

# Natural language processing

## Chatbots

Linus Petkevičius, PhD

Institute of Computer Science  
Vilnius University  
linas.petkevicius@mif.vu.lt

23<sup>th</sup> November 2022

## Things to know for today:

- Main definitions
- Structure and creation
- Hands on examples

# Dialogflow Digital Assistant Chatbot

Overview

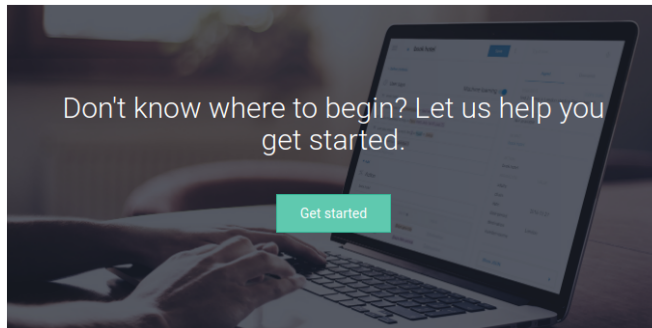


# Dialogflow (GCP)

- Redeem student voutcher
- Go to Console at <https://dialogflow.cloud.google.com>
- Create new project and budget alert
- Select project name and create first agent



# Welcome to Dialogflow!



Now it's time to create your first agent.

CREATE AGENT

# First agent

- Integration
- Dialogflow Messenger
- Try it now

# Digital Assistant Chatbots at Google

Voice and chat experience from end-to-end



**Google Cloud Platform**



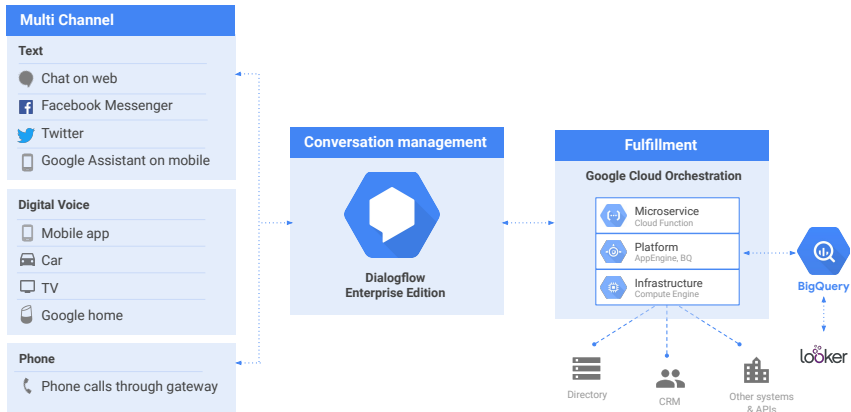
**Dialogflow**



**Actions on Google**



**Google Home**



Google Cloud

Confidential & Proprietary



# Dialogflow/Chatbot construct & terminology

- ❖ Intents
- ❖ Utterances
- ❖ Entities
- ❖ Context

# Intents

- The verbs in your dialog
- The action a user wants to take that they expect your chatbot to fulfill or facilitate
- Translated needs and wants
- How the application branches logic

**I need my coffee**  
Intent: Get coffee

**My laptop is broken**  
Intent: Tech support

**I want to set up an appointment**  
Intent: set up an appointment

- ❖ Intents
- ❖ Utterances
- ❖ Entities
- ❖ Context

## Intents (It. Ketinimai)

- Verb/action on what to do if found
- Training examples (not needed in Dialogflow)
- Formulation of Response if activated

# Utterances

- Spoken or typed phrases that invoke the chatbot and its intent.
- Triggers
- What the user will say, but maybe not what you think they will say

Hey Google, I want to work out

Hey Google, hungry

Hey Google, what's the weather?

- ❖ Intents
- ❖ **Utterances**
- ❖ Entities
- ❖ Context

# Utterances (lt. Išsireiškimai)

- Keywords which activates/trigger intent
- Formulation of Response if activated

# Entities

- The nouns in your dialog
- Composed of root terms and their synonyms
- Maps to variables
- Augmented by built-in entities

- ❖ Intents
- ❖ Utterances
- ❖ **Entities**
- ❖ Context

My name is Lily

The food was terrible

April 4, 2017

# Entities (It. Subjektai)

- Keywords which identifies facts/variables
- Allows to extract information

# Context

- How the chatbot keeps track of where the user is at in the conversation
- The background history you need when entering a conversation in progress
- Method for an application to store and access variables

