

Smart Bots

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Bots

Welcome to the future.



Microsoft Bot Framework

Your bots - wherever your users are talking.



Microsoft Cognitive Services

Democratizing AI.



Workshop

Let's build one from scratch.

Disclaimer: This slide-deck was prepared by the author (Arunabh Verma) in his personal capacity. The opinions expressed in this presentation are the author's own and do not necessarily reflect Microsoft Corporation's official policy or position.

This deck was prepared for use on Georgia Tech campus for a presentation on Chat Bots. (And is being made available on GitHub alongside the code from the workshop session, for students' future reference) Most of the 'opinion' slides are in the 1st section 'Bots', and have been marked with a Footer (author's initials) on the bottom right.

Agenda

1. Bots
 - a. Why should you care?
 - b. The hype is real!
 - c. So, what the heck is a Chatbot anyway?
 - d. How did we end up here?
 - e. Why is everyone going crazy about this?
 - f. What do they say the future is like?
 - g. Personal Insights / NUI.
 - h. Popular platforms & tools.
2. Microsoft Bot Framework
 - a. Overview
 - b. Components
 - c. Emulator
 - d. Building a Bot
3. Microsoft Cognitive Services
 - a. Overview
 - b. API Collection
 - c. Why use it?
 - d. Vision
 - e. Computer Vision API
 - f. Speech
 - g. Language
 - h. Knowledge
 - i. Search
4. Putting it all together: Let's build a smart-bot from scratch (Workshop)
5. End / QnA



Entity linking

Bing news search

Forecasting

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Language

Customer feedback analysis



Speech

Bing image search

Speech API

Text to speech

Custom recognition (CRIS)



Machine Learning

Spell check

Thumbnail generation

Academic knowledge

Web language model



Knowledge

Bing autosuggest

Computer vision



Vision

Emotion

Anomaly detection

Sentiment scoring



Search

ORC, tagging, captioning

Bing web search

01. Bots

Welcome to the future.



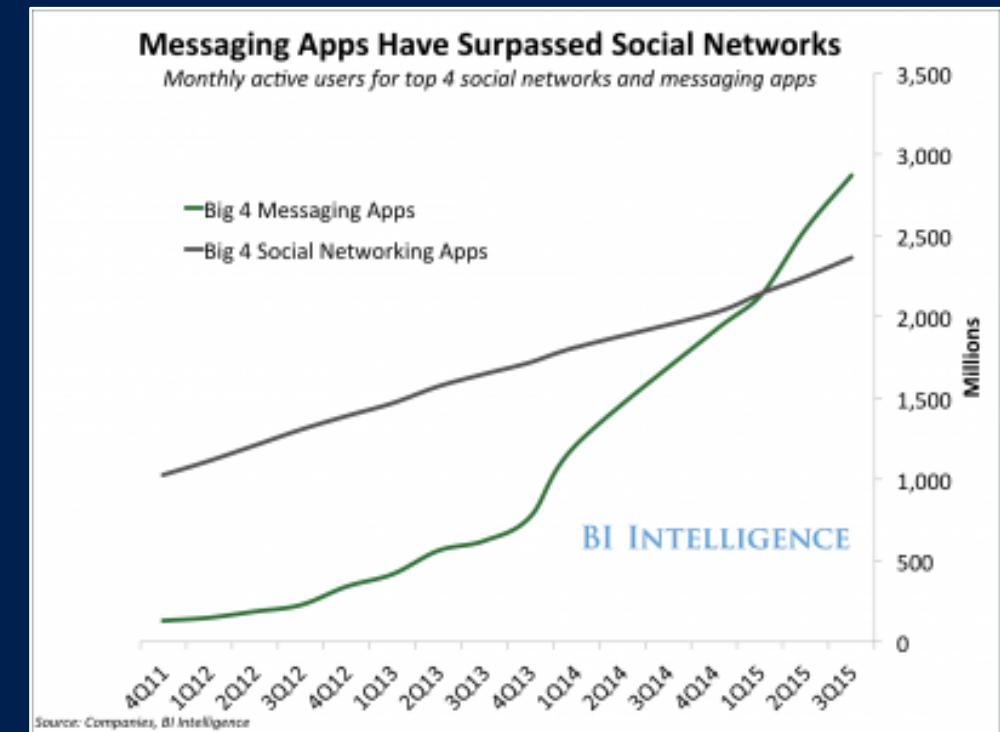
Why should you care?

