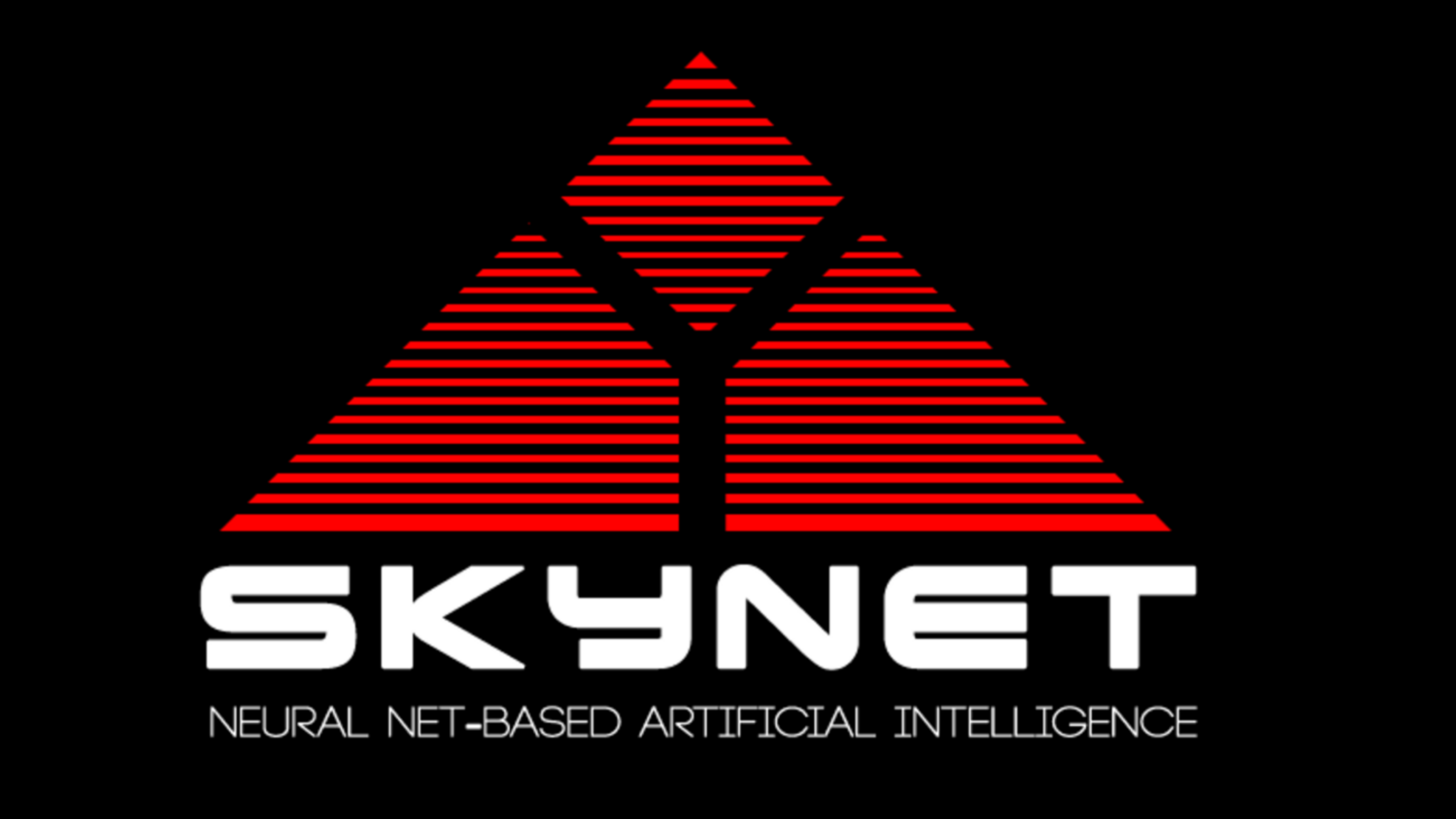
xpand it

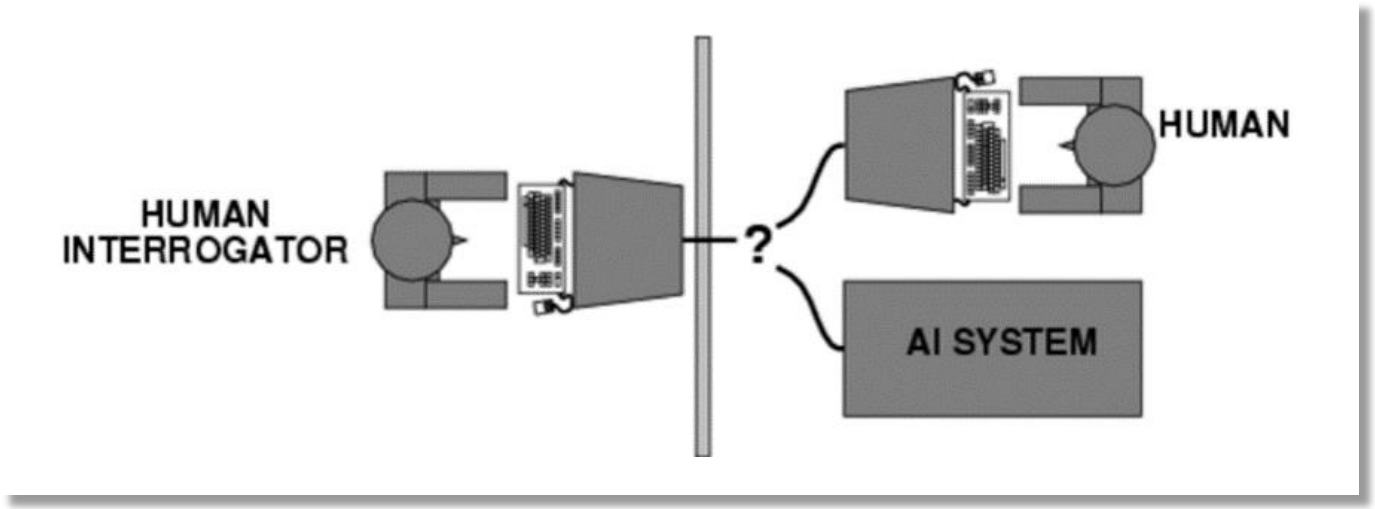
PASSION FOR **EXCELLENCE**

