

# Desirable Features of a Chatbot-building Platform

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# What lies ahead?

- Background
  - Chatbots
  - Chatbot-building Platforms
- Desired features of Chatbot-building Platforms
  - Feature Categories
  - Example – Features for Intent Management
  - Example Rankings
- Conclusion

Background

# Chatbots – What are they?

- It is a *colloquial* term used to refer to a class of software components, which can interact with users using Natural Languages
- The communication medium can be *text* or *speech*
- The communication could be *flexible* or *constrained*
- The bot (shortened term for "chatbot") could be an *independent* component or *part* of a larger application
- Examples – Google Assistant, FB Messenger Bots, E-commerce Bots



Please choose one of the following options.



### Check my booking

Check booking status and get help with flight irregularities

[Check my booking](#)

[Flight was canceled](#)

[Missed my connection](#)

### Baggage

Get answers to



Check my booking



Alright. Please enter your booking code or ticket number so that I can have a look.



[Booking code](#)

[Ticket number](#)



Booking code





Please choose one of the following options.



### Check my booking

Check booking status and get help with flight irregularities

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Flight was canceled

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### Baggage

Get answers to

Check my booking

Alright. Please enter your booking code or ticket number so that I can have a look.

Booking code

Ticket number

Booking code

Examples of a  
*constrained* interface



Lufthansa Chatbot



Please enter your booking code, e.g. AB3CDE or Ab25aj.

Thank you, I'm checking your booking now.



Please enter the last name used in the booking (e.g. Smith).

Srivastava

Sorry, I can't find your booking. Please try again and select booking code or ticket number for identification.



Booking code

Ticket number

You're stupid



I'm sorry, but stick with me. I'm getting better all the time.



Type a message...





Lufthansa Chatbot



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Thank you, I'm checking your booking now.



Please enter the last name used in the booking (e.g. Smith).

Sorry, I can't find your booking. Please try again and select booking code or ticket number for identification.



I'm sorry, but stick with me. I'm getting better all the time.



Type a message...



Example of a *flexible* interface



# Chatbot building Platforms – How do they help?

- There are several commercial platforms available today, which can aid in development and deployment of chatbots
- These platforms provide a set of features which are useful in
  - Defining the types of queries the bot will cater to (aka Intents)
  - Providing details of each type, including specific pieces of information that the user will supply (often called Entities or Parameters)
  - Supplying response templates or callbacks (usually known as Fulfilments)
  - Orchestrating conversational flow, as close as possible, to a conversation between two human beings (we refer to it as Flow Management)
  - Deploying the built chatbot on one or more mediums (also called Integrations)
- Examples – Google Dialogflow, IBM Watson Assistant, Amazon Lex



Fruit-Seller

en

Intents

Entities

Knowledge <sup>[beta]</sup>

Fulfillment

Integrations

Training

History

Analytics

Prebuilt Agents

Small Talk

> Docs

Standard  
Free [Upgrade](#)

Support

Account

Logout

## Intents

CREATE INTENT

Search intents



Default Fallback Intent

Default Welcome Intent

enquiry

purchase

Try it now



See how it works in Google Assistant. [↗](#)

Agent

USER SAYS

[COPY CURL](#)

Show me the price list

DEFAULT RESPONSE

Fruits: Apple - ₹80, Orange - ₹60, Guava - ₹40  
(Prices per Kg)

INTENT

enquiry

ACTION

Not available

DIAGNOSTIC INFO

Name of the Chatbot

List of defined and  
"added" intents

Definitions for *Intents*,  
*Entities*, *Fulfilments* etc.

Test Console to check  
responses for a given query

The screenshot displays the Dialogflow console interface. On the left is a sidebar menu with the following items: Fruit-Seller (with a dropdown arrow and a gear icon), en (with a plus icon), Intents (highlighted in blue with a plus icon), Entities (with a plus icon), Knowledge [beta], Fulfillment, Integrations, Training, History, Analytics, Prebuilt Agents, Small Talk, Docs, Standard Free (with an Upgrade button), Support, Account, and Logout. The main area is titled 'Intents' and features a 'CREATE INTENT' button. Below this is a search bar labeled 'Search intents'. A list of intents is shown: Default Fallback Intent, Default Welcome Intent, enquiry, and purchase. A red arrow points from the 'Name of the Chatbot' text to the 'Fruit-Seller' label in the sidebar. Another red arrow points from the 'List of defined and "added" intents' text to the list of intents. A third red arrow points from the 'Definitions for Intents, Entities, Fulfilments etc.' text to the sidebar menu. A fourth red arrow points from the 'Test Console to check responses for a given query' text to the 'Test Console' section on the right. The 'Test Console' section includes a 'Try it now' input field, a 'See how it works in Google Assistant' link, an 'Agent' section, a 'USER SAYS' section with the text 'Show me the price list' and a 'COPY CURL' link, a 'DEFAULT RESPONSE' section with the text 'Fruits: Apple - ₹80, Orange - ₹60, Guava - ₹40 (Prices per Kg)', an 'INTENT' section with the text 'enquiry', an 'ACTION' section with the text 'Not available', and a 'DIAGNOSTIC INFO' section.

