#### **Assignment 4**

#### **Problem Statement**

#### Develop elementary chatbot for suggesting investment as per the customers need.

## Theory

#### With the spread of messengers, virtual chatterbots that imitate human conver- sations for solving various tasks are becoming increasingly in demand. Chinese WeChat bots can already set medical appointments, call a taxi, send money to friends, check in for a flight and many many other. Online chatbots save time and efforts by automating customer support. Gartner forecasts that by 2020, over 85% of customer interactions will be handled without a human.

#### However, the opportunites provided by chatbot systems go far beyond giv- ing responses to customers’ inquiries. They are also used for other business tasks, like collecting information about users, helping to organize meetings and reducing overhead costs. There is no wonder that size of the chatbot market is growing exponentially.

#### Of course, it is not so simple to create an interactive agent that the user will really trust. That’s why IM bots have not replaced all the couriers, doctors and the author of these lines. In this article, instead of talking about the future of chatbots, we will give you a short excursion into the topic of chatbots, how they work, how they can be employed and how difficult it is to create one yourself.

#### Consumers also benefit from chatbots and they are getting increasingly inter- ested in this technology. A study presented at the 4th International Conference on Internet Science in November, 2017 identified reasons why people choose to interact with chatbots. According to this research, the main factors that motivate people to use chatbots are:

#### Productivity. Chatbots provide the assistance or access to information quickly and efficiently.

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#### Entertainment. Chatbots amuse people by giving them funny tips, they also help killing time when users have nothing to do.

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#### Social and relational factors. Chatbots fuel conversions and enhance social experiences. Chatting with bots also helps to avoid lonliness, gives a chance to talk without being judged and improves conversational skills.

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#### Curiosity. The novelty of chatbots sparks curiosity. People want to explore their abilities and to try something new.

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**Deftning a Chatbot**

#### A chatbot (also known as a talkbot, chatterbot, Bot, IM bot, interactive agent, or Artificial Conversational Entity) is a computer program or an artificial intel- ligence which conducts a conversation via auditory or textual methods. Such programs are often designed to convincingly simulate how a human would be- have as a conversational partner, thereby passing the Turing test. Chatbots are typically used in dialog systems for various practical purposes including cus- tomer service or information acquisition. Some chatterbots use sophisticated natural language processing systems, but many simpler systems scan for key- words within the input, then pull a reply with the most matching keywords, or the most similar wording pattern, from a database.

### Creation of a Chatbot

#### The process of creating a chatbot follows a pattern similar to the development of a web page or a mobile app. It can be divided into Design, Building, Analytics and Maintenance.

#### **Design** The chatbot design is the process that defines the interaction between the user and the chatbot.[40] The chatbot designer will define the chatbot personality, the questions that will be asked to the users, and the overall interaction. It can be viewed as a subset of the conversational design. In order to speed up this process, designers can use dedicated chatbot design tools, that allow for immediate preview, team collaboration and video export. An important part of the chatbot design is also centered around user testing. User testing can be performed following the same principles that guide the user testing of graphical interfaces.

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#### **Building** The process of building a chatbot can be divided into two main tasks: understanding the user’s intent and producing the correct answer. The first task involves understanding the user input. In order to properly understand a user input in a free text form, a Natural Language Processing Engine can be used. The second task may involve different approaches depending on the type of the response that the chatbot will generate.

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#### **Analytics** The usage of the chatbot can be monitored in order to spot potential flaws or problems. It can also provide useful insights that can improve the final user experience.

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#### **Maintenance** To keep chatbots up to speed with changing company prod- ucts and services, traditional chatbot development platforms require on- going maintenance. This can either be in the form of an ongoing service provider or for larger enterprises in the form of an in-house chatbot train- ing team.[47] To eliminate these costs, some startups are experimenting with Artificial Intelligence to develop self-learning chatbots, particularly in Customer Service applications.

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#### **Chatbot development platforms** The process of building, testing and deploying chatbots can be done on cloud based chatbot development plat- forms offered by cloud Platform as a Service (PaaS) providers such as Yekaliva, Oracle Cloud Platform, SnatchBot and IBM Watson. These cloud platforms provide Natural Language Processing, Artificial Intelli- gence and Mobile Backend as a Service for chatbot development.

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## **Regular Expressions**

Regular Expressions (regex) are used to find patterns in text. While the details and usage of regular expressions are beyond this article, they can identify many complex predefined patterns in even large strings of text. We can use regular expressions to define a set of “commands” that our bot will understand. When we receive a message from a user, we use regular expressions to match against our predefined commands. In more complex cases these matches allow us to extract additional information from the message.

# **AIML Tags:**

There are around 14 tags that we normally use in AIML. There are much more present and there are differences in AIML 1.0 and 2.0 please do check out the version before you use other specific tags.