Cognitive LAB

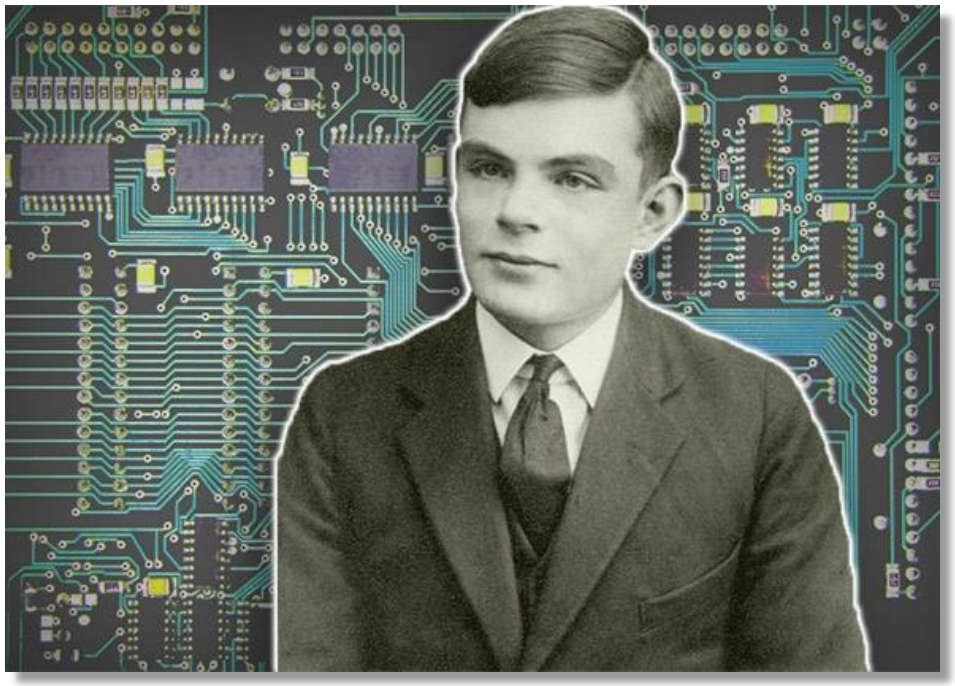

SKYNET
NEURAL NET-BASED ARTIFICIAL INTELLIGENCE

Let's look back 69 years

