Amazon Lex and Robo-advisors

Installation for Deep Learning

Please install before Deep Learning unit commences

Instructions

Conversational User Interfaces (CUIs) and Robo-advisors

Conversational User Interfaces (CUIs) and Robo-advisors

In the early years of computing, interfaces were text-based and people used commands to interact with computers.

```
Welcome to FreeDOS


CuteMouse v1.9.1 alpha 1 [FreeDOS]
Installed at PS/2 port
C:\>ver

FreeCom version 0.82 pl 3 XMS_Swap [Dec 10 2003 06:49:21]

C:\>dir
 Volume in drive C is FREEDOS_C95
 Volume Serial Number is 0E4F-19EB
 Directory of C:\

FDOS                 <DIR>   08-26-04   6:23p
AUTOEXEC BAT           435   08-26-04   6:24p
BOOTSECT BIN           512   08-26-04   6:23p
COMMAND  COM        93,963   08-26-04   6:24p
CONFIG   SYS           801   08-26-04   6:24p
FDOSBOOT BIN           512   08-26-04   6:24p
KERNEL   SYS        45,815   04-17-04   9:19p
         6 file(s)       142,038 bytes
         1 dir(s)   1,064,517,632 bytes free

C:\>_
```

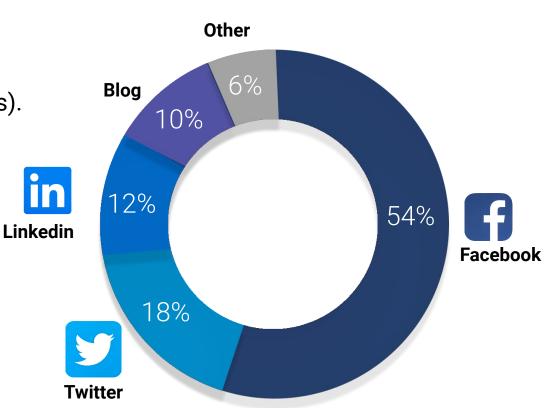# Conversational User Interfaces (CUIs) and Robo-advisors

Thanks to natural language processing (NLP), we can create conversational user interfaces (CUIs) that allow computers to understand, analyze, and have meaningful conversations using human language.

Chatbots are the most common application of CUIs.

CUIs and Robo-advisors

CUIs and <mark>robo-advisors</mark> enhance customer engagement by using digital communication channels (social media or messaging apps).

Social media channels that consumers are using to contact their banking providers
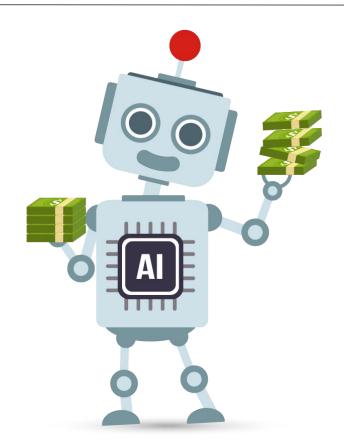
Other 6%

Blog 10%

Linkedin 12%

Twitter 18%

Facebook 54%

Robo-advisors:
Chatbots disrupting finance and banking

Chatbots Disrupting Finance and Banking

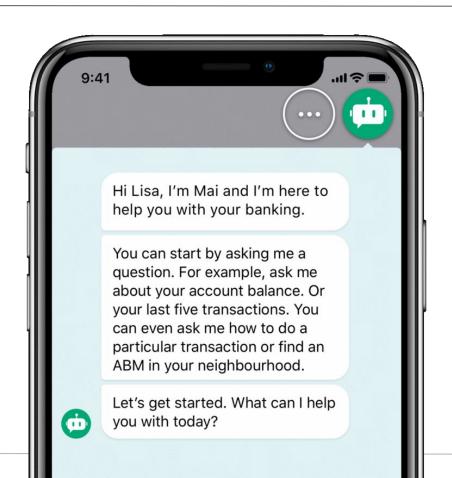According to Juniper Research, banks will save about

$8 billion USD

annually by 2020, thanks to chatbot use.