Yuuuge market opportunity!

- Being touted as the “Next dev gold rush”.
- 1B+ Messenger MAUs.

Extremely easy and fun to build, and simple to use.

Even if it's a bubble in it's current form, “conversation” is the foundation for the future of HCI.



So many competitions/prizes/incentives..
(e.g. Telegram \$1M)

The hype is real!

“Threads are the new apps”

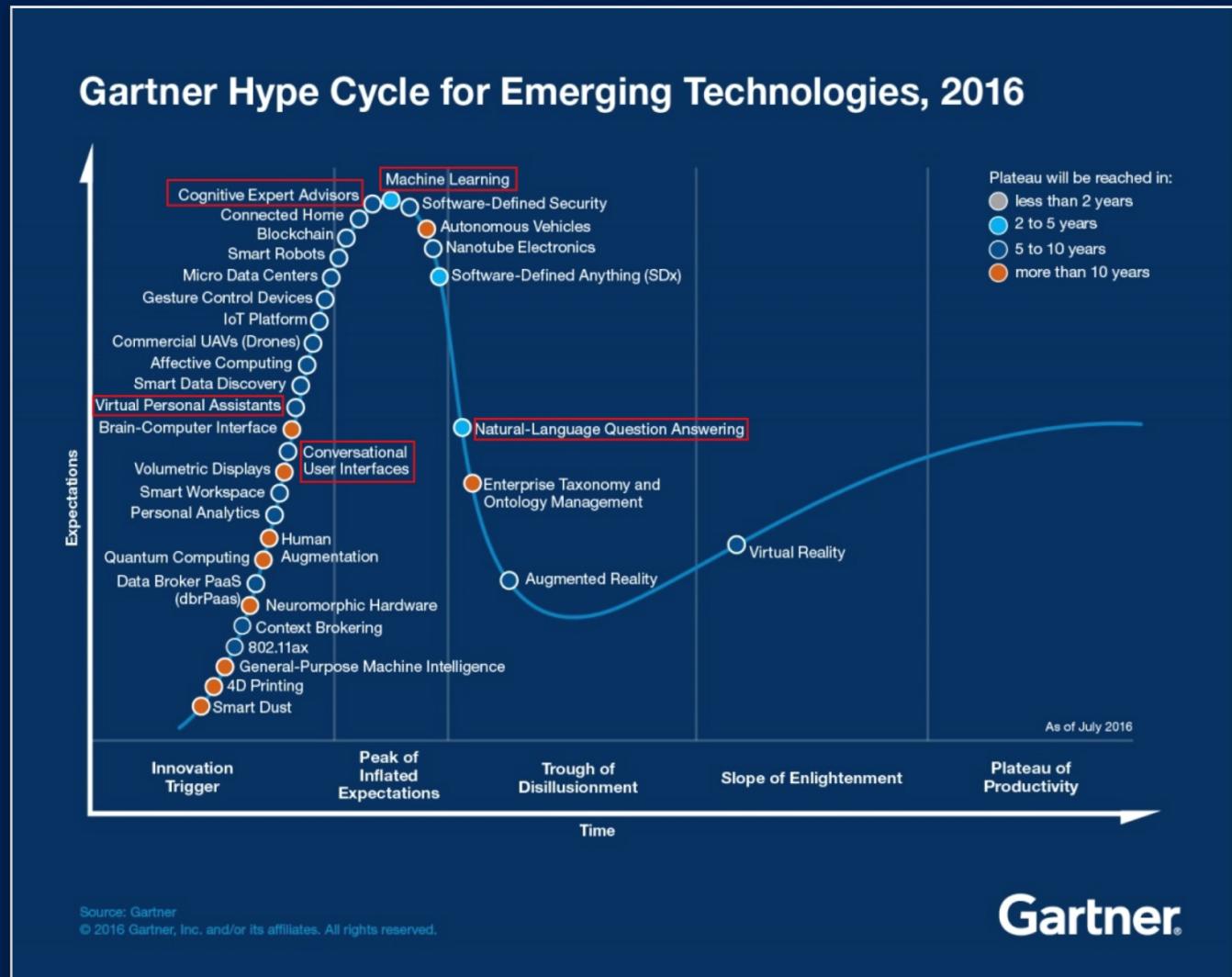
-David Marcus, Head of Engg. , FB Messenger.