- A.I. is not new

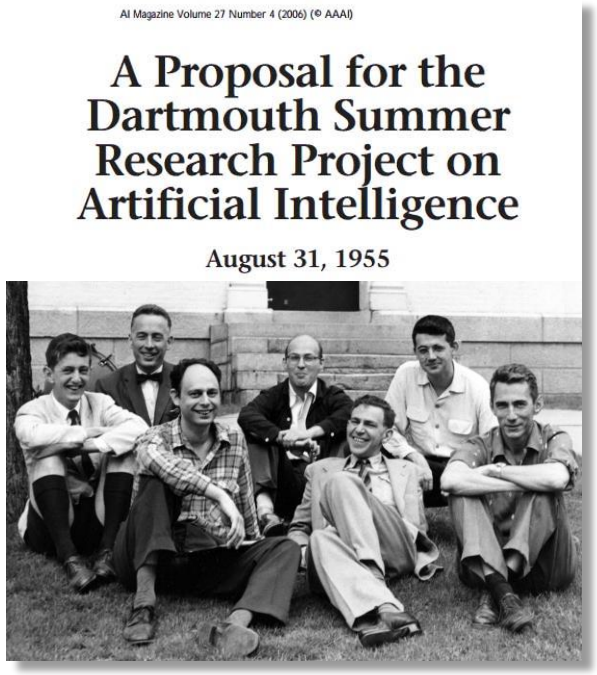


Turing Test 1950



Meet Marvin Minsky, the father of A.I.