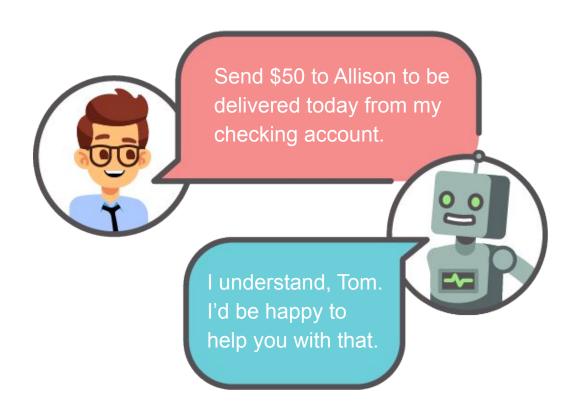# Chatbots Disrupting Finance and Banking

Chatbots can perform tasks 24/7. Customers don't need to wait for human replies for most common tasks or inquiries.
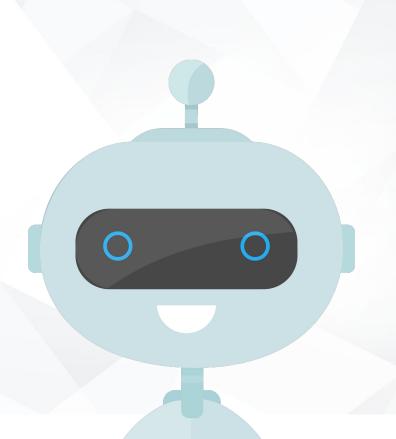
Chatbots Disrupting Finance and Banking

Using NLP and sentiment analysis, chatbots understand how customers speak. Financial institutions can respond more adequately to customer needs.

Send $50 to Allison to be delivered today from my checking account.
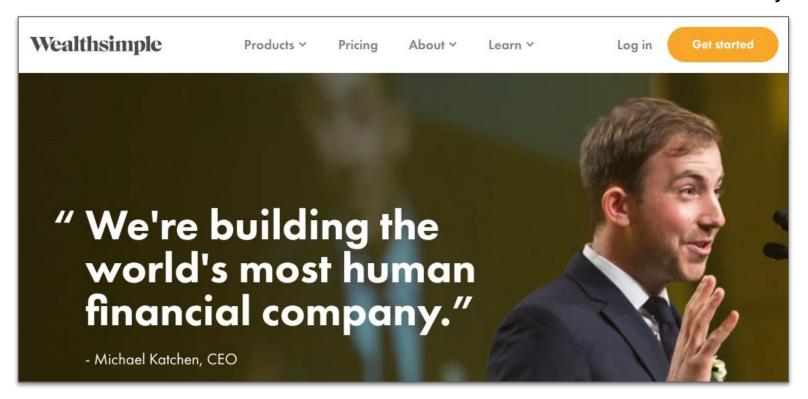
I understand, Tom. I'd be happy to help you with that.

Chatbot
Use Cases

Robo-advisors in Canada

The first robo-advisors were introduced in the Canadian FinTech industry in 2014.

Robo-advisors in Canada

Financial assets management aided by robo-advisors are expected to show an annual growth rate of 26.7% from 2020 to 2023

Wealthsimple now has over $5 billion AUM

Robo-advisors in Canada

Depending on how a robo-advisor operates (e.g., as a portfolio manager or investment advisor), they need to register with the Investment Industry Regulatory Organization of Canada (IIROC) and follow suitability obligations, like disclosing potential investment risks to their clients.

Chatbot Use Cases: Wealthsimple

Powerful technology + human help.

- This Toronto-based, online investment management firm is focused on millennials.

- Founded in 2014, Wealthsimple holds (as of August 2019) over $5B CAD in assets under management.

FinTech

How Canada's Wealthsimple is building a whole financial suite

Written by Ruby Hinchliffe 11th February 2020

Wealthsimple, the Canadian investment management challenger with five billion in assets, launched a no-fee spending account with 2.4% interest in Canada at the end of last month. The fintech – which is not a bank – has partnered with two unnamed "major Canadian banks" to deliver the cash offering to customers.