“\$200B Chatbot disruption..”

-Venturebeat.

30,000 FB Messenger bots in 3 months.

“There’s a bot for that” is now a thing.



So, what the heck is a Chatbot anyway?

A service, powered by AI, that you interact with via a chat interface (aka. Conversational-UI)

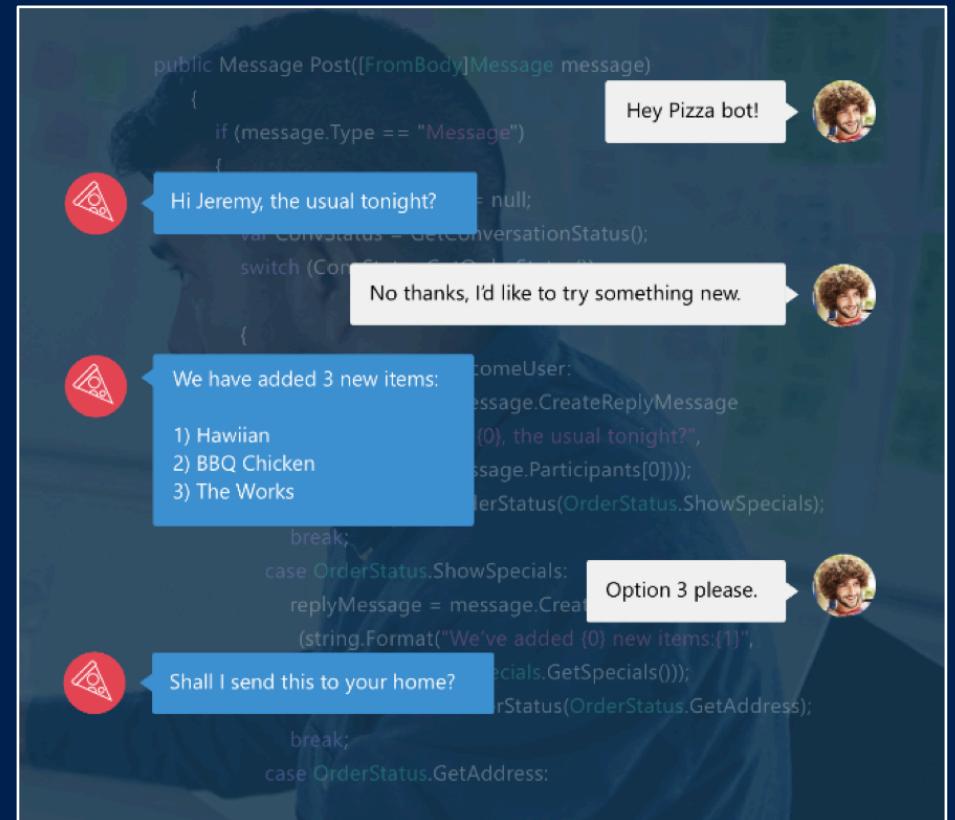
It can live in any Messaging App (aka. Channel)
e.g. : FB Messenger, Skype, Slack, Telegram, Text, Allo, Email..

Static Chatbots:

- Based on a pre-programmed set of rules.
- Very limited. Can only respond to specific commands.

Smart Chatbots:

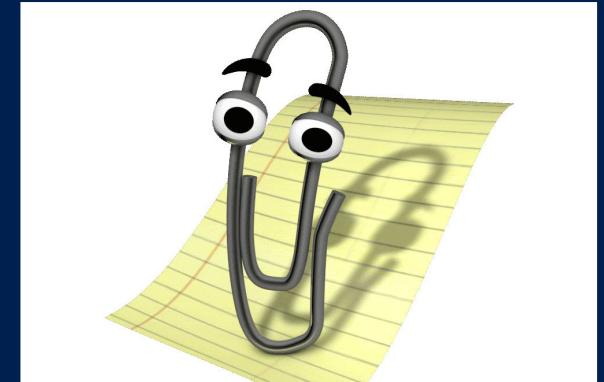
- Backed by Machine Learning.
- Don't have to be very specific, they understand language.
- Continually learn through conversations.