- ❖ Intents
- ❖ Utterances
- ❖ Entities
- ❖ **Context**

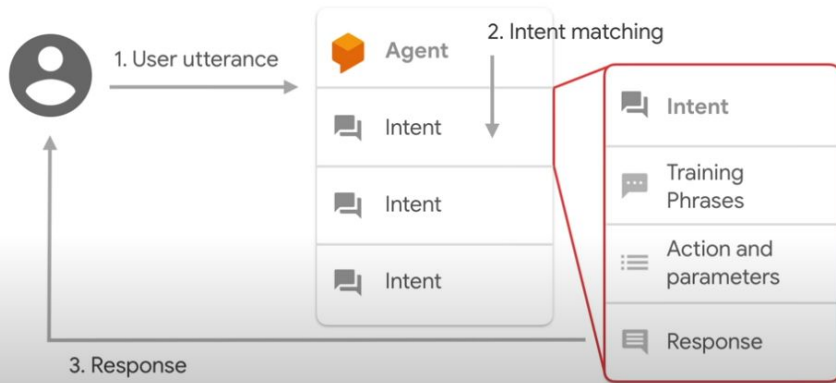
Book a flight  
from **Los Angeles**  
to **Hawaii** for less  
than **\$300**

You got it!













```
{
  "id": "4f932df9-56...",
  "timestamp": "2017-05-26T14:14:00.000Z",
  "lang": "en",
  "result": {
    "source": "agent",
    "action": "flight.book", "parameters": {
      "geo-city": "Los Angeles",
      "geo-state-us": "Hawaii", "price": {
        "amount": 300, "currency": "USD"
      },
      "contexts": [{
        "name": "flightbook", "parameters": {
          "geo-state-us.original": "Hawaii",
          "price": {
            "amount": 300,
            "currency": "USD"
          }
        }
      }
    ],
    "geo-city": "Los Angeles",
    "price.original": "$300",
    "geo-state-us": "Hawaii",
  }
}
```



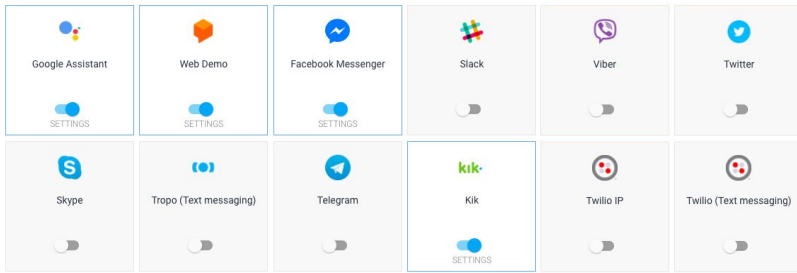
# Agent



# Pre-built agents help you get a head start

 <b>Food Delivery</b> Create and manage food and drink orders	 <b>Formats</b> Control default units of measurement	 <b>Hotel Booking</b> Find, create and manage reservations for hotels	 <b>Jokes</b> The agent tells jokes	 <b>Language Settings</b> Set language preferences	 <b>Local Services</b> Search local services and shops
 <b>Navigation</b> Ask for directions	 <b>News</b> Get news stories and manage news feed	 <b>Radio</b> Control playing radio stations	 <b>Reminders</b> Schedule, edit, view and remove reminders	 <b>Maps</b> Search maps for a location	 <b>Music</b> Play and control your music and playlists

## One-click integrations with most major platforms



# Knowledge Connectors

Dialogflow lets you pre-build explicit responses to specific user intents.

Knowledge Connectors enrich the conversation by complementing explicit intents with automated responses sourced from internal knowledge bases (articles, FAQs, etc.).

A screenshot of a 'Create New Document' dialog box. The dialog has a blue header bar with the title 'Create New Document' and a close button (X). The main content area is white and contains several form fields and options. At the top, there is a 'Document Name' field with a placeholder 'Enter document name'. Below it is a 'Mime Type' dropdown menu currently set to 'text/plain'. A list of document types is shown below the dropdown, with 'FAQ' selected and highlighted in grey. Other options in the list include 'Knowledge Base Article (experimental)'. Below the list, there are three radio button options: 'File on Cloud Storage' (selected), 'URL', and 'Upload file from your computer'. The 'File on Cloud Storage' option has a text field below it with the placeholder 'gs://bucket-name/object-name'. The 'URL' option has a text field below it with the placeholder 'http://www.example.com/faq'. The 'Upload file from your computer' option has a 'SELECT FILE' button below it. At the bottom right of the dialog is a 'CREATE' button.