Founded in 2014, Wealthsimple is one of the few millennial investing platforms to be live across three major markets, including the US and the UK. The company has now launched four products covering spending, investing, tax, and trading, and it claims to have the largest digital investing presence in Canada, dominating roughly 70% of the market there now.

Chatbot Use Cases: Nest Wealth

Digital Wealth Solutions for Everyone.

- Nest Wealth created Canada's first SaaS-based digital wealth management platform to allow investors access to personalized, transparent wealth management services.
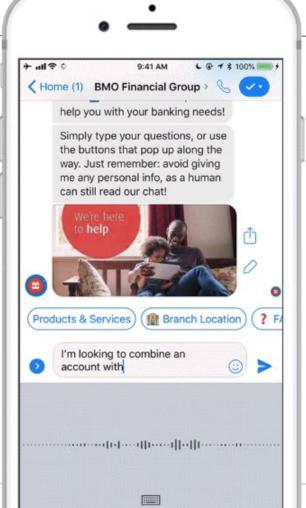
- It was founded in 2014 and is based in Toronto.

COMPANY NEWS | NEWS | VIDEO

COMPANY NEWS

May 15, 2019

Nest Wealth acquires Razor Logic Systems to bolster services to advisors

The Canadian Press

Chatbot Use Cases:

BMO Bolt™ from

BMO Bank of Montreal

Get instant answers without the wait.

- Launched by BMO in 2018, Bolt allows customers to contact the bank via Facebook or Twitter for questions about products, foreign exchange rates, and branch and ATM location information, 24/7.
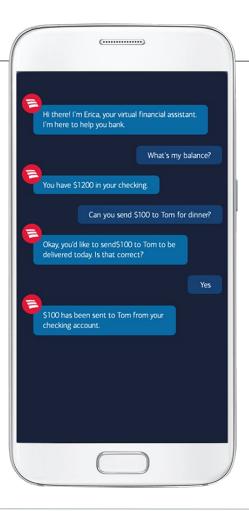
Chatbot Use Cases:

Erica from **Bank of America**

Always looking out for you and your finances.

- Erica was launched in 2018 to offer customers a digital banking experience that encompassed voice, in-app messaging, and predictive analytics.

- By December 2019, Erica reached more than 10 million users.

Today we will create a Robo-advisor!

Amazon Lex

AWS Lambda

Intro to Amazon Lex

What Is Amazon Lex?

Amazon Lex is a service for building CUIs into any application using voice and text.

Provides the same deep learning technologies that power Amazon Alexa.

Uses automatic speech recognition to convert speech to text and natural language understanding to recognize the intent of the text.

Encapsulates all the complexity of deep learning algorithms—no coding is needed to start using it.

Allows integration with third-party applications, other Amazon Web Services, and your own code via AWS Lambda.

How to Use Amazon Lex

Follow these steps to build an application:

01 Create and configure a bot so it can understand the user's goals/intent.

02 Test the bot on the Amazon Lex console. Make sure it engages in conversation with the user.

03 Publish the bot and create an alias.

04 Deploy the bot on a mobile application or messaging platform such as Slack, Kik, or Facebook Messenger.

Amazon Lex

Amazon Lex Jargon

Bot

The core component of Amazon Lex, a bot performs automated tasks such as booking a hotel, making a wire transfer, or suggesting an investment portfolio.

Intent

Represents an action that the user wants to perform, such as BookHotel, TransferMoney, or SuggestPortfolio. A bot can have more than one intent.

Utterances

Speech or text phrases that trigger the intent.

Slots

A piece of data that is necessary for the chatbot to fulfill the user's intent. Think of it as required user input.

Fulfillment

When the chatbot has collected all the slot values, it proceeds with the logic in the fulfillment section. This is where an AWS lambda function can be used if business logic is needed.