**Basic Tags:**

1. **<aiml>:**Defines the beginning and end of an AIML document
2. **<category>:**Defines the knowledge in a knowledge base.
3. **<pattern>:**Defines the pattern to match what a user may input.
4. **<template>:**Defines the response of an Alicebot to user’s input.

# **Steps:**

Steps in building an AIML rule-based [chatbot](https://chatbotslife.com/):

1. Install AIML modules.
2. Create a standard startup file
3. Creating AIML Files
4. Including random responses in AIML files.
5. Write a python program with brain module for faster response.

## **1. Install AIML modules:**

## For python 2

pip install aimlFor python 3

pip install python-aiml

OR

pip3 install python-aiml

## **2. Creating a standard startup file:**

It is standard to create a startup file called **std-startup.xml** as the main entry point for loading AIML files. In this case, we will create a basic file that matches one pattern and takes one action. We want to match the pattern **load aiml b** and have it load our aiml brain in response.

<!-- In the file std-startup.xml -->**<aiml** **version**="1.0.1" **encoding**="UTF-8"**>**

**<category>**

<!-- Pattern to match in user input -->

<!-- If user enters "LOAD AIML B" -->

**<pattern>**LOAD AIML B**</pattern>**

<!-- Template is the response to the pattern -->

<!-- This learn an aiml file -->

**<template>**

**<learn>**basic\_chat.aiml**</learn>**

<!-- You can add more aiml files here -->

<!--<learn>more\_aiml.aiml</learn>-->

**</template>**

**</category>**

**</aiml>**

## **3. Creating AIML Files:**

Above we created the AIML file that only handles one pattern, **load aiml b**. When we enter that command to the [bot](https://chatbotslife.com/), it will try to load **basic\_chat.aiml**. It won’t work unless we actually create it. Here is what you can put inside **basic\_chat.aiml**. We will match two basic patterns and respond.

<!-- In file basic\_chat.aiml -->**<aiml** **version**="1.0.1" **encoding**="UTF-8"**>**

**<category>**

**<pattern>**HELLO**</pattern>**

**<template>**

Well, hello!

**</template>**

**</category>**

**<category>**

**<pattern>**WHAT ARE YOU**</pattern>**

**<template>**

I'm a bot, silly!

**</template>**

**</category>**

**</aiml>**

## **4. Including random responses in AIML file:**

You can also add random responses like this. This one will respond randomly when it receives a message that starts with “One time I “. The **\*** is a wildcard that matches anything. As I would like to call it gives more colourful responses

**<category>**

**<pattern>**ONE TIME I \***</pattern>**

**<template>**

**<random>**

**<li>**Go on.**</li>**

**<li>**How old are you?**</li>**

**<li>**Be more specific.**</li>**

**<li>**I did not know that.**</li>**

**<li>**Are you telling the truth?**</li>**

**<li>**I don't know what that means.**</li>**

**<li>**Try to tell me that another way.**</li>**

**<li>**Are you talking about an animal, vegetable or mineral?**</li>**

**<li>**What is it?**</li>**

**</random>**

**</template>**

**</category>**

It can be fun to write your own AIML files, but it can be a lot of work. I think it needs around 10,000

patterns before it starts to feel realistic. So feel free to use the AIML files available online.

**5. Project and source code:**

import aiml

# Create the kernel and learn AIML files

kernel = aiml.Kernel()

kernel.learn("std-startup.xml")

kernel.respond("load aiml b")

# Press CTRL-C to break this loop

while True:

print kernel.respond(raw\_input("Enter your message >> "))

## **Speeding up Brain Load**

When you start to have a lot of AIML files, it can take a long time to learn. This is where brain files come in. After the bot learns all the AIML files it can save its brain directly to a file which will drastically speed up load times on subsequent runs.

**import** aiml

**import** os

kernel = aiml.Kernel()

**if** os.path.isfile("bot\_brain.brn"):

    kernel.bootstrap(brainFile = "bot\_brain.brn")

**else**:

    kernel.bootstrap(learnFiles = "std-startup.xml", commands = "load aiml b")

    kernel.saveBrain("bot\_brain.brn")

# kernel now ready for use

**while** **True**:

**print** kernel.respond(raw\_input("Enter your message >> "))

## **Reloading AIML While Running**

You can send the load message to the bot while it is running and it will reload the AIML files. Keep in mind that if you are using the brain method as it is written above, reloading it on the fly will not save the new changes to the brain. You will either need to delete the brain file so it rebuilds on the next startup, or you will need to modify the code so that it saves the brain at some point after reloading. See the next section on creating Python commands for the bot to do that.

load aiml b

## **Adding Python Commands**

If you want to give your bot some special commands that run Python functions, then you should capture the input message to the bot and process it before sending it to **kernel.respond()**. In the example above we are getting user input from **raw\_input**. We could get our input from anywhere though. Perhaps a TCP socket, or a voice-to-text source. Process the message before it goes through AIML. You may want to skip the AIML processing on certain messages.

