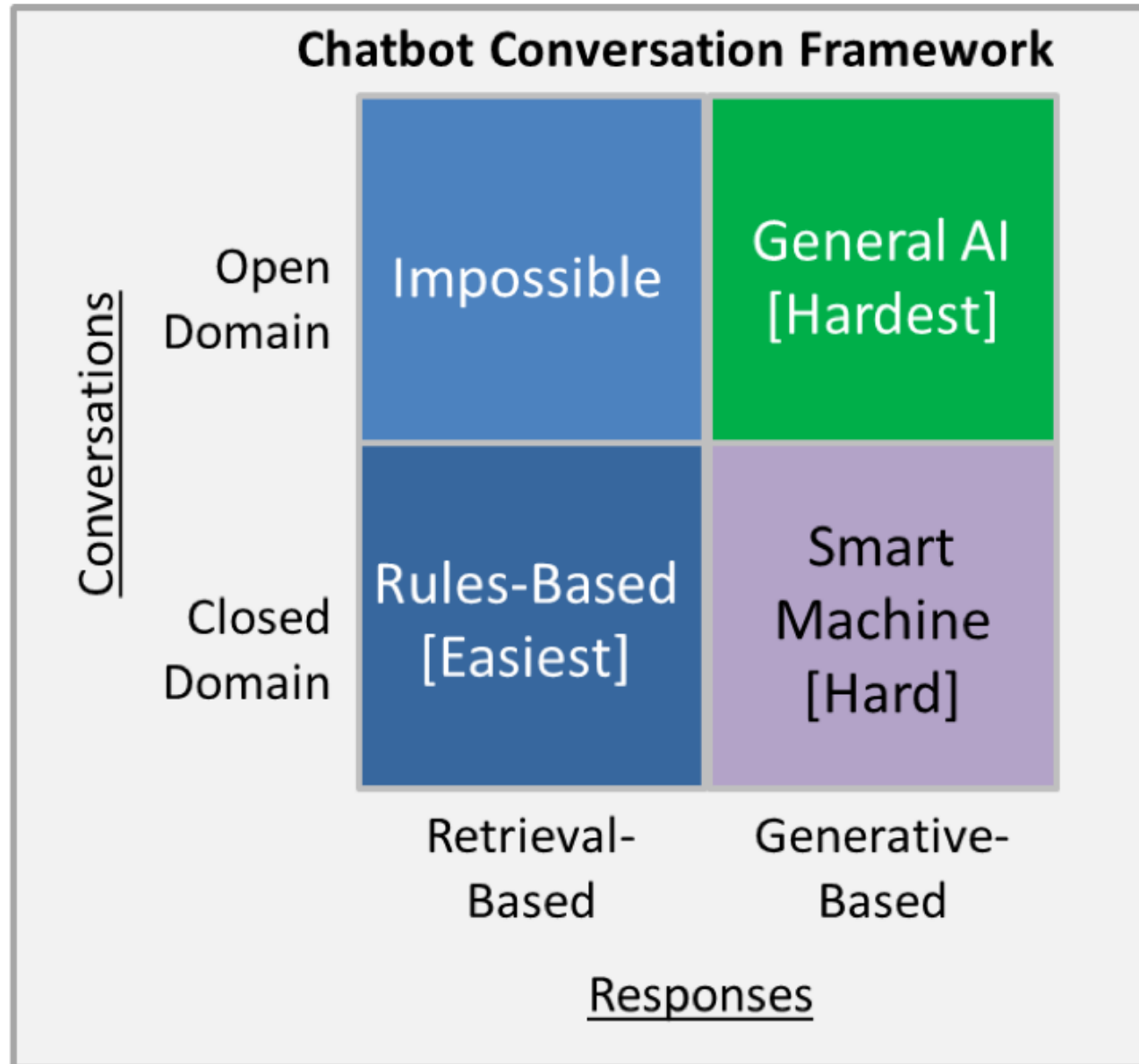
(Alan Turing ,1950)

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

Chatbot

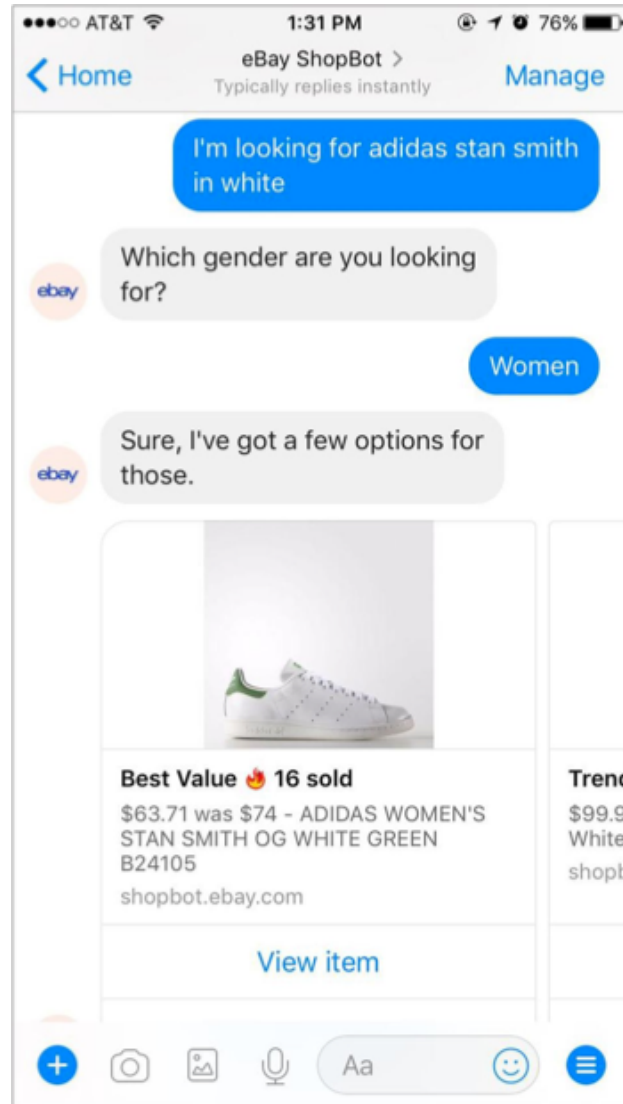
**“online human-computer
dialog system
with
natural language.”**