AWS Supported Regions

You can only use Amazon Lex from [these regions](#):

Asia Pacific (Sydney)
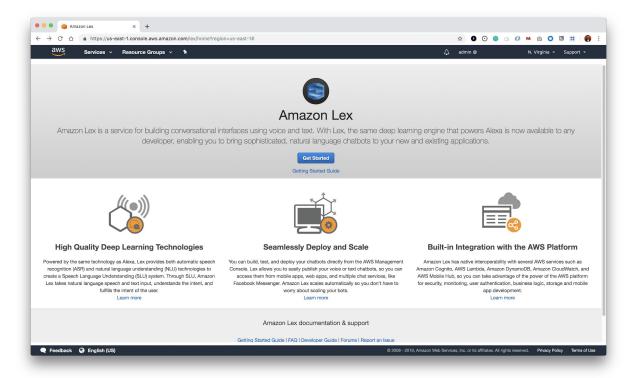
EU (Ireland)

US East (N. Virginia)

US West (Oregon)

AWS Lex Pricing

You can try Amazon Lex for free. From the date you get started with Amazon Lex, you can process up to 10,000 text requests and 5,000 speech requests per month for free for the first year.

Instructor Demonstration
Creating Your First Bot Using Amazon Lex

First time on Lex

More on Lex Sentiment Analysis

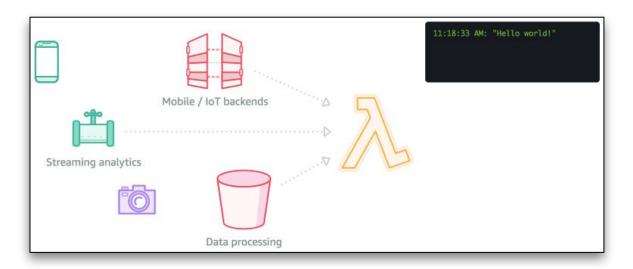We would incur additional charges to conduct sentiment analysis on Lex, but you can find out more about it [here](#)

Intro to AWS Lambda

Intro to AWS Lambda

What's AWS Lambda?

It's a technology that executes code remotely without provisioning or managing servers.

Just upload your code, and AWS Lambda takes care of everything. You can have your code automatically trigger from other Amazon Web Services, or call it directly from any web or mobile app.
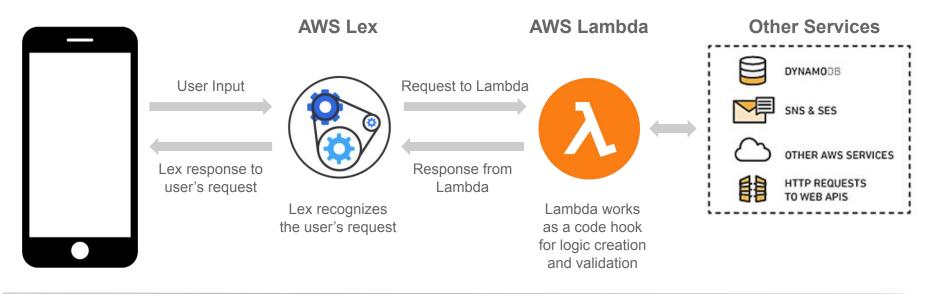
Time For a Quick Video

[Intro to AWS Lambda](#)

Intro to AWS Lambda

How AWS Lambda boosts chatbots

AWS Lambda enhances chatbots by combining the NLP capabilities of Amazon Lex with the possibility of running code to fulfill user's requests. For example, booking a hotel room, making a wire transfer, or providing financial advice about an investment portfolio.