Dialogflow

Fruit-Seller

en

Intents

Entities

Knowledge [beta]

Fulfillment

Integrations

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Intents

CREATE INTENT

Search intents

Default Fallback Intent

Default Welcome Intent

enquiry

purchase

Try it now

See how it works in Google Assistant.

Agent

USER SAYS

Show me the price list

COPY CURL

DEFAULT RESPONSE

Fruits: Apple - ₹80, Orange - ₹60, Guava - ₹40 (Prices per Kg)

INTENT

enquiry

ACTION

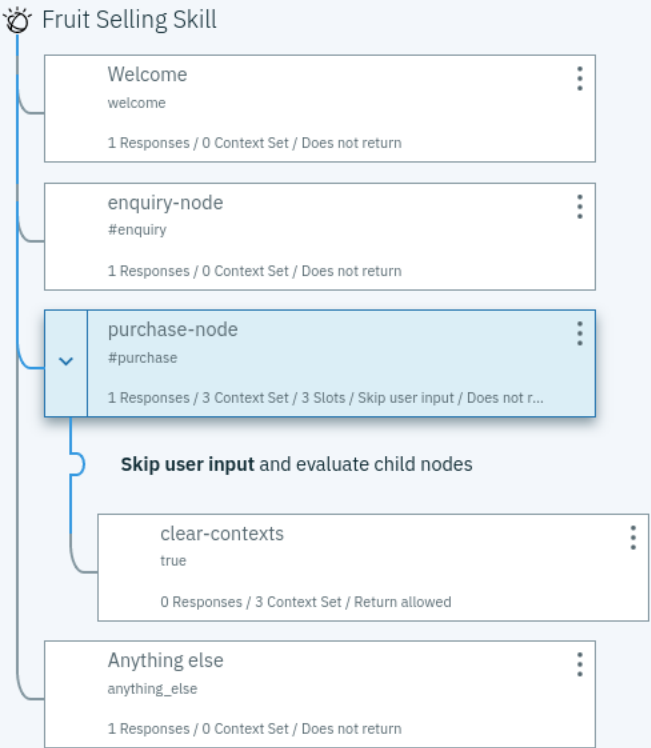
Not available

DIAGNOSTIC INFO

Add node

Add child node

Add folder



Add node

Add child node

Add slot

## Fruit Selling Skill

Welcome  
welcome

1 Responses

1 Responses / 0 Context Set / Does not return

## enquiry-node

#enquiry

1 Responses / 0 Context Set / Does not return

## purchase-node

#purchase

1 Responses / 3 Context Set / 3 Slots / Skip user input / Does not r...

## Skip user input and evaluate child nodes

## clear-contexts

true

0 Responses / 3 Context Set / Return allowed

## Anything else

anything\_else

0 Responses / 0 Context Set / Does not return

Management –  
as Dialog Tree

node"

If assistant recognizes:

#purchase



Then check for:

[Manage handlers](#)

	CHECK FOR	SAVE IT AS	IF NOT PRESENT, ASK	TYPE		
1	@productName	\$productName	What fruit would you	Required		
2	@productQty	\$productQty	How many Kgs?	Required		
3	@address	\$address	Where should we ser	Required		

Add slot

Then respond with



Text



Your order for \$productName (\$productQty Kg) is on it's way to \$address !!