Chatbot Conversation Framework

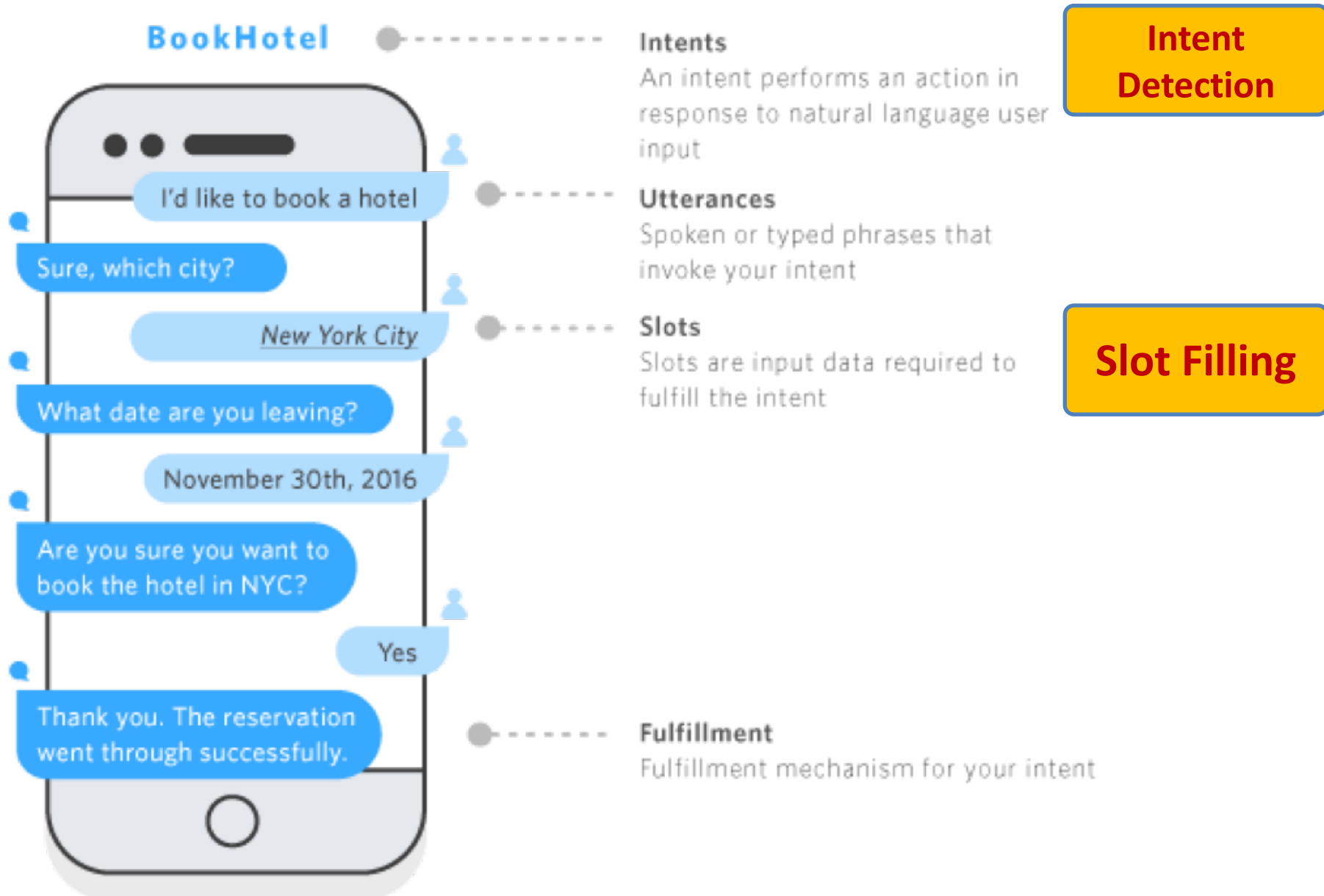


**From
E-Commerce
to
Conversational Commerce:
Chatbots
and
Virtual Assistants**

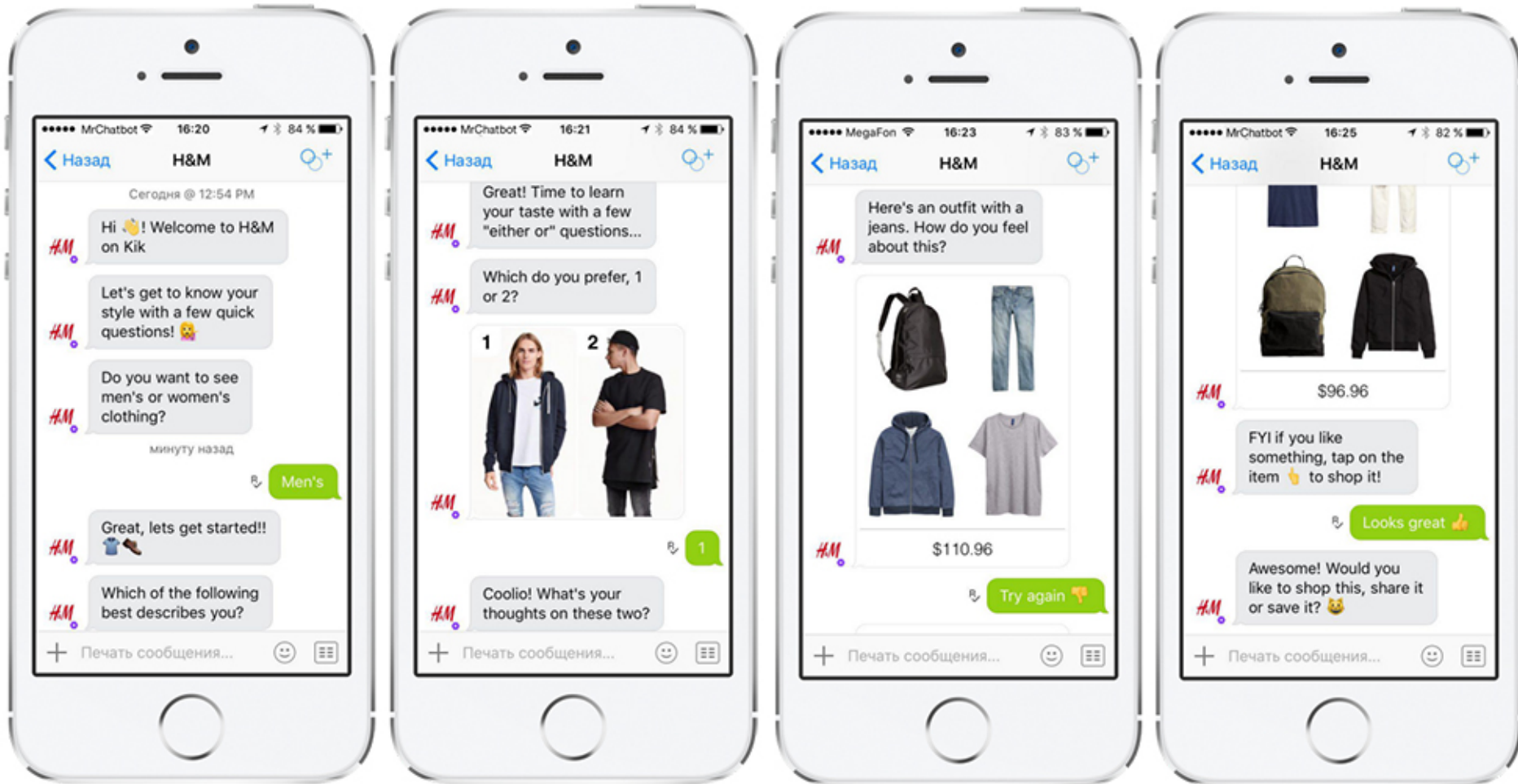
Conversational Commerce: eBay AI Chatbots



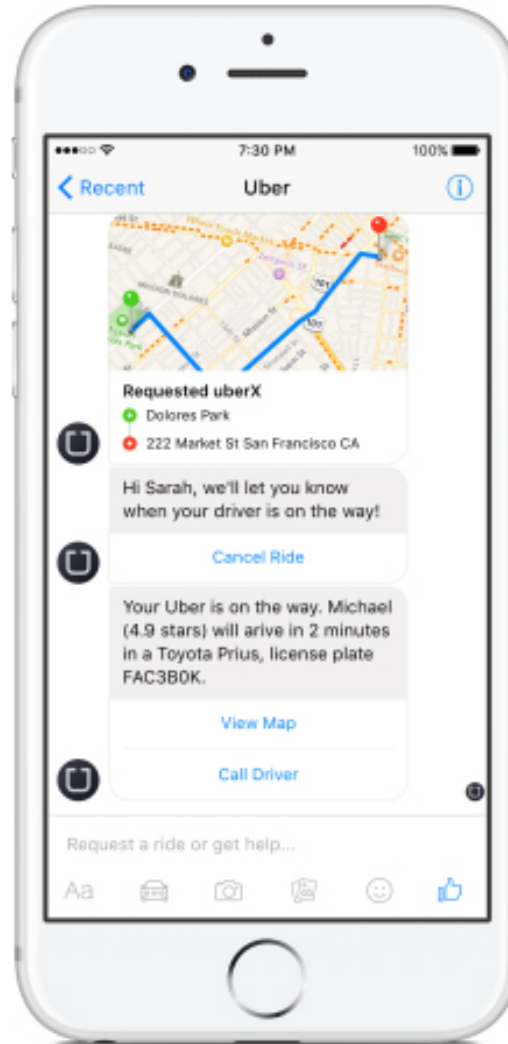
Hotel Chatbot



H&M's Chatbot on Kik



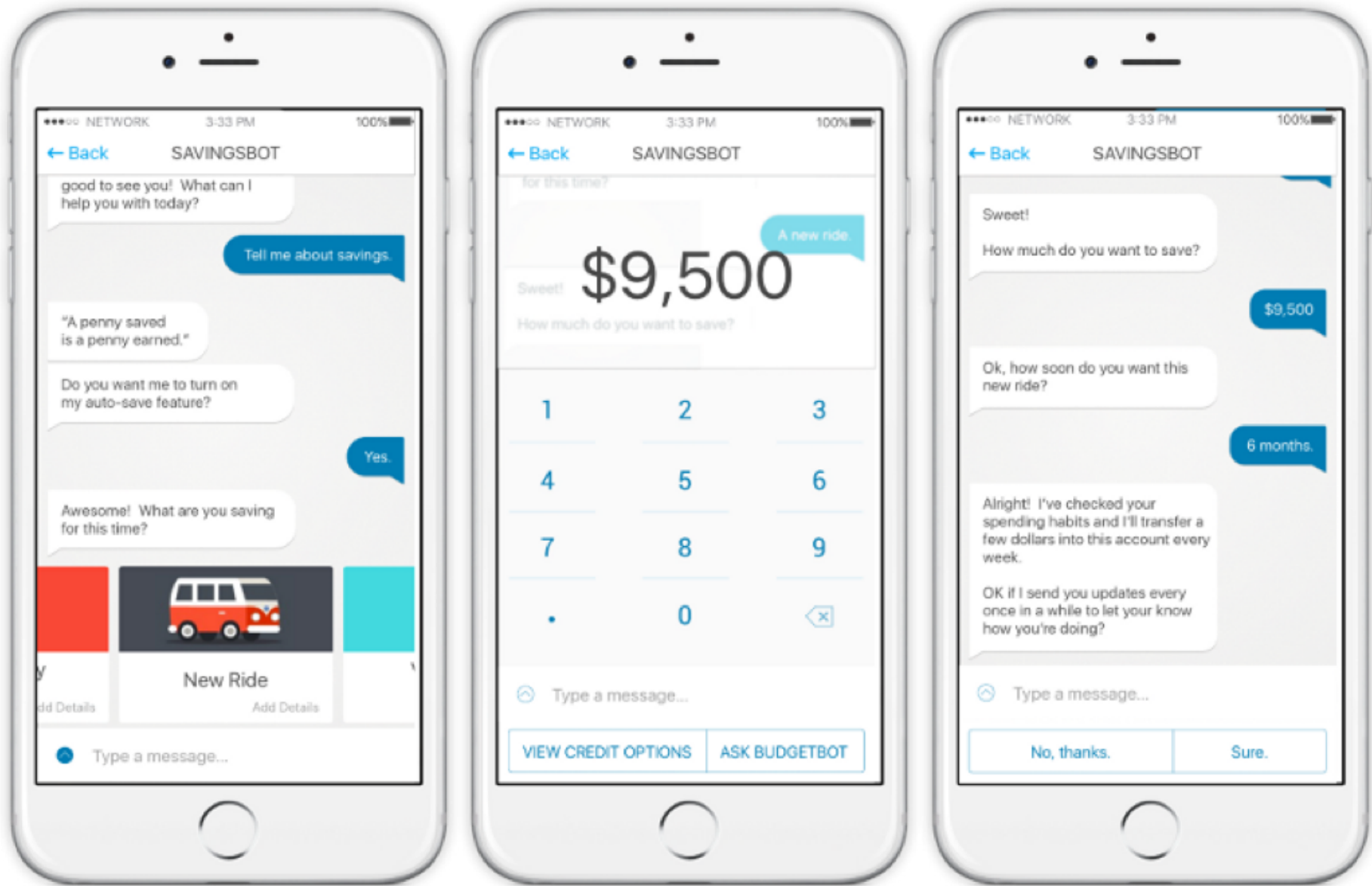
Uber's Chatbot on Facebook's Messenger



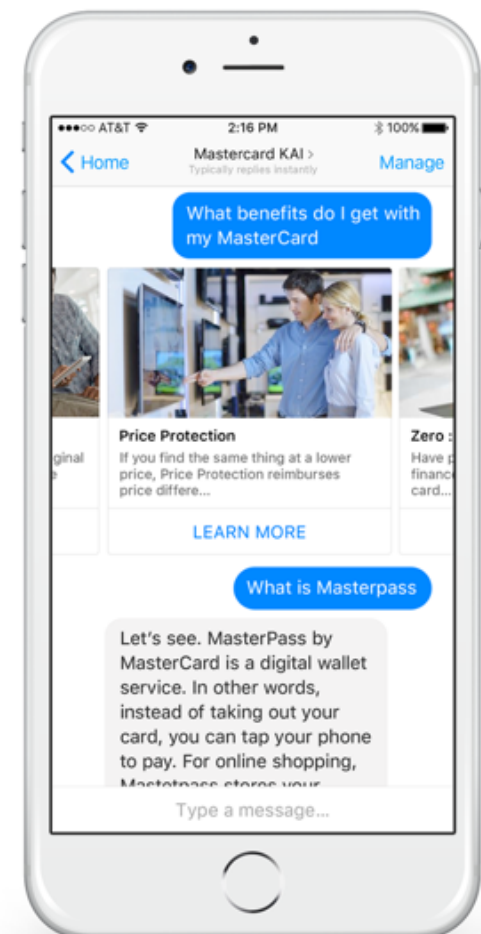
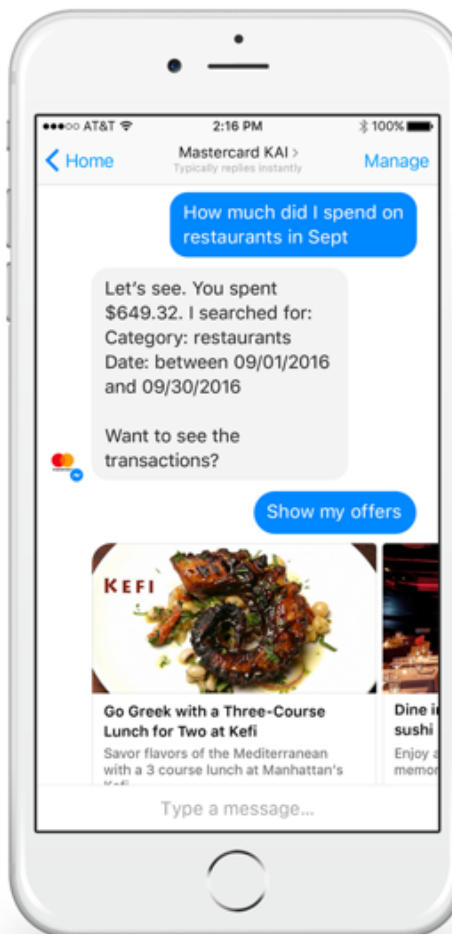
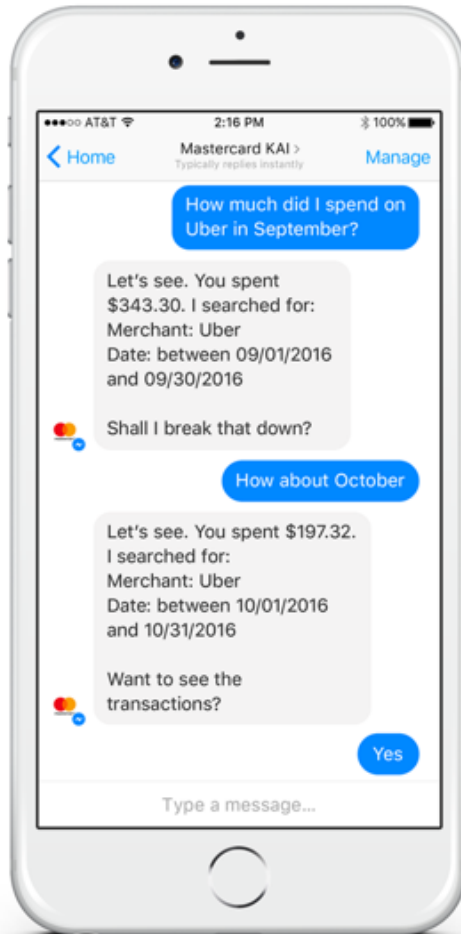
- Uber's chatbot on Facebook's messenger
- one main benefit: it loads much faster than the Uber app