AWS Lex

AWS Lambda

Other Services

User Input

Request to Lambda

Lex response to user's request

Response from Lambda

Lex recognizes the user's request

Lambda works as a code hook for logic creation and validation

DYNAMODB

SNS & SES

OTHER AWS SERVICES

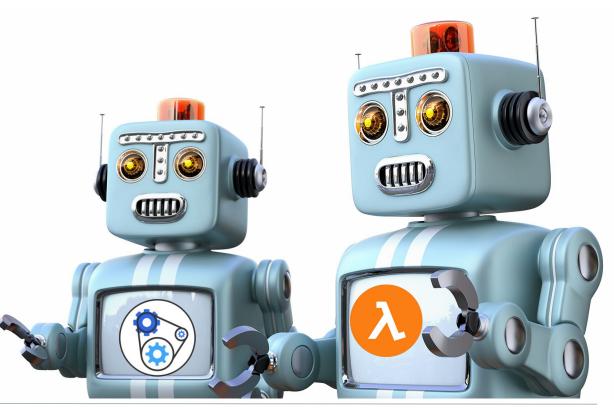HTTP REQUESTS TO WEB APIS

How Lex and Lambda talk

ElicitSlot

Informs Amazon Lex that the user is expected to provide a slot value in the response.

Delegate

Directs Amazon Lex to choose the next course of action based on the bot configuration.

Close

Informs Amazon Lex not to expect a response from the user.

Instructor Demonstration
Intro to AWS Lambda

Anatomy of a Lambda Function for Amazon Lex

This is how the 'requests' library is imported into AWS Lambda

```
### Required Libraries ###
from datetime import datetime
from dateutil.relativedelta import relativedelta
from botocore.vendored import requests

### Functionality Helper Functions ###
def parse_float(n):

def get_btcprice():

def build_validation_result(is_valid, violated_slot, message_content):

def validate_data(birthday, cad_amount, intent_request):
```

Helper functions implement data validation and business logic support

Anatomy of a Lambda Function for Amazon Lex

Dialog actions helper functions control conversations response events

```python
### Dialog Actions Helper Functions ###
def get_slots(intent_request):

def elicit_slot(session_attributes, intent_name, slots, slot_to_elicit, message):

def delegate(session_attributes, slots):

def close(session_attributes, fulfillment_state, message):
```

List of supported modules on AWS Lambda

Supported Python Modules

Activity:
Understanding Lambdas

In this activity, you will inspect the code of a Lambda function to have a better understanding of how it works.

More Resources

Lambda Function Input Event and Response Format

Amazon Lex and AWS Lambda Blueprints

Time's Up! Let's Review.

Instructor Demonstration
Testing AWS Lambda Functions

Activity: Buggy Lambdas

In this activity, you will test AWS Lambda functions that validate Amazon Lex intents.
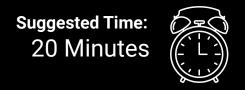
Time's Up! Let's Review.

Instructor Demonstration
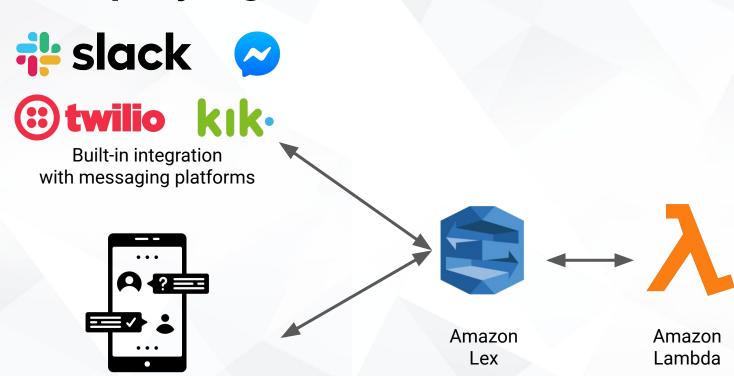Custom Slots

Activity: Crypto Converter

In this activity, you will extend the cryptocurrency converter by adding a custom slot to allow users to select between Bitcoin, Ethereum, or Ripple to convert from dollars.

Suggested Time:
20 Minutes

Time's Up! Let's Review.

Deploying Amazon Lex Bots

Built-in integration
with messaging platforms

Mobile apps using AWS SDK
or AWS Mobile Hub

Amazon
Lex

Amazon
Lambda

Learn more at: Developing Amazon Lex Bots Guide

[Amazon Lex Deployment Guide](#)