Response variations are set to **sequential**. Set to [random](#)  
[Learn more](#)

Add response type

And finally:

Skip user input

and evaluate child nodes



Add node Add

1

If assistant recognizes:

#purchase

2

Then check for:

	CHECK FOR	SAVE IT AS	IF NOT PRESENT, ASK	TYPE	
1	@productName	\$productName	What fruit would you	Required	
2	@productQty	\$productQty	How many Kgs?	Required	
3	@address	\$address	Where should we ser	Required	

Add slot

3

And finally:

Skip user input and evaluate child nodes

Example of IBM Watson

Defin  
In th

Then respond with

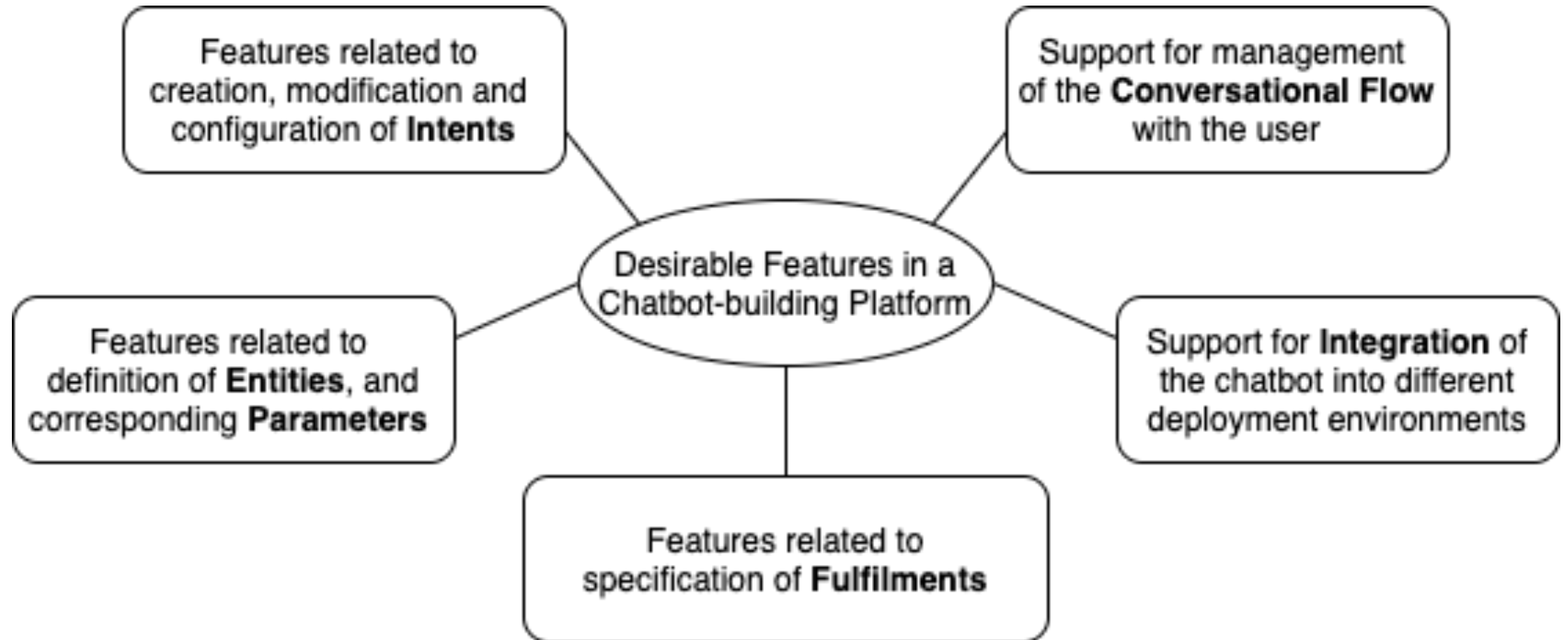
Text

Your order for \$productName (\$productQty Kg) is on it's way to \$address !!

Response variations are set to **sequential**. Set to [random](#)  
[Learn more](#)

# Desired features of Chatbot- building Platforms

# Feature Categories





# Example – Intent Management

Desired Platform Features	
<i>Intent Management Features</i>	
<i>Create Intents</i> ←	Composite Feature – consists of sub-features
Add Parameters	
Add training examples	
Tag Parameter occurrences in training examples	
Map Parameter occurrences to specific values	Simple Feature
<i>Update Intents</i>	
Provide new training examples	
Edit existing training examples	
Remove existing training examples	
<i>Delete Intents</i> ←	Simple Feature
<i>Default Intent</i>	
Provide default response	
Set a minimum confidence threshold to trigger any Intent	
Provide counterexamples – to trigger Default Intent explicitly	