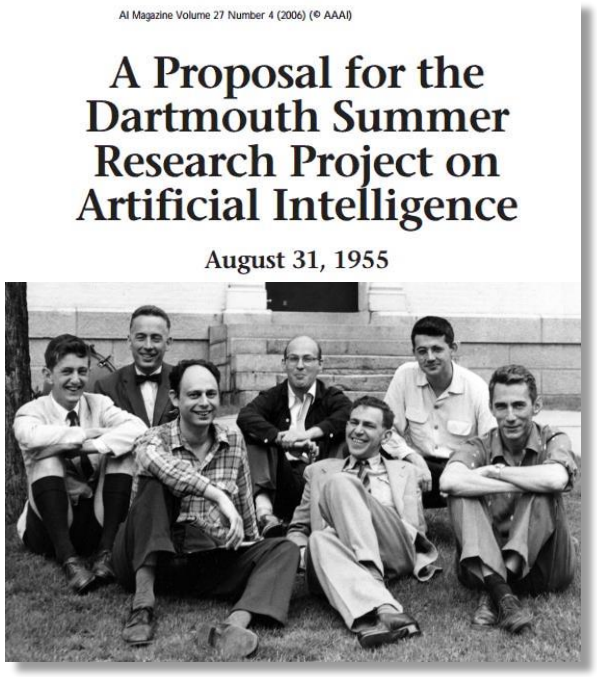
c.1937 New York



1955 Dartmouth Research Project

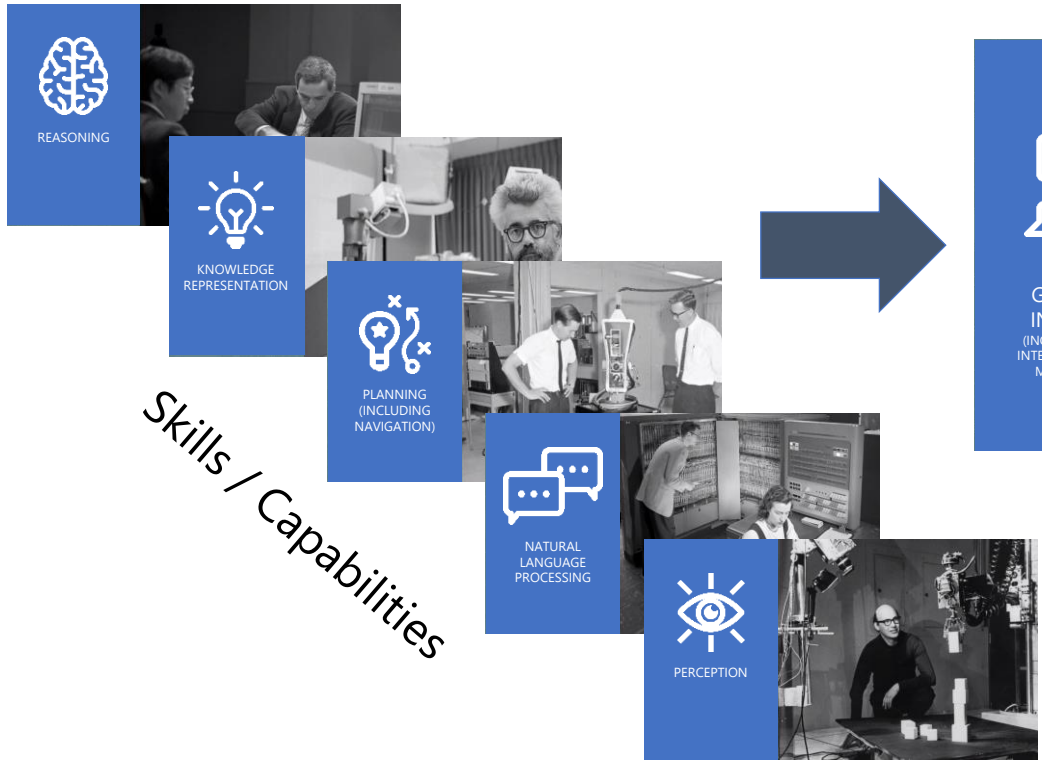
1959 Creates MIT A.I. Lab

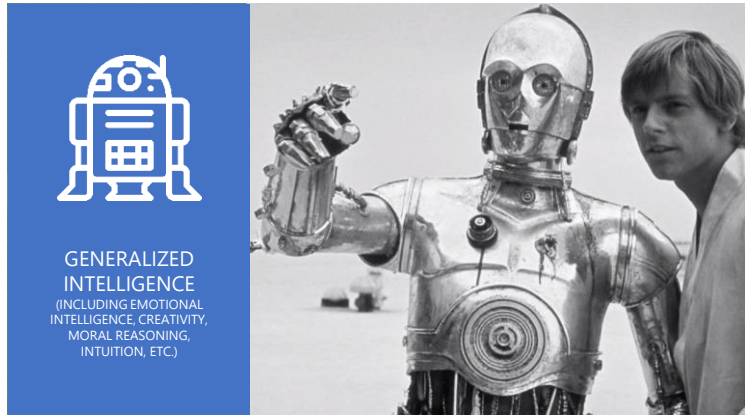
Meet Marvin Minsky, the father of A.I.



1955 Dartmouth Research Project

"Learning can be so precisely described that a machine can be made to simulate it"





A.I. is a broad topic

The study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of success at some goal.

+ Cognitive Computing

...involves self-learning systems to copying the way the human brain works.

+ Machine Learning

...computer programs that can change when exposed to new data.

+ Data Science

...**scientific** methods, processes and systems to extract knowledge or insights from **data**

Why A.I. now?