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

Savings Bot



Mastercard Makes Commerce More Conversational

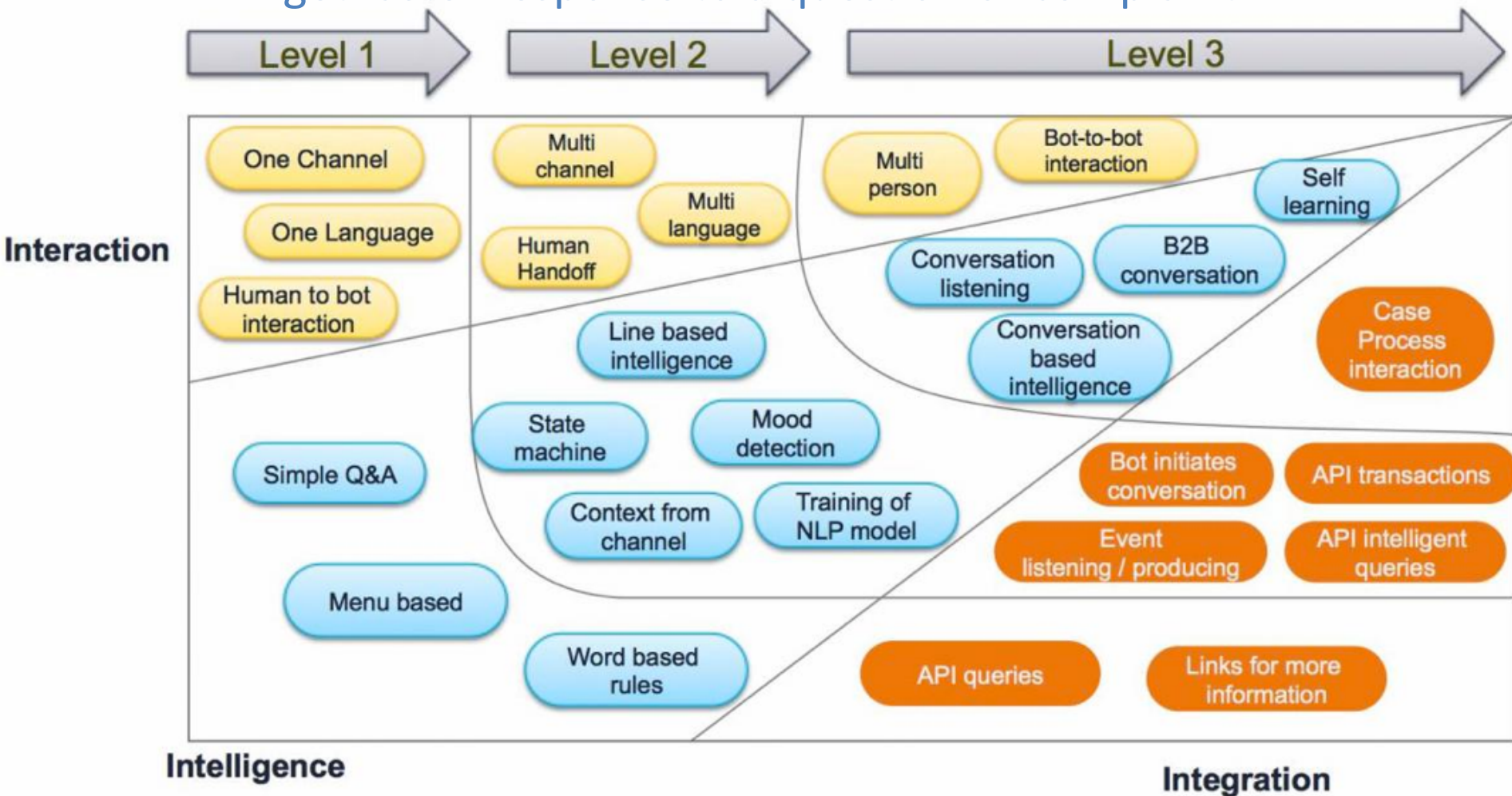


POWERED BY
Kasisto

Chatbots

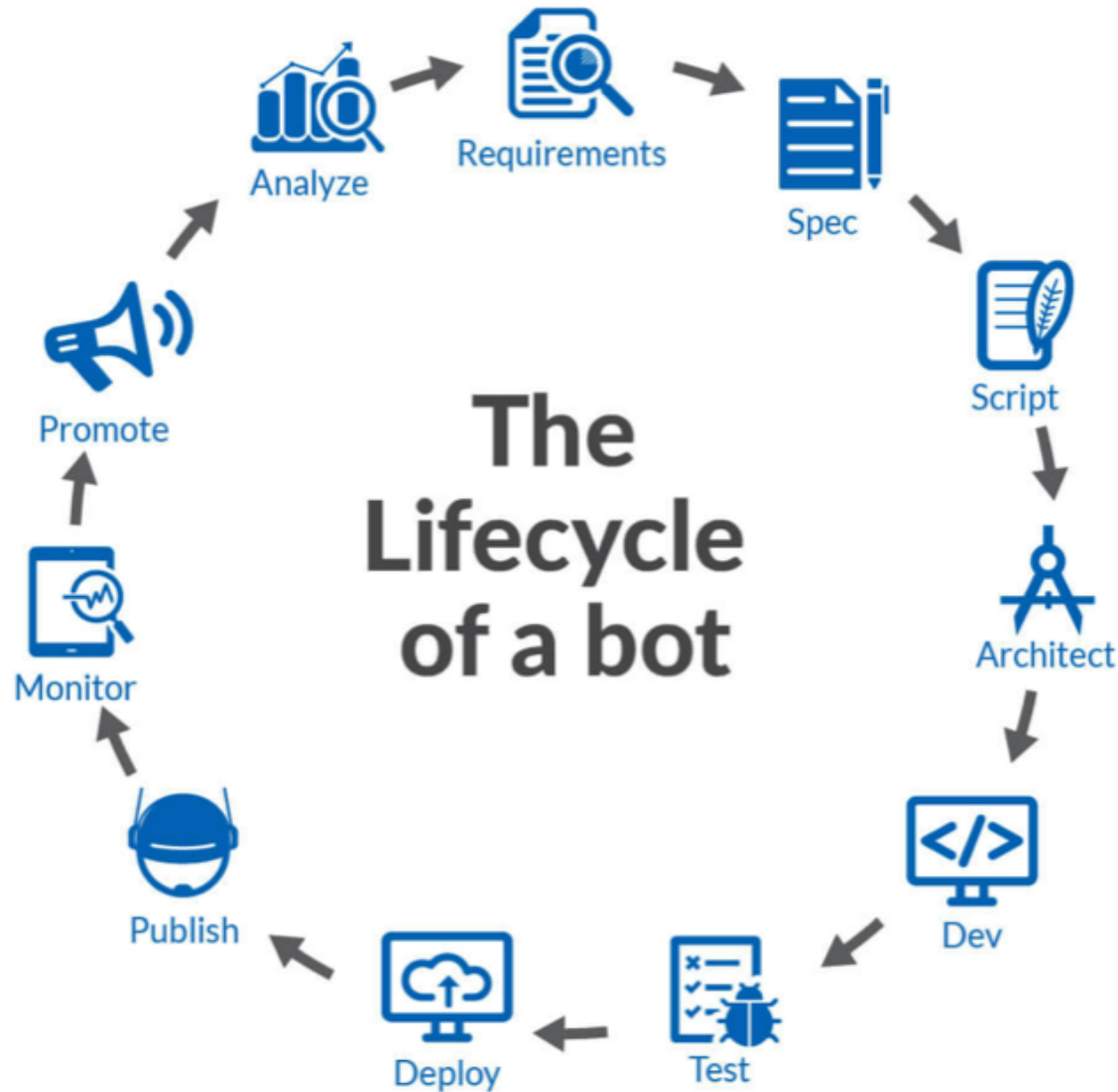
Bot Maturity Model

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



Bot Life Cycle and Platform Ecosystem

The Bot Lifecycle

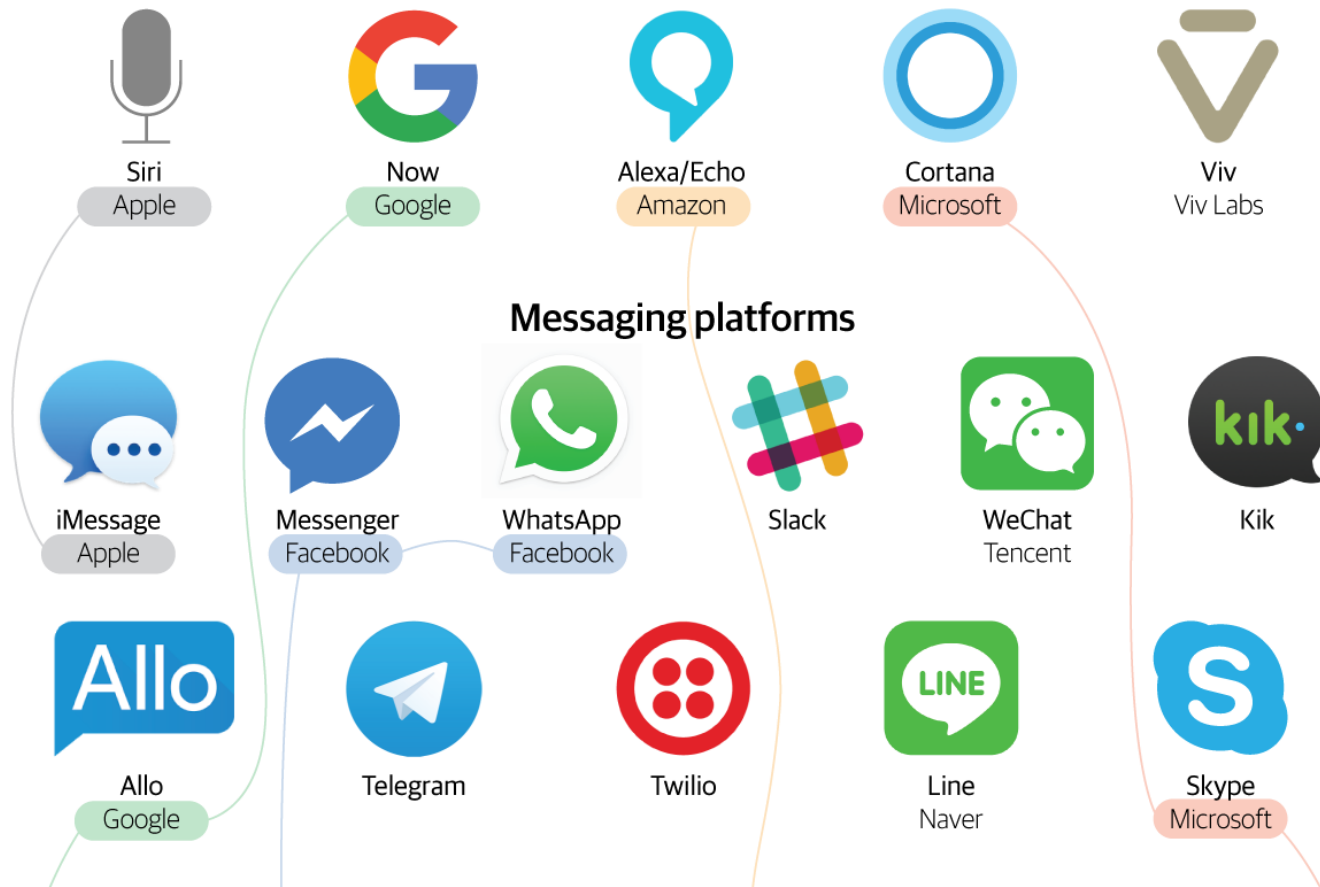


The bot platform ecosystem and the emerging giants

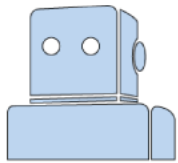
Nearly every large software company has announced some sort of bot strategy in the last year. Here's a look at a handful of leading platforms that developers might use to send messages, interpret natural language, and deploy bots, with the emerging bot-ecosystem giants highlighted.

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



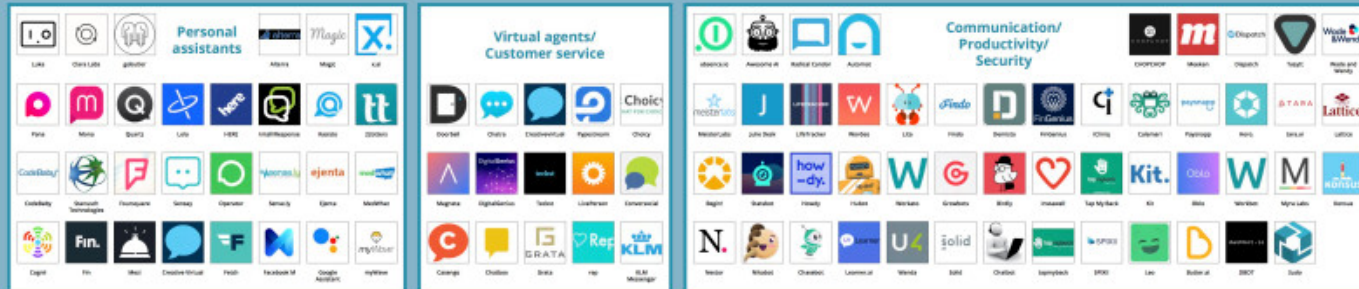
Gupshup



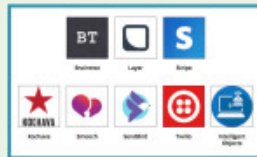
Sequel

Bots Landscape

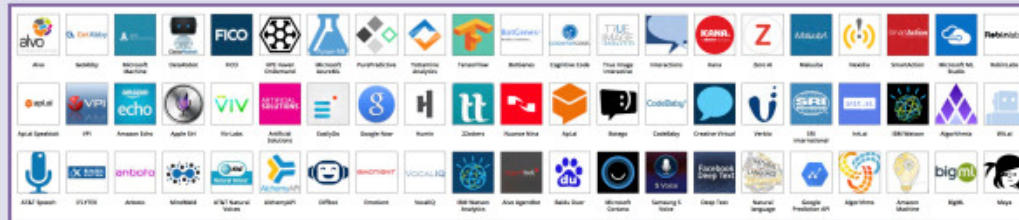
Bots with traction



Connectors/ Shared Services



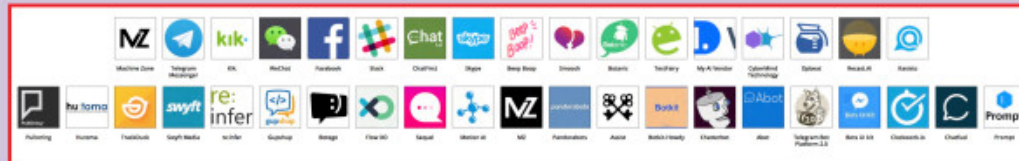
