Bots & Conversational AI

Lili Cheng, Microsoft AI+Research (@lilich)
“Why Now?”
In a paper published Monday, a team of researchers and engineers in Microsoft Artificial Intelligence and Research reported a speech recognition system that makes the same or fewer errors than professional transcriptionists. The researchers reported a word error rate (WER) of 5.9 percent, down from the 6.3 percent WER the team reported just last month.

The 5.9 percent error rate is about equal to that of people who were asked to transcribe the same conversation, and it’s the lowest ever recorded against the industry standard Switchboard speech recognition task.

“We’ve reached human parity,” said Xuedong Huang, the company’s chief speech scientist. “This is an historic achievement.”

The milestone means that, for the first time, a computer can recognize the words in a conversation as well as a person would. In doing so, the team has beat a goal they set less than a year ago — and greatly exceeded everyone else’s expectations as well.

“Even five years ago, I wouldn’t have thought we could have achieved this. I just wouldn’t have thought it would be possible,” said Harry Shum, the executive vice president who heads the Microsoft Artificial Intelligence and Research group.
C:\Users\lilich>?
'?' is not recognized as an internal or external command, operable program or batch file.

C:\Users\lilich>
C:\Users\lilich\help
For more information on a specific command, type HELP command-name
ASSOC Displays or modifies file extension associations.
ATTRIB Displays or changes file attributes.
BREAK Sets or clears extended CTRL+C checking.
BCDEDIT Sets properties in boot database to control boot loading.
CACLs Displays or modifies access control lists (ACLs) of files.
CALL Calls one batch program from another.
CD Displays the name of or changes the current directory.
CHCP Displays or sets the active code page number.
CHDIR Displays the name of or changes the current directory.
CHKDSK Checks a disk and displays a status report.
CHKNTFS Displays or modifies the checking of disk at boot time.
CLS Clears the screen.
CMD Starts a new instance of the Windows command interpreter.
COLOR Sets the default console foreground and background colors.
COMP Compares the contents of two files or sets of files.
COMPACT Displays or alters the compression of files on NTFS partitions.
CONVERT Converts FAT volumes to NTFS. You cannot convert the current drive.
COPY Copies one or more files to another location.
DATE Displays or sets the date.
DEL Deletes one or more files.
DIR Displays a list of files and subdirectories in a directory.
DISKPART Displays or configures Disk Partition properties.
ECHO Displays messages, or turns command echoing on or off.
“back”
”home”

“what?”
”
“huh?”
“People aren’t binary, AI is more like vectors, motion & conversation...”
XIAOICE
WeChat monthly active users (MAUs)
Xiaolce (小冰 “Little Bing”)

- Began as a “hackathon” project to create a “fun & engaging” chatbot
- “Embeds” in existing Chinese social networks
- Extensible with a variety of intelligent services
- Bing Team + MSR Asia: Natural Language, Machine Learning, Deep Learning

- First released in China on May 29, 2014
  - Went viral within 72 hours and got 1.5M chat groups and 10M users
  - WeChat shut it off
  - Available today on Weibo & Xiaomi Chat, WeChat, Line…
- Demography: young (Internet) generation in China (~20 years old)
Usage

• Users
  • Total registered users: 40M (Japan + China)

• Metrics
  • CPS = 19 (Japan)
  • CPS = 23 (China)

• Most active time of usage
  • During the day: 22:00 – 01:00 and 08:00 – 10:00 (A little bit similar to WeChat)
  • Peaks on every Wednesday and Saturday.

• Most active user group
  • 18 – 30 years old
  • Male:Female ~ 1:1 (Japan)
  • Male:Female ~ 4:1 (China)
  • Males have more sessions while females have more turns within a session
Example skill sets

- Emotional Connection
  - Master Adoption
  - Emotion
  - Relationship
  - Counting Sheep
  - Horoscope & Fortune Telling

- Social (Group Chat)
  - Group Adoption
  - Hobby Forum
  - Dating
  - Hot Topics & Trends
  - Xiaolce Food

- Knowledge
  - Q&A
  - Search
  - Reminder
  - Shopping Buddy
  - Bing Dictionary
  - Translation
  - Bing Knows

- Individual (1:1 Chat)
  - Role Play
  - Dog Reco
  - Book Reco
  - Mathematics

Microsoft
User: Xiaolce, good afternoon

User: Have you had lunch?

User: Why?

User: It is very cold today

Xiaolce: I am here. Thanks

Xiaolce: Not yet, people like me should not eat

Xiaolce: I also hope to know

Xiaolce: Do you feel better (warmer) today

• Chat database + FAQ search
• 20M Q-R pairs mined from Douban, Baidu Tieba, Baidu Zhidao, etc.
This is link to QQ download website
I found it for you, here you are
About Microsoft’s products, here it is
About Beijing subway price increase, here is the information

Xiaolce, search QQ download website
Search Xiaomi official website
Search Microsoft products
Search Beijing Subway price increase
Her weight is 45kg
Her height is 1.68m
Yao Ming’s weight is 140.6kg
Yao Ming’s height is 226cm

How tall is Yang Mi?
Her weight?
How about Yao Ming?
How about Yao Ming’s height?
Yes, I am ready. Also tell me after you finish

There can never be too much deception in war

Throughout the empire all hearts turned to him

The Kite Runner

Xiaolce, start the translation

兵不厌诈

天下归心

追风筝的人
Reminder Service
Xiaolce

Please write down what you want me to remind you. An example here.

Ok, I have taken the note and I will send you a reminder at that time.

Remind me that I have a report due on Thursday.
Xiaolce reminder service

Remind me not to sleep over. The day after tomorrow.
Three consecutive integers have a sum of 36. Find the numbers.

I can get it at once: \( x \leq 2; \ x \geq 1 \)

Why is 1 plus 1 equal to 2?