# Languages Supported

<https://cloud.google.com/dialogflow-en-terprise/docs/reference/language>



Language Name	Language Tag	Speech-to-Text	Text-to-Speech	Telephony	Knowledge Connectors	Sentiment Analysis
Chinese						
↳ Cantonese	zh-HK	✓				
↳ Simplified	zh-CN	✓				✓
↳ Traditional	zh-TW	✓				✓
Danish	da	✓	✓			
Dutch	nl	✓	✓			
English	en	✓	✓	✓	✓	✓
↳ Australian locale	en-AU	✓	✓		✓	
↳ Canadian locale	en-CA	✓	✓		✓	
↳ Great Britain locale	en-GB	✓	✓		✓	
↳ Indian locale	en-IN	✓	✓		✓	
↳ US locale	en-US (equivalent to en)	✓	✓	✓	✓	✓
French	fr	✓	✓			✓
↳ Canadian locale	fr-CA	✓	✓			
↳ France locale	fr-FR (equivalent to fr)	✓	✓			✓
German	de	✓	✓			✓
Hindi	hi	✓				
Indonesian	id	✓				
Italian	it	✓	✓			✓
Japanese	ja	✓	✓			✓
Korean	ko	✓	✓			✓
Norwegian	no	✓				
Polish	pl	✓	✓			
Portuguese	pt	✓	✓			✓
↳ Brazilian	pt-BR	✓	✓			
Russian	ru	✓	✓			
Spanish	es	✓	✓			✓
↳ Latin America locale	es-419	✓				
↳ Spain locale	es-ES (equivalent to es)	✓	✓			✓
Swedish	sv	✓	✓			
Thai	th	✓				

# Built-in Sentiment Analysis

Measures sentiment of a user request to provide a data point about the user's emotional state of mind.

That data can be used to help determine the need for bringing in live agent help.

[How to interpret sentiment value](#)




**Agent**

USER SAYS

COPY CURL

The service here really sucks!

 DEFAULT RESPONSE

▼

PLAY

I didn't get that. Can you say it again?

INTENT

Default Fallback Intent

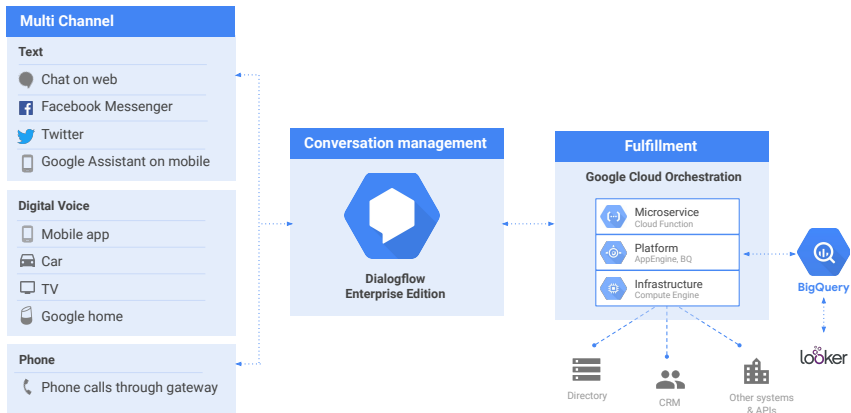
ACTION

input.unknown

SENTIMENT

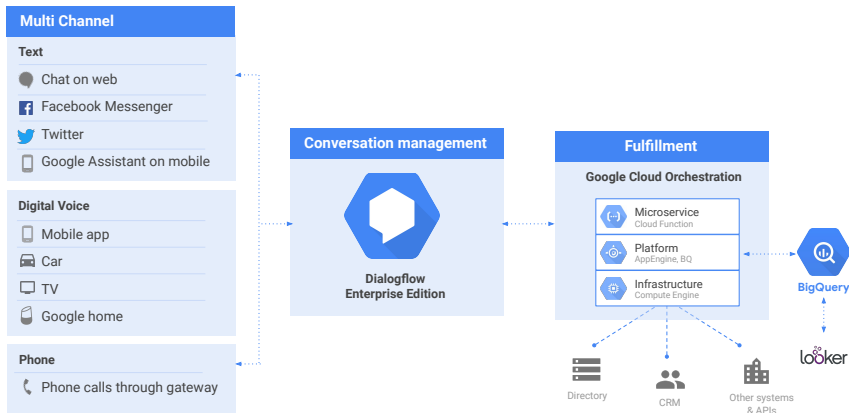
Query Score: -0.9

DIAGNOSTIC INFO



Google Cloud

Confidential & Proprietary



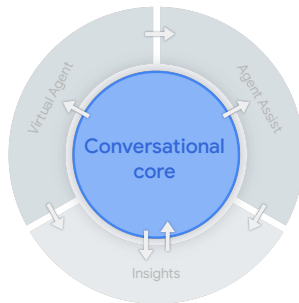
Google Cloud

Confidential & Proprietary



# Conversational Core

Contact Center AI technology



Enabling a  
conversation that is  
close to human

## Understand

- Speech-to-text

## Talk

- Text-to-speech

## Interact

- **Dialogflow**
- Document assist
- Sentiment analysis

## CCAI automates simple interactions and enables agents to solve issues quickly, using industry-leading AI



### 1 Virtual Agent

Gives patients 24/7 access to immediate conversational self-service, with seamless handoffs to live agents for more complex issues.

### 2 Agent Assist

Empowers agents with continuous support during their calls by identifying intent and providing real-time, step-by-step assistance.

### 3 Insights

Uses natural language processing to identify call drivers, popular questions, and other information that helps contact center managers learn about patient interactions to improve call outcomes.



Q & A