How did we end up here?

Not a new thing! Around since 60's. "Loebner Prize for AI" since 90's.

What's new: Unashamedly artificial! No more trying to pass as humans.



Evolution of human interaction patterns, with businesses:



Why is everyone going crazy about this?

Messaging Apps are the new kings

- Millennials and GenZ prefer text and images for communication.
- Light weight, easy and ubiquitous compared to using separate Apps.



Advancements in Machine Learning

- Deep Learning
- Computers getting better at understand speech, language, visuals..



Market Factors

- Apple & Google show.
- Android/iOS Home screens are like the portals from Web 1.0
- Enterprises struggling with customer engagement.



What do they say the future is like?

Loud people with polar opinions!

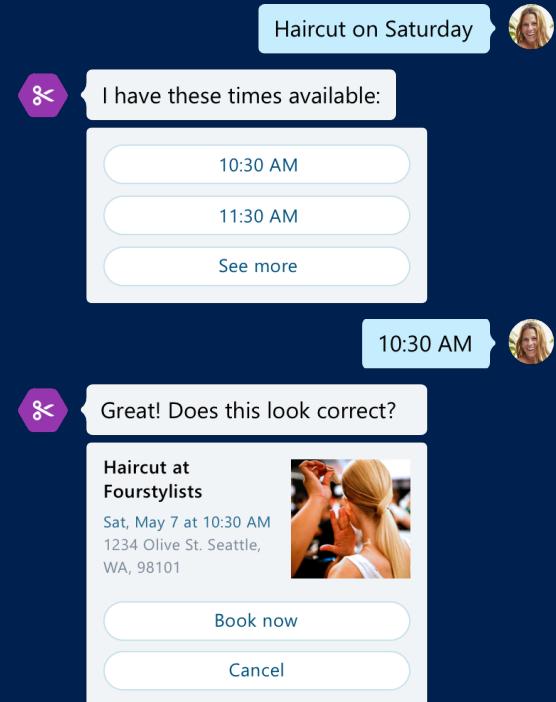
- “Either bots are the holy grail and they’re going to kill all Apps. Or bots are a fad that’ll end in a few months”

Reasonable speculation:

- Some scenarios are inherently conversations and are best served via bots (Option-overloading Settings App / ATM).
- “Potential of being the next big thing. Early use cases however, are likely to be evolutionary enhancements to how we interact with existing software”

USP: Scalable, Familiar and Light-weight.

- Solves the “Download a big dedicated App from the App Store, create a username and start from scratch with no context” problem.





Personal Insights / NUI.



Excel at the 1st two -> Good s/w engineer.

Be cognizant of and proactively involved in the 3rd, that's where's the revolutionary stuff is.

Conversational UI:

- Present: Primarily text based.
- Near Future: Better speech and vision.
- Far Future: NUI == {Mixed Reality + AI + Human-like Conversations}. *Garvis!*

Agents (Cortana, Siri, Now, Alexa) will be the new runtime/Shell!

Popular platforms and tools

Conversational Canvases:

- Text Messaging
- FB Messenger (~1B)
- Skype (300M)
- Slack
- Telegram
- Kik
- WeChat
- Email
- Web Chat



Tools/SDKs:

- Microsoft Bot Framework
- Microsoft Cognitive Services
- wit.ai (acquired by FB last year)
- api.ai (acquired by Google last month)
- howdy.ai
- textit.in
- converse.ai
- Chatfuel





Web language
model



Knowledge

Thumbnail
generation

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Language

Customer
feedback
analysis

Bing
news search

Forecasting



Speech

Recommendation
API

Text analytics

Custom
recognition
(CRIS)



Machine
Learning

Academic
knowledge

Spell
check



02. Microsoft Bot Framework

Your bots - wherever your users are talking.