Composite Feature – consists of sub-features

Simple Feature

# Example – Intent Management

Desired Platform Features	Dialogflow	Watson Assistant	Lex
<i>Intent Management Features</i>	<i>1</i>	<i>0.9583</i>	<i>0.8177</i>
<i>Create Intents</i>	<i>1</i>	<i>1</i>	<i>0.9375</i>
Add Parameters	1	1	1
Add training examples	1	1	0.75 (A)
Tag Parameter occurrences in training examples	1	1	1 (A)
Map Parameter occurrences to specific values	1	1	0 (A)
<i>Update Intents</i>	<i>1</i>	<i>1</i>	<i>1</i>
Provide new training examples	1	1	1
Edit existing training examples	1	1	1
Remove existing training examples	1	1	1
<i>Delete Intents</i>	<i>1</i>	<i>1</i>	<i>1</i>
<i>Default Intent</i>	<i>1</i>	<i>0.8333</i>	<i>0.3333</i>
Provide default response	1	1	1
Set a minimum confidence threshold to trigger any Intent	1	0.75 (B)	0 (B)
Provide counterexamples – to trigger Default Intent explicitly	1	0.75 (C)	0 (C)

# Example – Intent Management

Desired Platform Features	Dialogflow	Watson Assistant	Lex
<i>Intent Management Features</i>	<i>1</i>	<i>0.9583</i>	<i>0.8177</i>
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Remove existing training examples	1	1	1
<i>Delete Intents</i>	<i>1</i>	<i>1</i>	<i>1</i>
<i>Default Intent</i>	<i>1</i>	<i>0.8333</i>	<i>0.3333</i>
Provide default response	1	1	1
Set a minimum confidence threshold to trigger any Intent	1	0.75 (B)	0 (B)
Provide counterexamples – to trigger Default Intent explicitly	1	0.75 (C)	0 (C)

Some entries are not 1, meaning the feature is either not supported or supported only partially

# Example Rankings (Values)

Desired Platform Features	Dialogflow	Watson Assistant	Lex
<i>Intent Management Features</i>	<i>1</i>	<i>0.9583</i>	<i>0.8177</i>
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Add Parameters	1	1	1
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Map Parameter occurrences to specific values	1	1	0 (A)
<i>Update Intents</i>	<i>1</i>	<i>1</i>	<i>1</i>
Provide new training examples	1	1	1
Edit existing training examples	1	1	1
Remove existing training examples	1	1	1
<i>Delete Intents</i>	<i>1</i>	<i>1</i>	<i>1</i>
<i>Default Intent</i>	<i>1</i>	<i>0.8333</i>	<i>0.3333</i>
Provide default response	1	1	1
Set a minimum confidence threshold to trigger any Intent	1	0.75 (B)	0 (B)
Provide counterexamples – to trigger Default Intent explicitly	1	0.75 (C)	0 (C)

# Example Rankings (Reasons)

- |     |   |
|-----|---|
| (A) | Lex only expect placeholders instead of actual values, e.g. a training example in Lex looks like “Book a ticket from <i>\$source</i> to <i>\$destination</i> ”, as compared to say a tagged example in Dialogflow or Watson Assistant, e.g. “Book a ticket from <i>Delhi:source</i> to <i>Mumbai:destination</i> ”. |
| (B) | In Watson Assistant, although an explicit value cannot be specified, an if condition in the Dialog Tree can handle it. No direct or indirect mechanism found in Lex for doing the same.   |
| (C) | In Watson Assistant, it cannot be done explicitly but can be done by tagging an example <i>irrelevant</i> in the dashboard or passing it indirectly by restoring a skill from a JSON file. No direct or indirect mechanism found in Lex for doing the same.   |

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(B)	In Watson Assistant, although an explicit value cannot be specified, an if condition in the Dialog Tree can handle it. No direct or indirect mechanism found in Lex for doing the same.
(C)	In Watson Assistant, it cannot be done explicitly but can be done by tagging an example <i>irrelevant</i> in the dashboard or passing it indirectly by restoring a skill from a JSON file. No direct or indirect mechanism found in Lex for doing the same.

The reasons for non-zero entries are explained briefly in another table

# Conclusion

# In short ...

- This work is part of a series of work, exploring issues with building of chatbots (especially when a platform is used for the same)
- The paper presents a compiled list of features that are desired, on a chatbot-building platform
- The list is based on our in-depth study of three platforms – Google Dialogflow, IBM Watson Assistant and Amazon Lex
- We also present the relative rankings for the support of these features on these platforms (on a scale of 0 to 1)
- Entries with a values other than 1, are explained with brief explanations



# Thank You

That'll be all from my side. Over to you !!