AI Tools: Natural Language Processing, Machine Learning, Speech & Voice Recognition



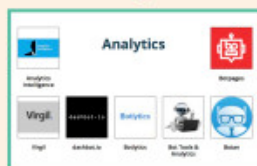
Bot Discovery



Bot developer frameworks and tools



Analytics



Messaging



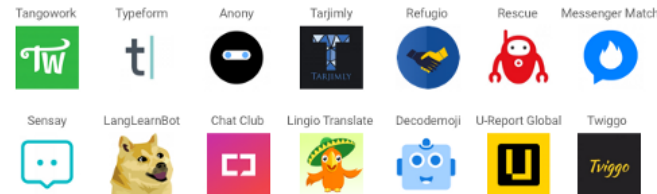
RECAST.AI Messenger Bot Landscape

May 2017

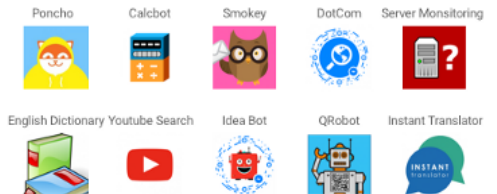
Food



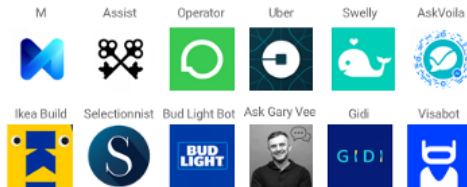
Communication



Utilities



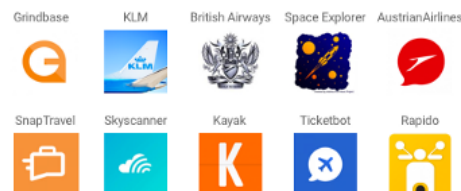
Personal



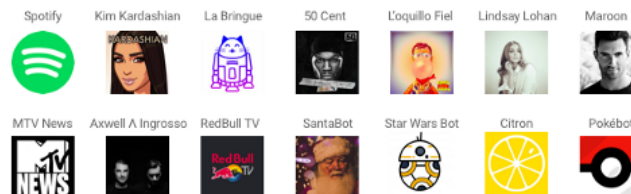
Analytics



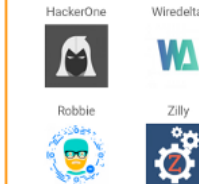
Travel



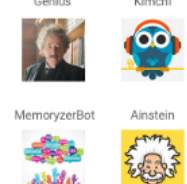
Entertainment



Developer Tools



Education



**Dialogue
on
Airline Travel
Information System
(ATIS)**

The ATIS (Airline Travel Information System) Dataset

<https://www.kaggle.com/siddhadev/atis-dataset-from-ms-cntk>

Sentence	what	flights	leave	from	phoenix
Slots	O	O	O	O	B-fromloc
Intent	atis_flight				

Training samples: 4978

Testing samples: 893

Vocab size: 943

Slot count: 129

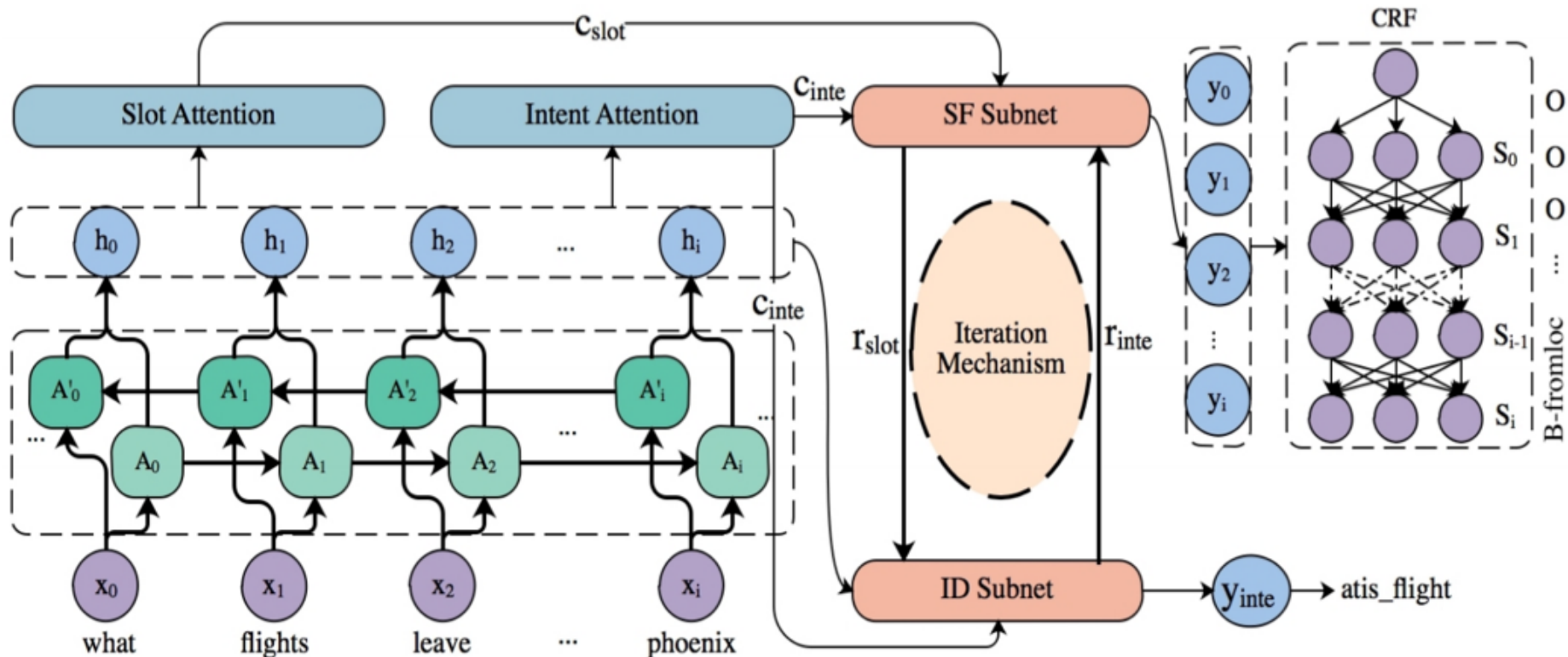
Intent count: 26

SF-ID Network (E et al., 2019)