Computer
vision



Vision

Bing
autosuggest



Search

Emotion

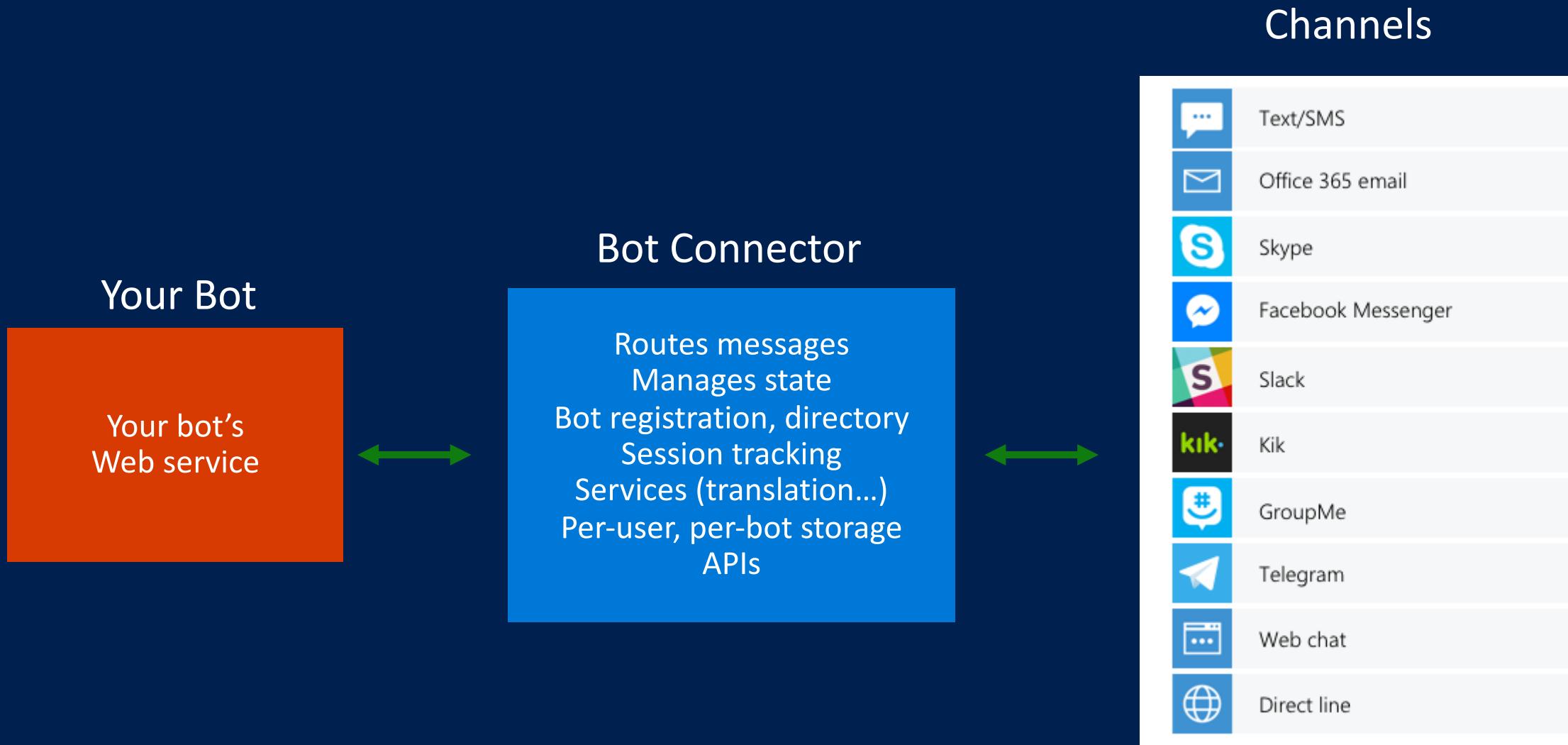
Anomaly
detection

Sentiment
scoring

ORC, tagging,
captioning

Bing
web search

Bot Framework - Overview





Bot Framework - Components

Bot Builder SDKs

Build great dialogs within your Node.js or C# based bot

- Open source SDK on Github.
- Libraries, samples and tools.
- Chat emulator.
- Leverage related services available in Cognitive Services.



Bot Connector

Connect your bots to various channels

- Register, connect, publish and manage your bot through the bot dashboard.
- Message routing.
- Automatic translation to 30+ languages.
- User and state management.
- Embeddable web chat control.
- Debugging tools.