The arrival of machine learning

Performance for decades-old challenges has been transformed

Image recognition

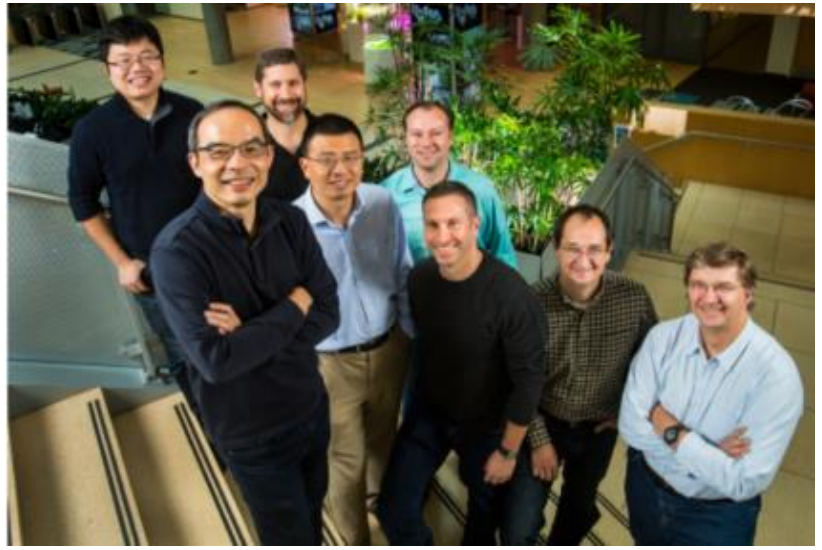
28% error rate ⇢ 7% ⇢

Speech recognition

26% error rate ⇢ 4% ⇢

Oct. 2016 Historic Achievement:

Microsoft researchers reach human parity in conversational speech recognition

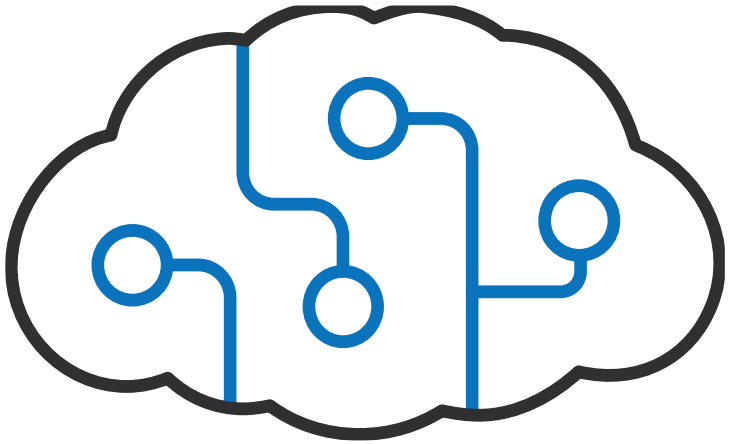


What are Cognitive Services?

The Cognitive Services are a collection of complimentary ‘services’ (29 and counting) to assist developers with the processing of natural input sources such as speech, images and emotion.

The Cognitive Services are organized into five pillars: Speech, Language, Vision, Knowledge and Search.

By combining different Cognitive Services developers can build intelligent apps with powerful algorithms using just a few lines of code.



The Pillars

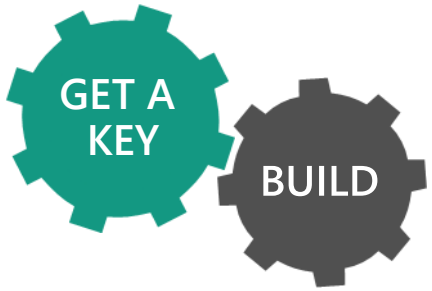
Language	Vision	Speech	Search	Knowledge
Spell Check	Computer Vision	Speech	Autosuggest	Academic
Linguistic Analysis	Content Moderator	Speaker Recognition	Image	Entity Linking
Text Analytics	Emotion	Translator	News	Exploration
Translator	Face	Custom	Video	QnA Maker
Web Language Model	Video		Web	Recommendations
	Video Indexer		Custom	
Custom Language Understanding	Custom Vision Service	Custom Speech	Custom Search	Custom Decision Service

Cognitive Services

Easy

Roll your own with REST APIs

Simple to add: just a few lines of code required



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, and Azure Machine Learning

Quality documentation, sample code, and community support

LUIS

The Language Gap

Language understanding in human-computer interaction is:

Technically Challenging

It's exceedingly difficult to enable a computer to understand what a person wants and to find the pieces of information that are relevant to their intent.