Slot Filling (SF)

Intent Detection (ID)

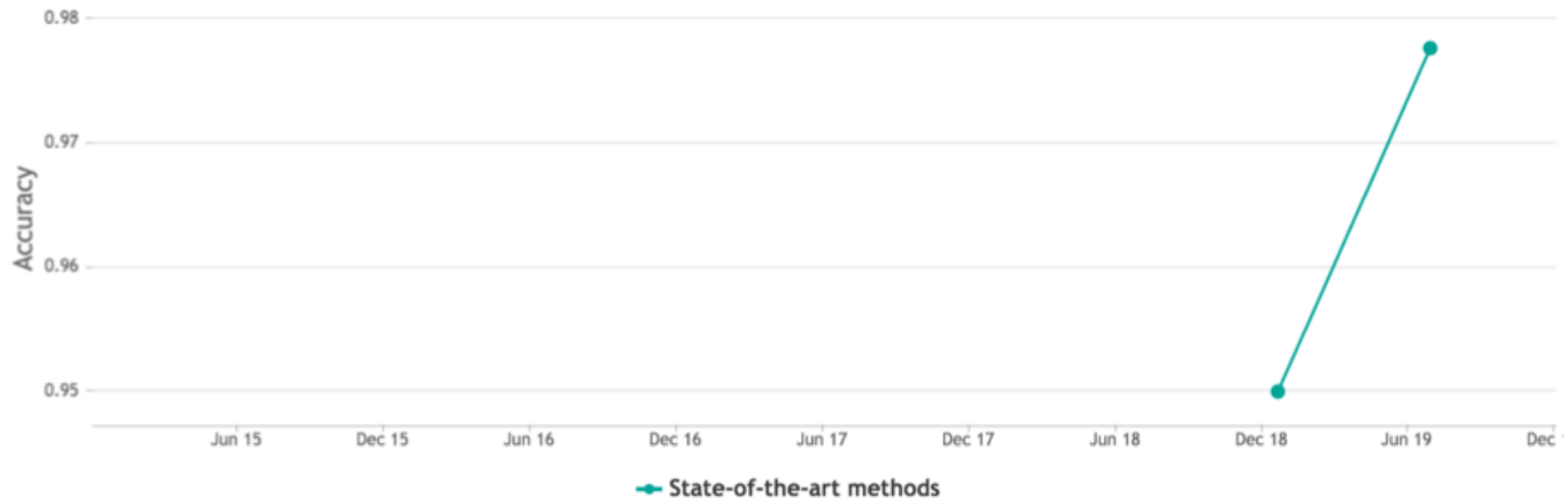
A Novel Bi-directional Interrelated Model for Joint Intent Detection and Slot Filling







Intent Detection on ATIS

State-of-the-art

Intent Detection on ATIS

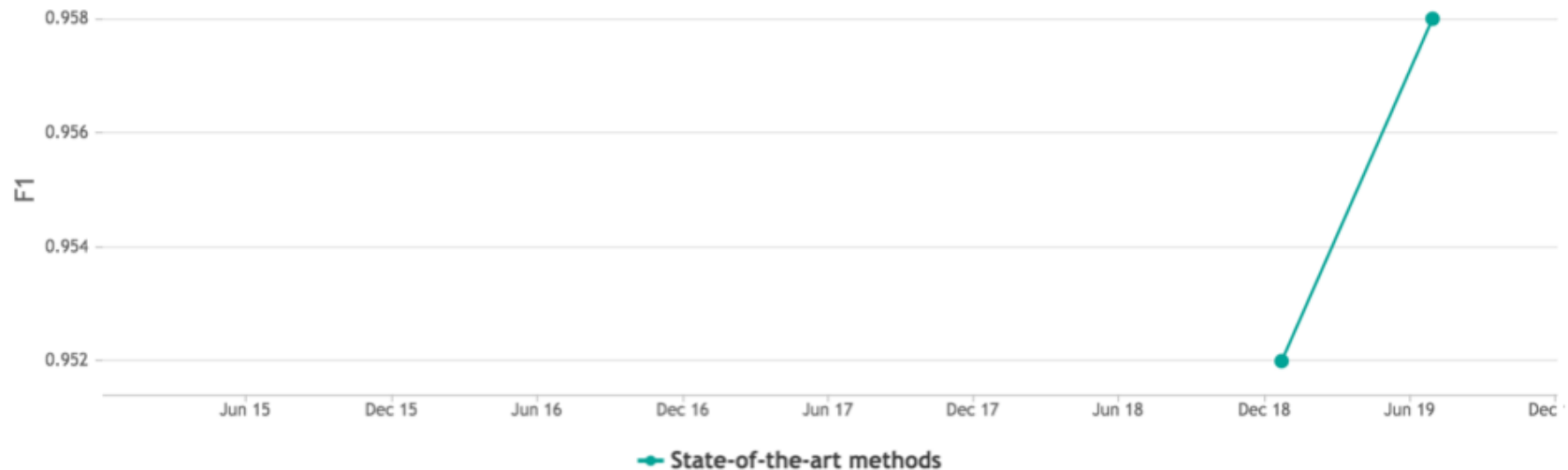






<div>Edit</div>						
RANK	METHOD	ACCURACY	PAPER TITLE	YEAR	PAPER	CODE
1	SF-ID	0.9776	A Novel Bi-directional Interrelated Model for Joint Intent Detection and Slot Filling	2019		
2	Capsule-NLU	0.950	Joint Slot Filling and Intent Detection via Capsule Neural Networks	2018		

Slot Filling on ATIS

State-of-the-art

Slot Filling on ATIS



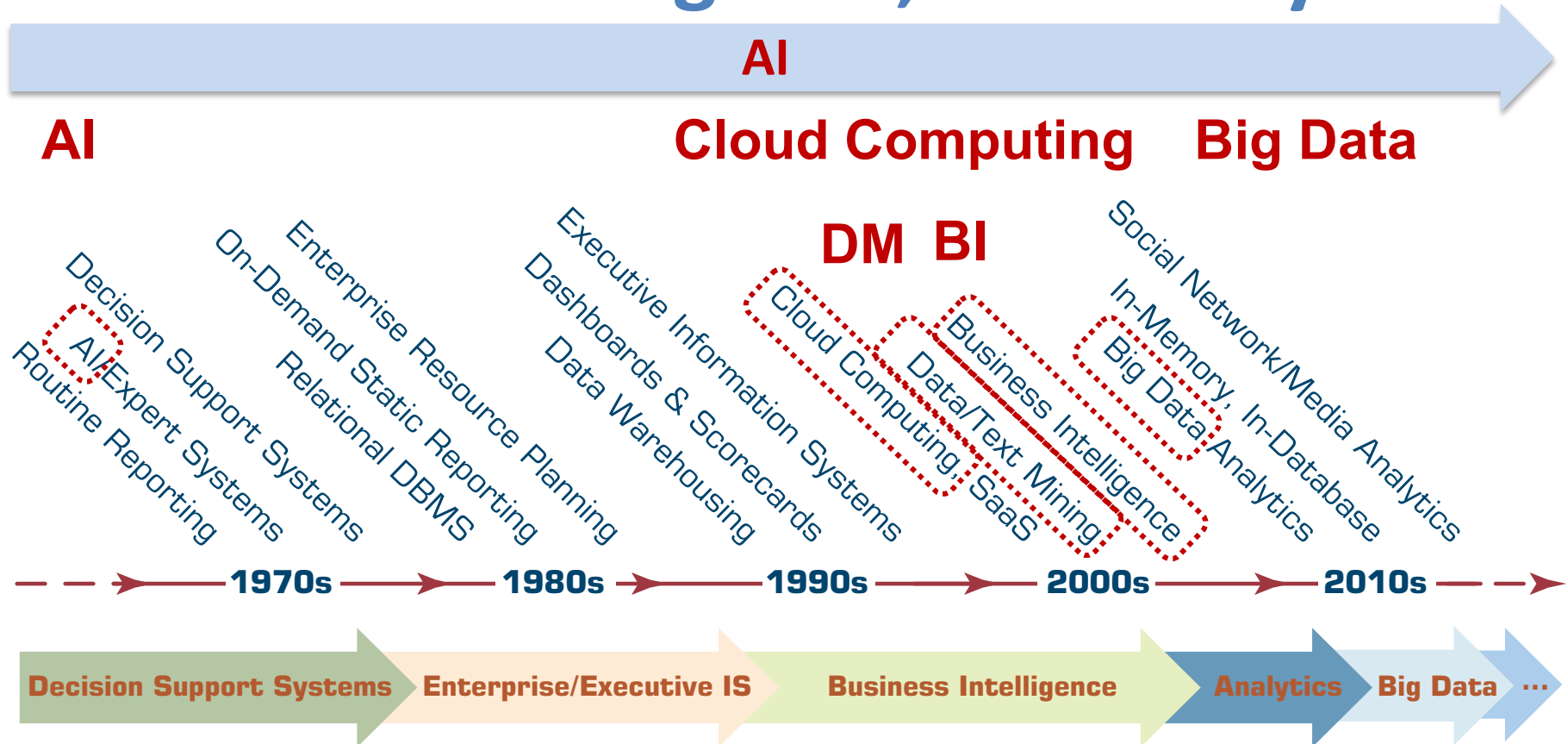
RANK	METHOD	F1	PAPER TITLE	YEAR	PAPER	CODE
1	SF-ID	0.958	A Novel Bi-directional Interrelated Model for Joint Intent Detection and Slot Filling	2019		
2	Capsule-NLU	0.952	Joint Slot Filling and Intent Detection via Capsule Neural Networks	2018		

Source: <https://paperswithcode.com/sota/slot-filling-on-atis>

Artificial Intelligence (AI)