Bot Directory

Try, use, and add published bots to the world's top conversation experiences

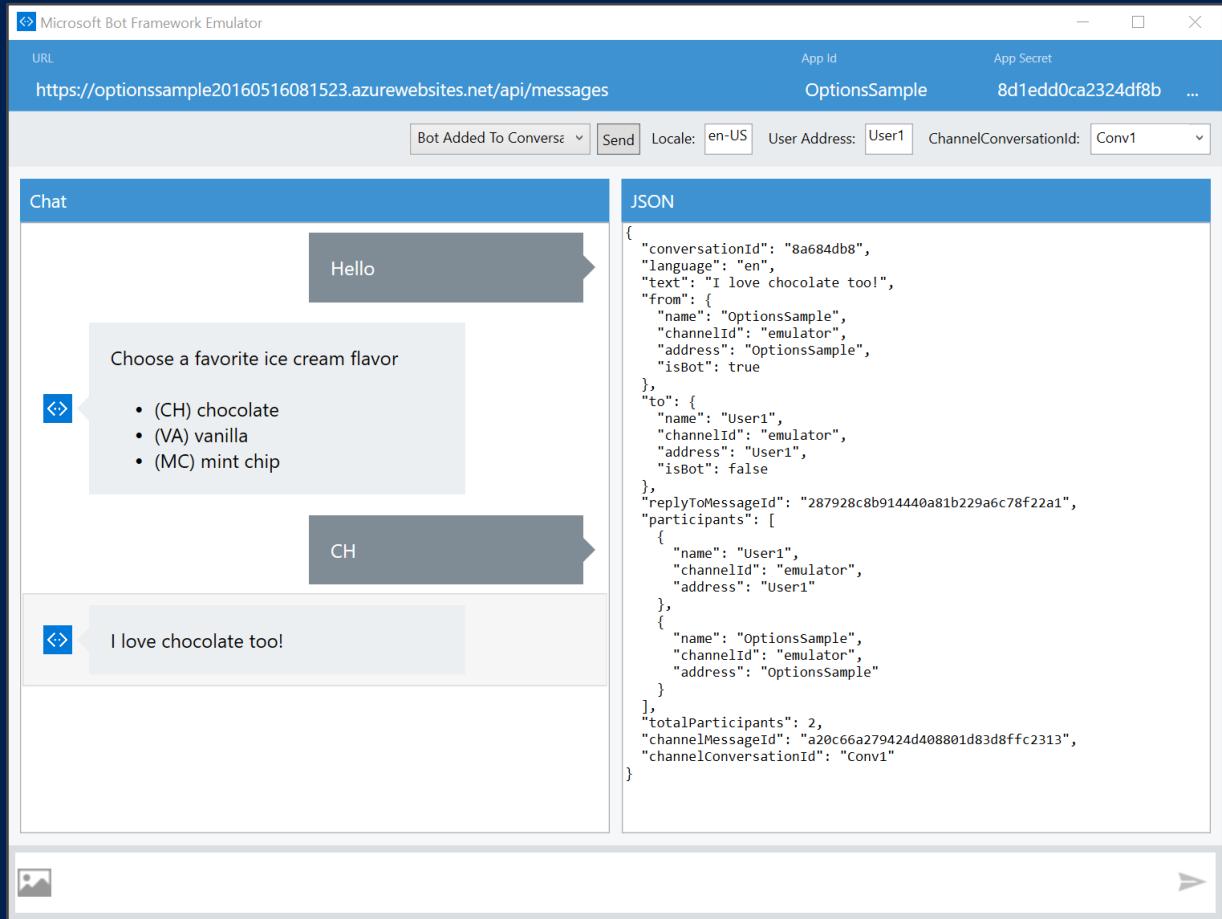
- Public directory of published and registered bots.
- Users can try your bot from the directory via the web chat control
- Users can discover and add your bot to the channels on which it is configured.