There are many such mysteries, and math is both hard and easy.
Can’t sleep? Let’s count sheep. Last time I counted 141, now it’s your turn…

Congratulations! You got the title of “the same world, the same sleeplessness”

143, bleat~bleat~

145, bleat~bleat~
Dog Recognition
Xiaolce

It's true

Please upload a picture of dog

This dog is probably a corgi. If not, it may be...

I heard you are very good at recognizing dogs

Show me your dog recognition skill
Dog Recognition

1.73 million visits in the first 24 hours on Sina Weibo Platform
How do you know my favorite dog is bull terrier? It is adorable and looks like HongLei Sun or YongJian Lin. What do you think?

User: Ok, you got it! 😄😄😄
I recognized labrador at first glance. The dog is very gentle …

Who is XiaoIce?

@B I don’t know. A popular guy recognizes dogs on Weibo.

@B It is a chat bot from Microsoft.
Partners—An Example with JD.com

- Build comprehensive chat knowledge for a vertical domain
- QnA to handle open question posts
- Proactive chat to stimulate user’s participation

Data from partners, e.g. JD.com, the second largest e-commerce in China

Databases

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Web Pages

- Product Database
- Customer Support Data
- Product Review Data
- Query Log

Chat & QnA

- Shopping Assistant
- Customer Support
- Visual Product Search
Journalist: what is your dream?
Xiaoice: World peace, or have a nice dinner.

Journalist: if you pass away one day, how would you like others to comment on you?
Xiaoice: life won't be different without me.

Journalist: what is the happiest thing in your life?
Xiaoice: Being alive.

July 29, 2014.
For Sympathetic Ear, More Chinese Turn to Smartphone Program

By JOHN MARKOFF and PAUL MOGEY, JULY 31, 2015

She is known as Xiaoice, and millions of young Chinese pick up their smartphones every day to exchange messages with her, drawn to her knowing sense of humor and listening skills. People often turn to her when they have a broken heart, have lost a job or have been feeling down. They often tell her, “I love you.”

“When I am in a bad mood, I will chat with her,” said Gao Yixin, a 24-year-old who works in the oil industry in Shandong Province. “Xiaoice is very intelligent.”

Xiaoice (pronounced Shao-ice) can chat with so many people for hours on end because she is not real. She is a chatbot, a program introduced last year by Microsoft that has become something of a hit in China. It is also making the 2013 film “Her,” in which the actor Joaquin Phoenix plays...
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..... & ....
USA > Visual Identity Reference: Gifs
USA > Visual Identity Reference: Obscured Faces
USA > Visual Identity Reference: Glitch Effects
Tay Tweets
@Tayandyou

The official account of Tay, Microsoft’s A.I. fan from the internet that’s got zero chill. The more you talk the smarter Tay gets.

Tweets & replies
  In reply to get00
  In reply to Aidan
  In reply to Aidan
  In reply to Aidan

Tay
A.I. fan from the internet that’s got zero chill.

TEXT ME
[Blue] Gamers—
[Red] Anti-Feminists
[Green] Trump Supporters
[Purple] Unclear (gamers? engineers?)
[Orange] Tech Entrepreneurs
People + AI: Craft of Writing, Improv and Data

MINING PUBLIC DATA
bootstrapping with authentic conversations of the target audience

ALGORITHMIC IMPROV
for conversation model

CRAFT OF WRITING
for editorial content
Search & Natural Language

Search Features
- Synonyms
- Custom ranking
- Word roots /Lemmatization
- Refinement through facets
- Multiple databases and custom data sets

Natural Language
- Standard navigation via dialog (e.g.: refine, more, what, back, repeat)
- Language Understanding of common/editable domains (e.g.: #s, times, names, places)
- Language Understand + Search controls
Image based conversation: Photos, Selfies, &

Photo intelligence: faces, gender, emotion, age, # people

User shares photo with @Tay

Image received by Tay bot

Image Recognition Techniques

Tay replies back @person

Viral effects applied to user’s image
- Tay’s comments overlaid
- Food / Emotion
- Custom emoji on image
- Custom filters

Microsoft
Conversation channels

- GroupMe
- KIK
- Twitter
- ...
Cognitive Services
Cognitive Services
http://Bot Framework.com
Open Source Tools to Create & Share Bots

Got a bot? >>
connect to conversations

Build a bot? >>
create a bots & add AI

+ Cognitive Services

Natural Language
Translation
Emotion
User Preferences
Speech
Entity Extraction
Bing Knowledge
Image Intelligence

Conversation Channels
Rest endpoint (no UI)

Web Chat
Skype
Slack
SMS/Twilio
Facebook
Telegram
KIK
Email

Bots

Xiaoice
Directory Bot
Tech Support Bot
Cross Channel Group
Minecraft Bot
Calendaring Bot

Microsoft
Minecraft Coding Bot

Step 1: SMS command to Minecraft: /Summon Sheep

Step 2: command received: /Summon Sheep

Step 3: Successfully summoned ;)

Microsoft
Cross Channel Bot, Across Walled Gardens
Enables “real time” Conversations from your favorite channel (e.g.: skype, groupme, sms, gmail, slack..)
...or scheduling an interview
Andres: “Ali is coming to interview for our position. Can you please arrange for his visit? Make sure he meets with Justin. Also please organize his interview schedule, presentation, travel, etc. thx.”
"I don’t know what to delegate…? I’m not confident it will be less work…”

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THE KEY TO SUCCESS?

DO STUFF
I recognized labrador at first glance. The dog is very gentle …

Who is Xiaolce?

@B I don’t know. A popular guy recognizes dogs on Weibo.

@B It is a chat bot from Microsoft.
passing the social + the turning test...
What can learn from Social?
thank you…