AI, Big Data, Cloud Computing

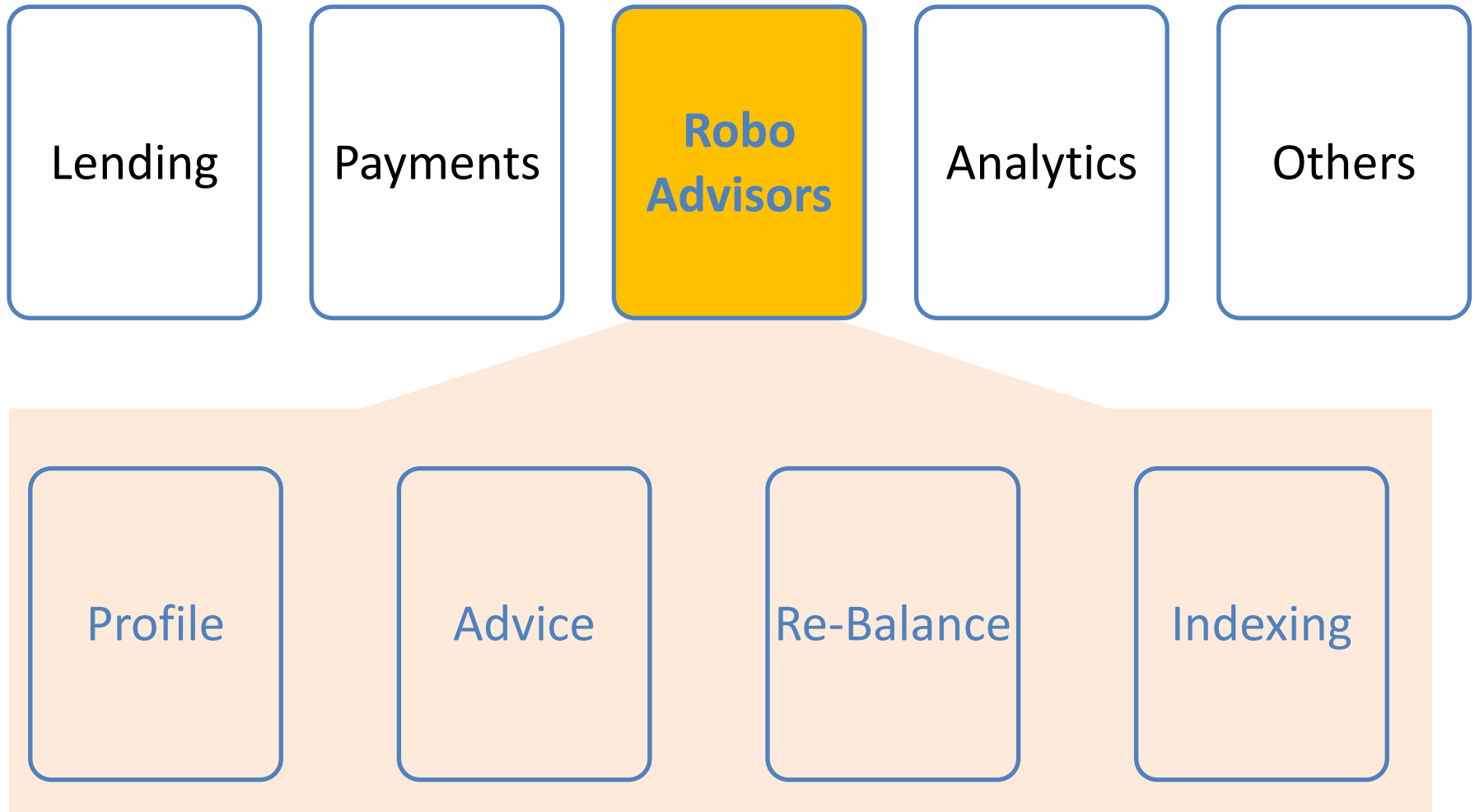
Evolution of Decision Support, Business Intelligence, and Analytics



AI in FinTech

Robo-Advisors

FinTech high-level classification



Wealthfront

Financial Planning & Robo-Investing for Millennials



Plan ▾

Invest

Borrow

Expertise ▾

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annoying sales calls, no judgment.

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<https://www.wealthfront.com/>

Betterment

Online Financial Advisor

Betterment

Why Betterment

How it works

What we offer

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HELLO, INVESTOR

Betterment is an online financial advisor built for people who refuse to settle for average investing. People who demand better. People like you.

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Right for every type of investor

New investor

I'm new to investing, or am looking for some guidance.

Hands-off investor

I invest, but don't have the time or desire to do it myself.

Hands-on investor

I'm a confident, hands-on investor looking for an optimal solution.

<https://www.betterment.com/>

Financial Advisor FinTech Solutions

Financial Advisor FinTech Solutions Map



From Algorithmic Trading to Personal Finance Bots: 41 Startups Bringing AI to Fintech

From Algorithmic Trading To Personal Finance Bots: 41 Startups Bringing AI To Fintech

AI in Fintech

41 Startups Bringing Artificial Intelligence To Fintech

General Purpose/ Predictive Analytics



Market Research & Sentiment Analysis



Search Engine



Quantitative Trading



Blockchain



Debt Collection



AI Assistants/Bots



Fraud Detection



Credit Scoring



Personal Banking



Artificial Intelligence (AI) in Fintech

General Purpose/ Predictive Analytics



Market Research & Sentiment Analysis



Search Engine



Artificial Intelligence (AI) in Fintech

Quantitative Trading



AI Assistants/Bots



Credit Scoring



Blockchain



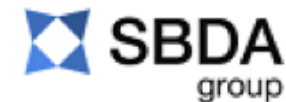
Debt Collection



Fraud Detection



Personal Banking



FinTech

Financial Technology

FinTech

“providing
financial services
by making use of
software and
modern technology”

Financial Services

Financial Services



FinTech: Financial Services Innovation

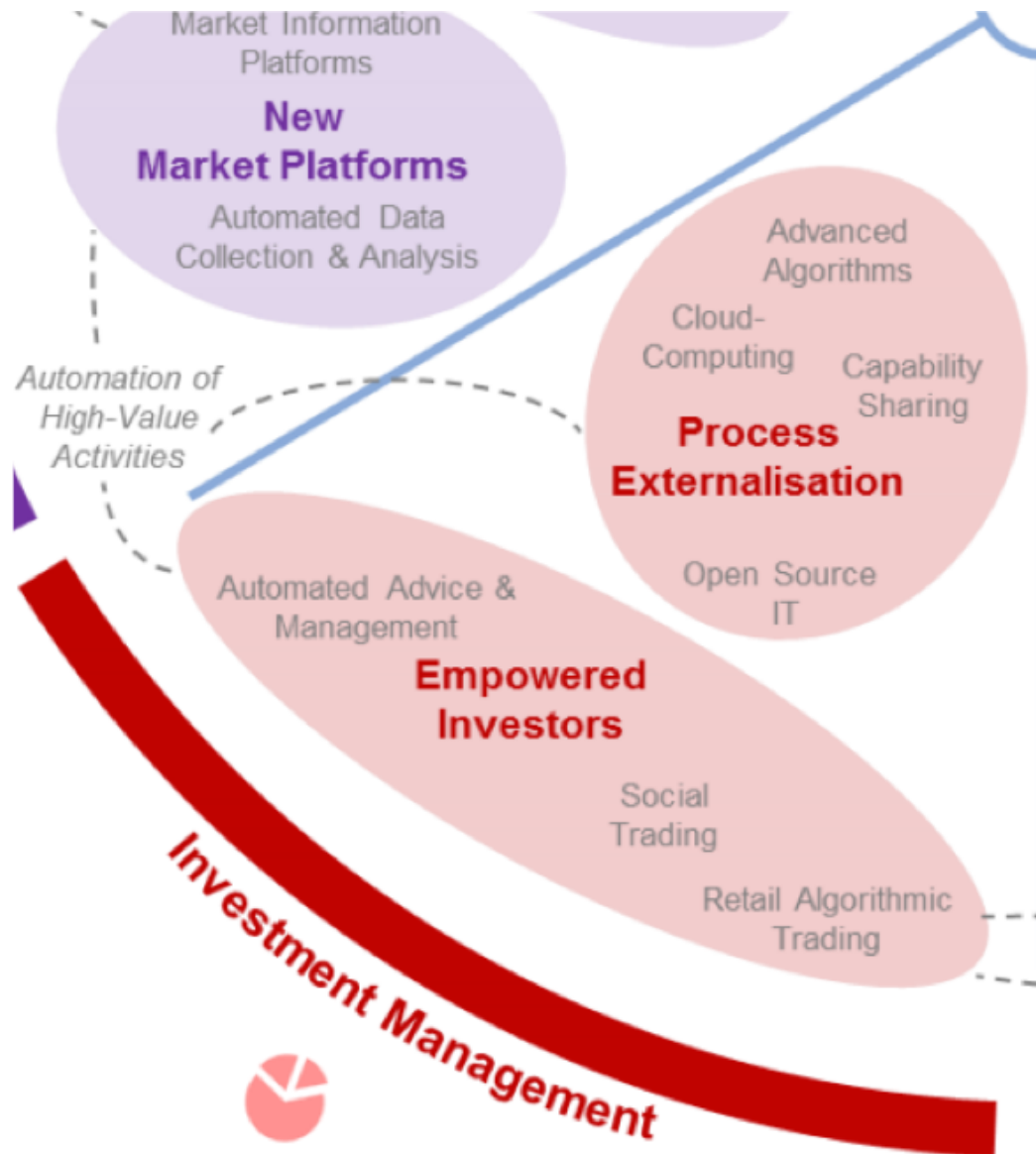


FinTech:

Financial Services Innovation

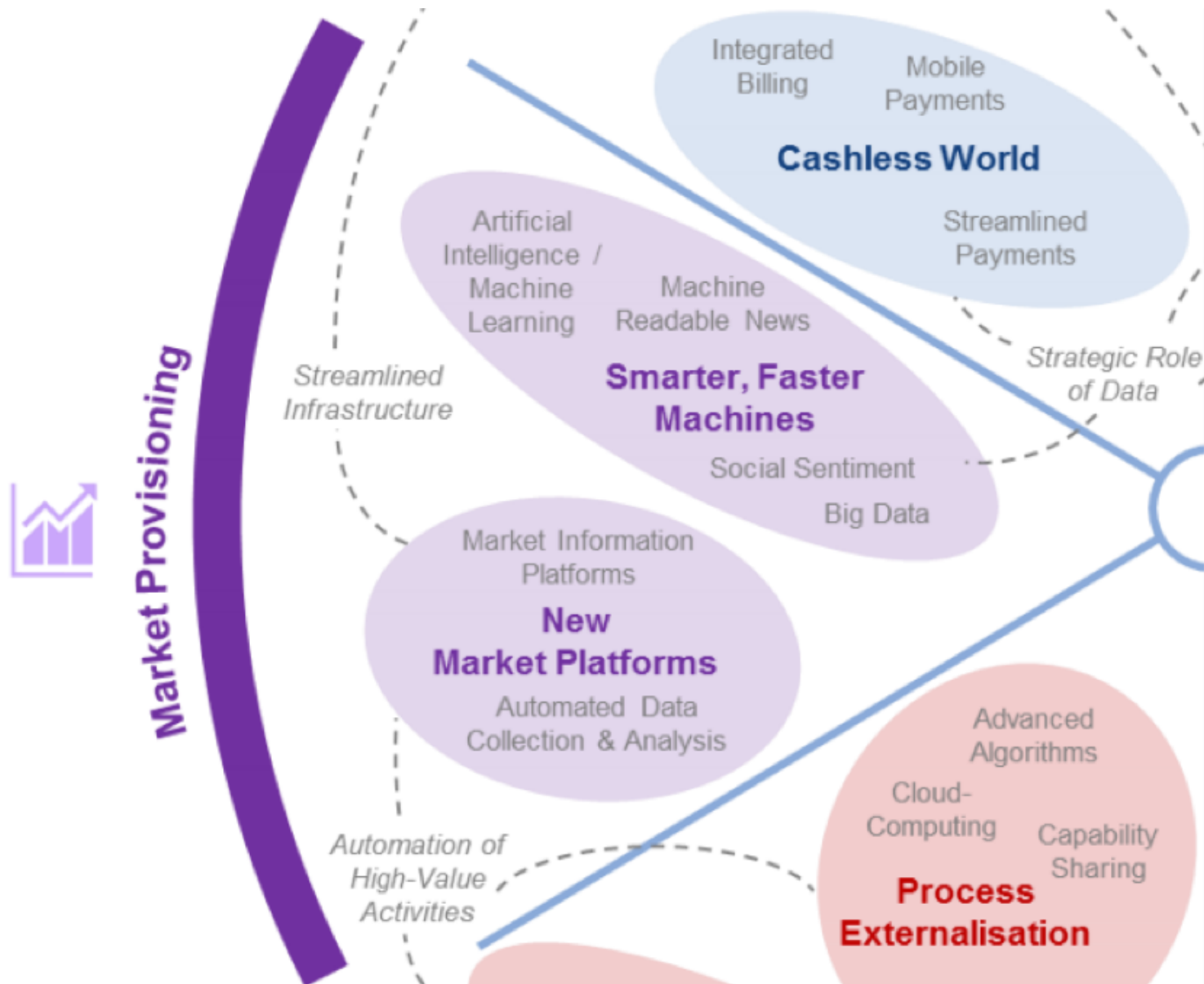
- 1. Payments**
- 2. Insurance**
- 3. Deposits & Lending**
- 4. Capital Raising**
- 5. Investment Management**
- 6. Market Provisioning**

5 FinTech: Investment Management



6

FinTech: Market Provisioning



The **New Alpha**: 30+ Startups Providing Alternative Data For Sophisticated Investors

New sources of **data mined** by startups like **Foursquare**, **Premise**, and **Orbital Insight** are letting investors understand **trends** before they happen.

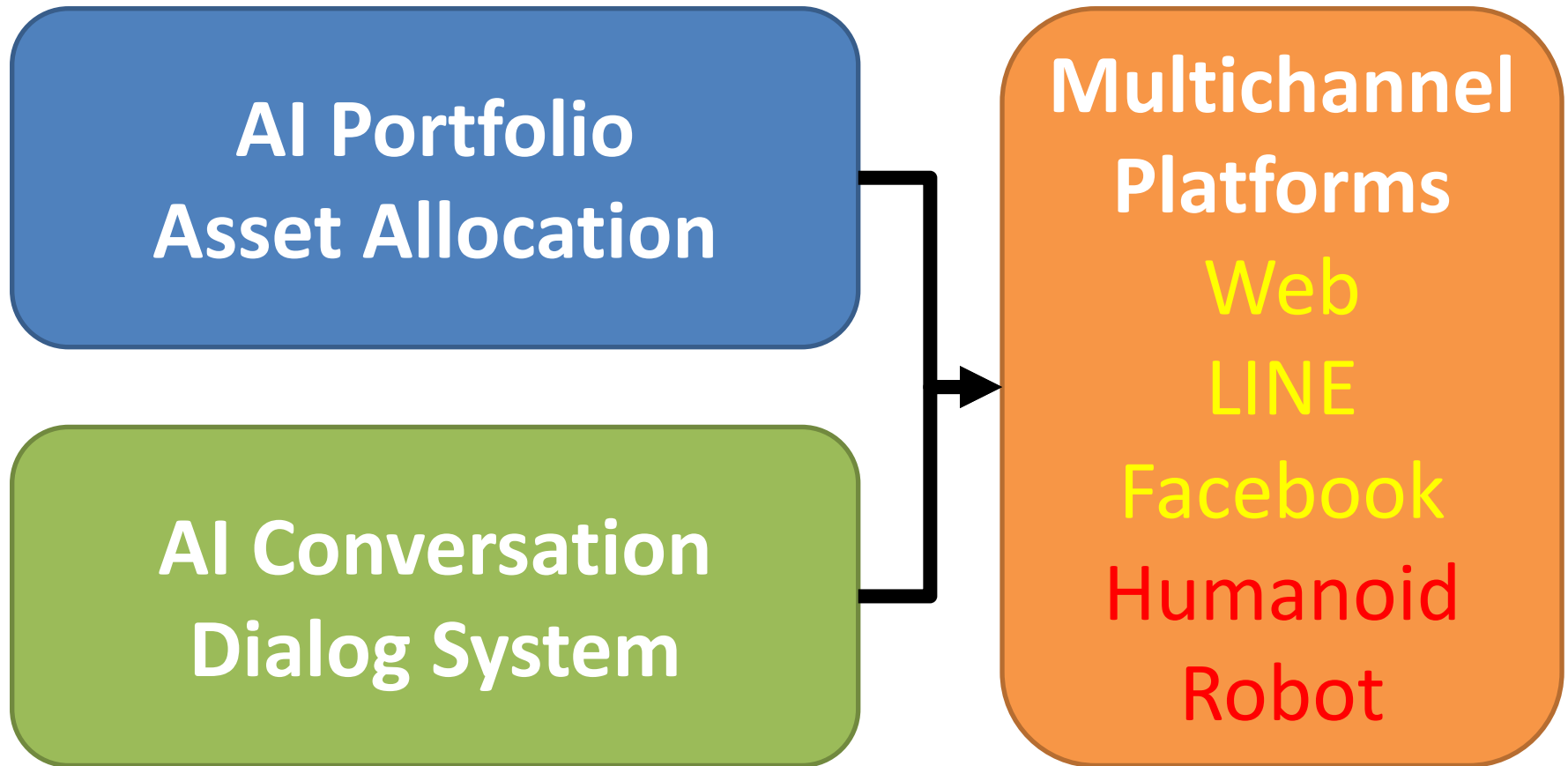
The New Alpha: 30+ Startups Providing Alternative Data For Sophisticated Investors

Alternative Data Sources

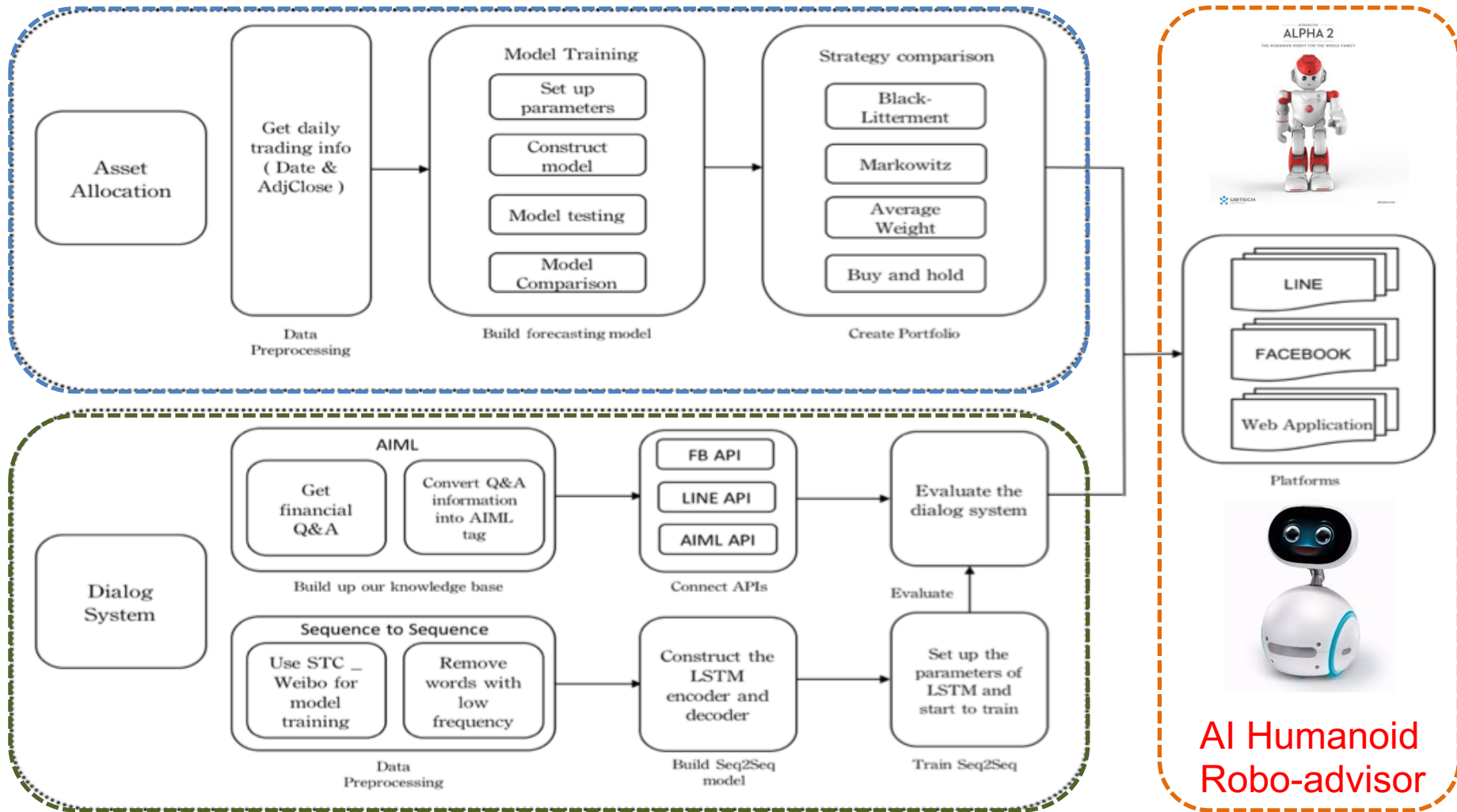


AI Humanoid Robo-Advisor

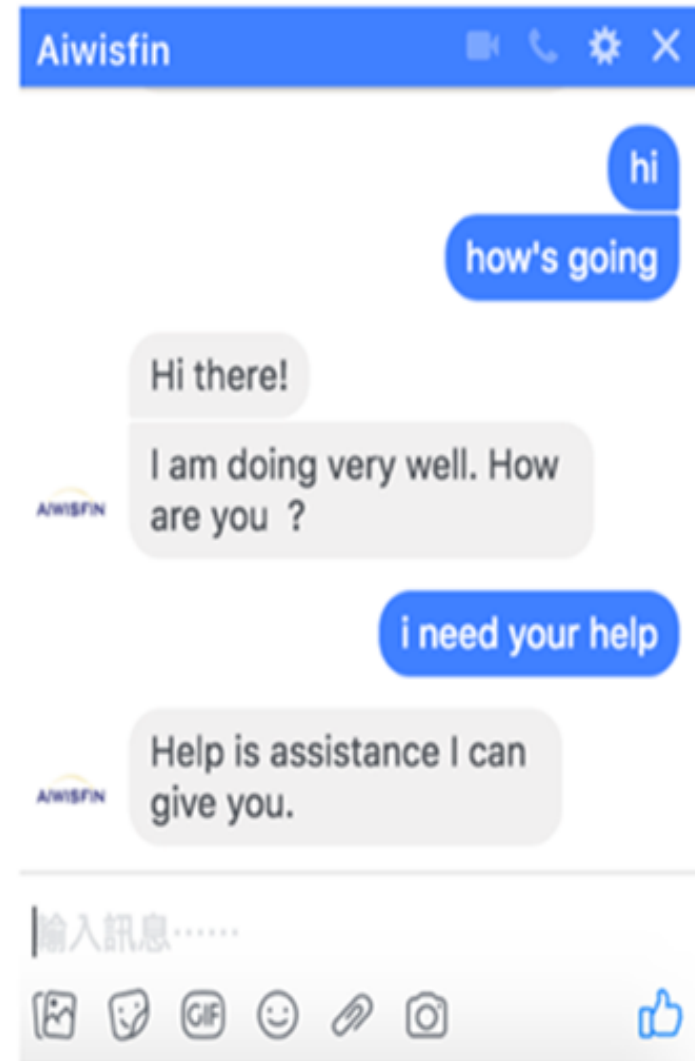
AI Humanoid Robo-Advisor for Multi-channel Conversational Commerce