Bot Framework - Emulator

Interacting with your Bot

- Test locally before deploying
 - Displays raw JSON results
 - Send events to that mimic user behavior
- Diagnose in the cloud
 - Just replace Keys/URL with cloud endpoints
 - Richer errors than in production
- Mac & Linux available too
 - Console app built on Mono



Building a Bot

1. Create your empty Bot and publish to get your URL
 - Download and Install the Bot Template
 - Download and Install the Bot Framework Emulator
2. Register your Bot with the Bot Connector
3. Apply your Bot Connector keys to your web.config
4. Verify with the test channel in the dev portal
5. Actually write your Bot's logic
6. Test locally & in the cloud with Bot Framework Emulator
7. Configure channels for your Bot
8. Share



03. Microsoft Cognitive Services

Democratizing AI.



Cognitive Services - Overview



Vision

From faces to feelings, allow your apps to understand images and video



Speech

Hear and speak to your users by filtering noise, identifying speakers, and understanding intent



Language

Process text and learn how to recognize what users want



Knowledge

Tap into rich knowledge amassed from the web, academia, or your own data



Search

Access billions of web pages, images, videos, and news with the power of Bing APIs



Cognitive Services - API Collection



Vision

Computer Vision | Emotion | Face | Video



Speech

Computer Recognition | Speaker Recognition Speech



Language

Bing Spell Check | Language Understanding
Linguistic Analysis | Text Analytics | Web Language Model



Knowledge

Academic Knowledge | Entity Linking | Knowledge Exploration | Recommendations



Search

Bing Autosuggest | Bing Image Search | Bing News Search | Bing Video Search | Bing Web Search

Why Microsoft Cognitive Services?

EASY + FREE

- Roll your own with REST APIs
- Simple to add: just a few lines of code required
- Free tier for getting started.



FLEXIBLE

- Integrate into the language and platform of your choice
- Breadth of offerings helps you find the right API for your app



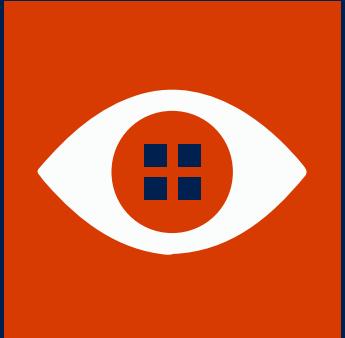
TESTED

- Built by experts in their field from Microsoft
- Research, Bing & Azure ML
- Quality documentation, sample code, and community support



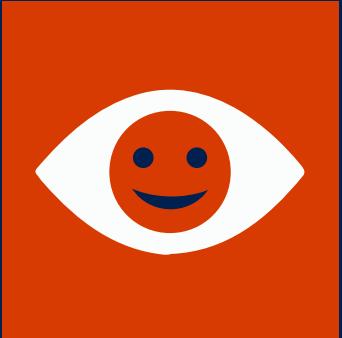


Vision



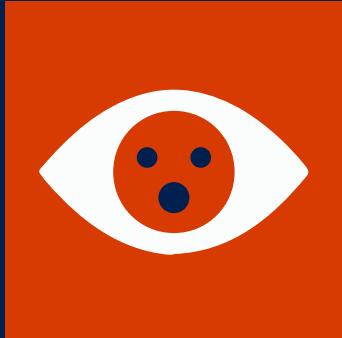
Computer Vision API

Distill actionable information from images



Face API

Detect, identify, analyze, organize, and tag faces in photos



Emotion API

Personalize experiences with emotion recognition



Video API

Analyze, edit, and process videos within your app



Computer Vision API

Is Adult Content: False
Categories: people_swimming

i https://portalstorageprod.azureedge.net ↵ ⌂

Features:	
Feature Name	Value
Description	{ "type": 0, "captions": [{ "text": "a man swimming in a pool of water", "confidence": 0.7850108693093019 }] }
Tags	[{ "name": "water", "confidence": 0.9996442794799805 }, { "name": "sport", "confidence": 0.9504992365837097 }, { "name": "swimming", "confidence": 0.9062818288803101, "hint": "sport" }, { "name": "pool", "confidence": 0.8787588477134705 }, { "name": "water sport", "confidence": 0.631849467754364, "hint": "sport" }]
Image Format	jpeg
Image Dimensions	1500 x 1155
Clip Art Type	0 Non-clipart
Line Drawing Type	0 Non-LineDrawing
Black & White Image	False