Costly to Implement

Building and maintaining machine learning systems requires a large investment of time, money and engineering resources

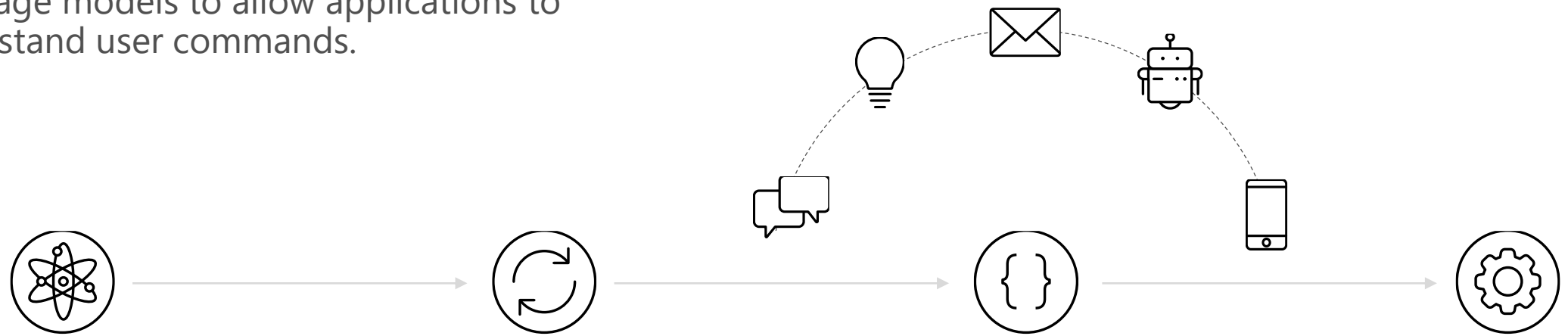
Often domain specific

In the past, building your own machine learned models often required assistance of a team of data scientists that would customize the models to the specific domain.

Introducing LUIS

Language Understanding Intelligence Service

A Microsoft Cognitive Service that provides developers with an easy way to create language models to allow applications to understand user commands.



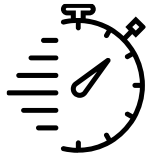
Create your own LU model

Train by providing examples

Deploy to an HTTP endpoint for any device

Maintain model with ease

Why LUIS?

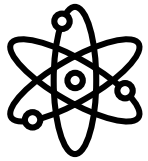


It is fast and easy

LUIS is designed to enable you to quickly deploy an HTTP endpoint that will take the sentences you send it and interpret them in terms of the intention they convey and the key entities that are present.

It learns and adapts

After your endpoint has processed a few dozen interactions, LUIS begins active learning. LUIS examines all the utterances that have been sent to it, and calls to your attention the ones that it would like you to label.



It is innovative

LUIS relies on the cutting-edge technologies developed and incubated directly by Microsoft Research that have been tried and tested with hundreds of internal and external customers all over the globe.

Pre-built Applications

In addition to allowing you to build your own applications, LUIS also provides selected models from the Microsoft Cortana personal assistant as a pre-built application.

How LUIS works

LUIS takes a user utterance and extracts intents and entities that correspond to activities in the client application's logic.

Utterance

An *utterance* is the textual input from the user, that your app needs to interpret. It may be a sentence, like "Book me a ticket to Paris", or a fragment of a sentence, like "Booking" or "Paris flight."

Intents

Intents are like verbs in a sentence. An *intent* represents actions the user wants to perform. Such as booking a flight, paying a bill, or finding a news article.

Entities

If *intents* are verbs, then *entities* are nouns. An *entity* represents an instance of a class of object that is relevant to a user's *intent*. In the *utterance* "Book me a ticket to Paris", "Paris" is an *entity* of type location.

LUIS Responses

User Utterance

"What's the forecast for London today?"

Query


```
"query":"What's the forecast for London today?",
"topScoringIntent":{
    "intent":"Weather",
    "score":0.9999981
}
```


Intents


```
"intents":[
    {
      "intent":"GetWeather",
      "score":0.9999981
    },
    {
      "intent":"None",
      "score":0.0604290478
    },
    {
      "intent":"LocationFinder",
      "score":0.0201619361
    },
    {
      "intent":"Reminder",
      "score":0.00177723425
    },
    {
      "intent":"BookFlight",
      "score":0.00110256893
    }
]
```


Entities


```
"entities":[
    {
      "entity":"forecast",
      "type":"GetWeather",
      "startIndex":9,
      "endIndex":9
      }
    },
    {
      "entity":"today",
      "type":"Datetime",
      "startIndex":11,
      "endIndex":16,
      "score":0.8928091,
      "resolution":
        {"date":"2017-09-13"}
    }
  ]
```

Demo