System Architecture of AI Humanoid Robo-Advisor



Conversational Model (LINE, FB Messenger)



Conversational Robo-Advisor

Multichannel UI/UX

Robots



ALPHA 2

ZENBO

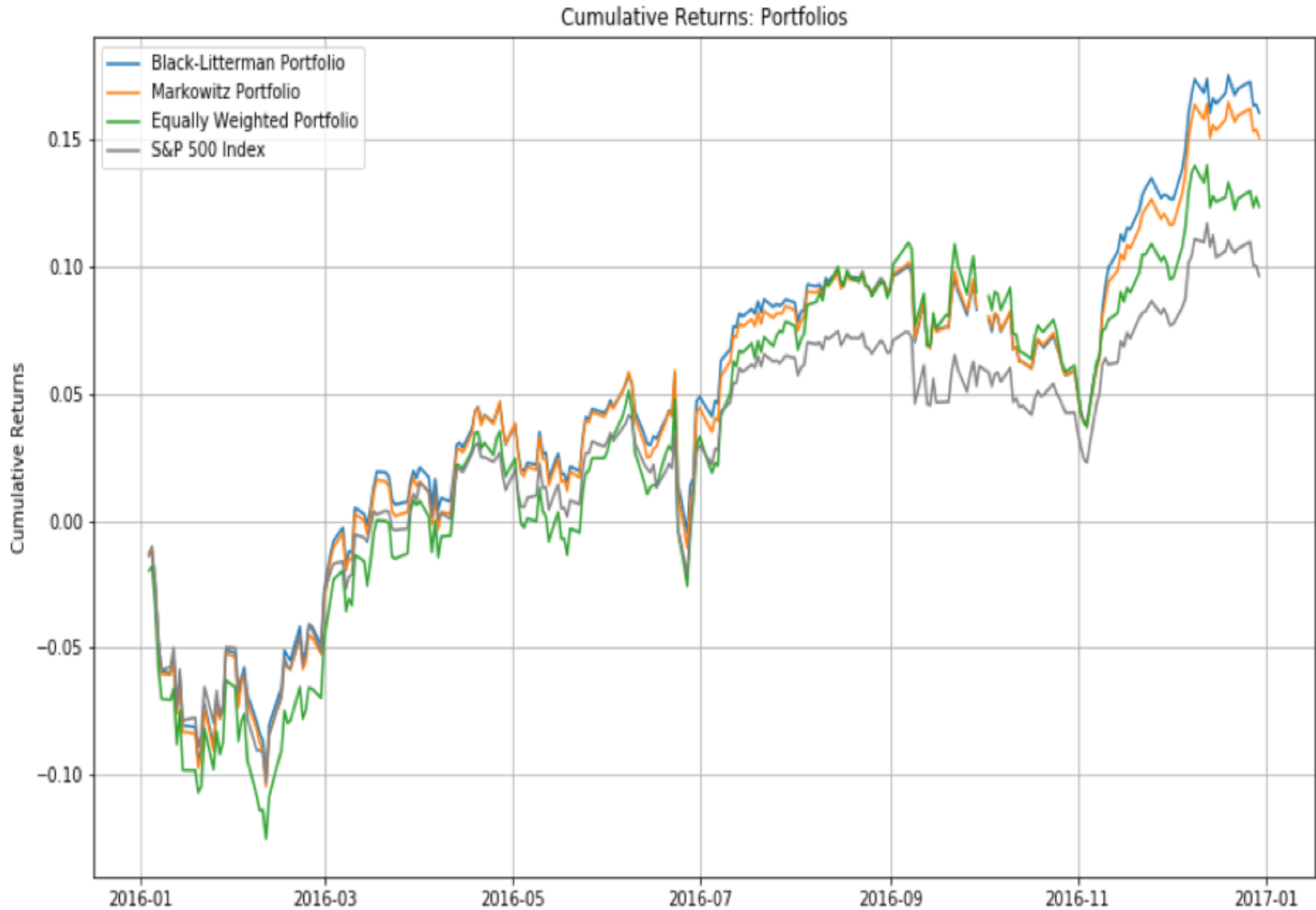


Portfolio Performance in 2016

Annual Portfolio Statistics

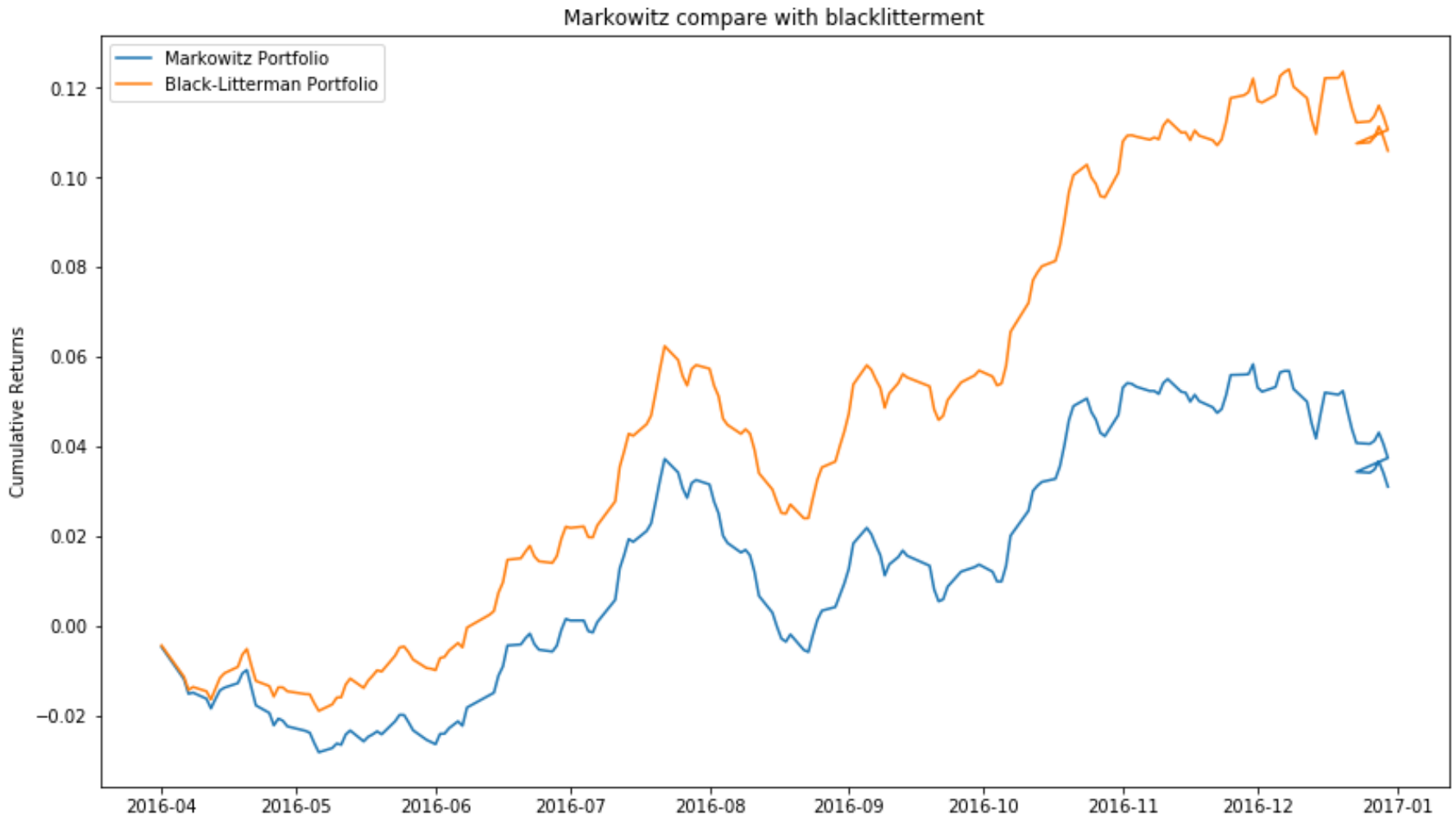
	Black-Litterman Portfolio - the LSTM Investor Views	Markowitz Portfolio	Equally Weighted Portfolio	S&P 500 Index
Annual return	16.151%	15.172%	12.428%	9.643%
Annual volatility	13.897%	14.365%	15.870%	13.169%
Sharpe ratio	1.14697	1.05534	0.81762	0.76492
Stability	0.82500	0.82515	0.82514	0.78754
Max drawdown	-10.105%	-10.465%	-12.529%	-10.306%
Skew	-0.35652	-0.52985	-0.56976	-0.36795
Kurtosis	2.49845	3.00613	2.41894	2.21958
Daily value at risk	-1.688%	-1.750%	-1.948%	-1.619%
Alpha	0.06445	0.05354	0.02158	0.00000
Beta	1.01485	1.04816	1.15631	1.00000
Information ratio	0.10935	0.09129	0.04655	-

Portfolio Cumulative Returns



Cumulative Returns

Markowitz v.s. Black-litterment



Source: Min-Yuh Day, Jian-Ting Lin and Yuan-Chih Chen (2018), "Artificial Intelligence for Conversational Robo-Advisor", in Proceedings of the 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2018), Barcelona, Spain, August 28-31, 2018

Summary

- **AI Dialogue System**
- **Conversational Commerce**
- **FinTech**

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AI Dialogue System for Conversational Commerce in FinTech

Host: Prof. Cheng-Zen Yang
Yuan Ze University

Time: 14:00-16:00, 2019/12/04 (Wednesday)
Place: 1309, Building 1, Yuan Ze University (YZU)
Address: 135 Yuan-Tung Road, Chung-Li, Taiwan



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2019-12-04