Speech



Bing Speech API

Convert speech to text and back again, and understand its intent



Speaker Recognition API

Give your app the ability to know who's talking



Custom Recognition Intelligent Service

Fine-tune speech recognition for anyone, anywhere

Language



Bing Spell Check API

Detect and correct spelling mistakes within your app



Web Language Model API

Leverage the power of language models trained on web-scale data



Linguistic Analysis API

Easily parse complex text with language analysis



Language Understanding Intelligent Service

Teach your apps to understand commands from your users



Text Analytics API

Detect sentiment, key phrases, topics, and language from your text



Knowledge



Academic Knowledge API

Explore relationships among academic papers, journals, and authors



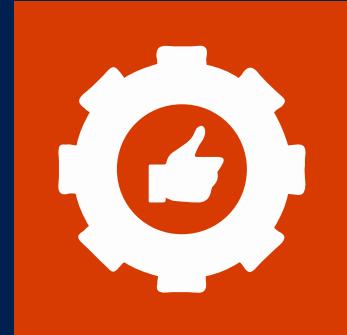
Knowledge Exploration Service

Add interactive search over structured data to your project



Entity Linking Service

Contextually extend knowledge of people, locations, and events



Recommendations API

Provide personalized product recommendations for your customers



Search



Bing Web Search API

Connect powerful search to your apps



Bing Autosuggest API

Give your app intelligent autosuggest options for searches



Bing Image Search API

Bring advanced image and metadata search to your app



Bing Video Search API

Trending videos, detailed metadata, and rich results



Bing News Search API

Link your users to robust and timely news searches



Entity linking

Bing
news search

Customer
feedback
analysis



Speech

Bing
image search

Speech API

Forecasting

Aあ

Language

Recommendation
API

Custom
recognition
(CRIS)



Machine
Learning

Text to
speech

Text analytics

Thumbnail
generation



04. Workshop

Let's build a Caption Bot from scratch.

Academic
knowledge

Spell
check

Web language
model



Knowledge

Bing
autosuggest

Computer
vision



Vision

Emotion



Microsoft

Sentiment
scoring



Search

ORC, tagging,
captioning

Bing
web search

https://github.com/ginnie/GitMAD_TechTalk_BasicCaptionBot0



Bringing it all together

The Seeing AI Application

Computer Vision, Image, Speech Recognition, NLP, and
ML from Microsoft Cognitive Services

<http://blogs.microsoft.com/next/2016/03/30/decades-of-computer-vision-research-one-swiss-army-knife/#sm.000umg9co16lpd4it2611ouzrbxs9>

<https://www.youtube.com/watch?v=R2mC-NUAmMk>

Resources

Preview Pricing

<https://www.microsoft.com/cognitive-services/en-us/pricing>

Documentation

<https://www.microsoft.com/cognitive-services/en-us/computer-vision-api/documentation>

<https://botframework.com>

Client SDKs

<https://github.com/Microsoft/ProjectOxford-ClientSDK>

<https://github.com/felixrieseberg/project-oxford> (nodejs)

<https://github.com/southwood/project-oxford-python>

<https://github.com/Microsoft/botbuilder>

Example Code

<https://github.com/Microsoft/BotBuilder-Samples>

<https://github.com/jsturtevant/happy-image-tester-nodejs>

Join Our Community

<https://stackoverflow.com/questions/tagged/microsoft-cognitive>

<https://social.msdn.microsoft.com/forums/azure/en-US/home?forum=mlapi>

<https://cognitive.uservoice.com/>

<https://stackoverflow.com/questions/tagged/botframework>

Ack / Refs

- MSFT: CogSvc - Allison Light, Cornelia Carapcea, Khaled Rashad. BotFrmwrk - Dan Driscoll. MSR - Mike Hall.
- Facebook (F8 2016)
- Gartner
- Business Intelligence
- TechWorld
- TechCrunch
- VentureBeat
- Technasia
- Flaticon ([Freepik](#), [Madebyoliver](#), [Plainicon](#), [Simpleicon](#))
- Guardian
- Dan Grover
- Recode (Mary Meekar's 2016 Internet Trends)
- Many other websites/blogs, based on a Google Alert for ChatBots ☺



Questions?

Thanks!

Contact: <https://www.linkedin.com/in/arunabhverma>