### **Investment Intent**

Complete intent:(Score: 96)

QUESTION: what

SUBJ: I

ACTION: had bought

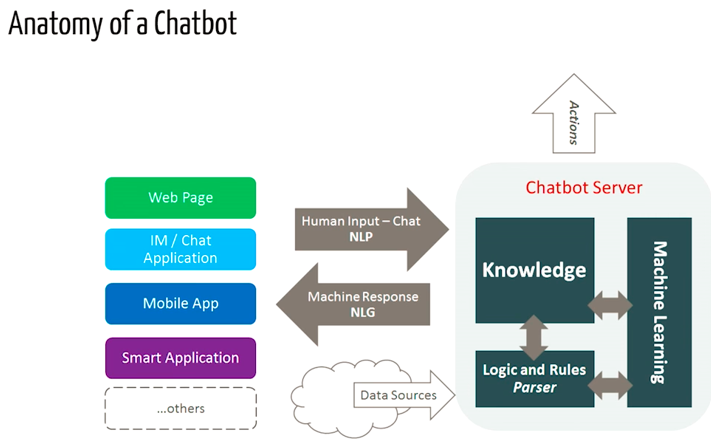
OBJ: Microsoft

QUANTITY: 100 shares

DATE: 2013-01-12

EXTRA: of

Purpose: PAST INVESTMENT



## Output

WHO IS MICHAEL JACKSON PLAY A GAME WITH ME

WHO IS YOUR FAVORITE CELEBRITY

ACCESS THE WEATHER INFORMATION FOR ME PLEASE OPEN RHAPSODY

WHAT IS THE WEATHER IN PARIS

WHAT IS YOUR FAVORITE BIBLE VERSE WHEN IS SUNSET

ARE YOU REALLY A ROBOT

WHO IS THE CURRENT PRIME MINISTER OF ISRAEL GOTO MY PICTURES

ADD TO MY CALENDAR WHEN IS HIGH TIDE

WHAT KIND OF MUSIC DO YOU LISTEN TO DO YOU LIKE JUSTIN BIEBER

ADD CONTACT MOM

WHAT IS YOUR ADDRESS COUNT TO 10

DO YOU BELEIVE IN GOD MY NAME IS TIM

WHERE IS THE NEAREST PIZZA

FIND THE MOVIE A WALK TO REMEMBER WHAT ARE YOU DOING

DEFINE JUSTICE OPEN CALCULATOR WHO IS BILL GATES OPEN GOOGLE MAPS

WHICH CAME FIRST THE CHICKEN OR THE EGG DO YOU LIKE ENGLAND

WHERE IS NIAGARA FALLS FORGET WHAT I JUST SAID FACEBOOK

BATTERY STATUS I DO NOT GET IT FIND WALMART

TURN ON BLUETOOTH

WHICH WEIGHS MORE GAS OR WATER SEARCH FOR PROVIDENCE WEATHER RADAR MY FAVORITE BOOK IS THE GREEN MILE PLAY MY MUSIC

WHERE IS THE CLOSEST SUBWAY MY HUSBAND IS A DOCTOR

MY FRIEND LARRY WANTS TO KNOW HOW OLD YOU ARE OPEN CONTACTS

WHAT IS YOUR FAVORITE VIDEO GAME WHO IS CHUCK NORRIS

MY BROTHER’SNAMEISJEREMY CANCELGOLFTODAY WHATTIMEISITINCHICAGO WHATISYOURFAVORITESINGER DELETEALLALARMS

MYFATHERS’S NAME IS WILLIAM ARNOLD FLEMING MY FATHER IS CALLED FRANK

TELL TONY I LOVE YOU OPEN MY MESSAGES

WHAT IS THE POPULATION OF GERMANY HOW DO I GET HOME

SHOW ME A PICTURE OF A HORSE SHOW ME A PICTURE OF THE MOON WHAT DATE IS TODAY

HOW MANY DAYS UNTIL CHRISTMAS CAN YOU TEACH ME ENGLISH

ARE YOU A ROBOT

HOW FAR AWAY IS THE SUN WHAT IS STAR TREK

SHOW ME A PICTURE OF A TURKEY

WHAT DO I HAVE ON MY SCHEDULE FOR JUNE SEND TEXT MESSAGE TO MOM

HELLO CAN YOU HEAR ME

WHAT IS THE CAPITAL OF CHINA ARE YOU A GIRL

I AM 38

WHAT DO YOU THINK OF HUMANS MY FAVORITE FOOD IS DIM SUM I AM 42

DO YOU LIKE DOGS MY FRIEND IS NIKKI

WHAT COLOR IS THE SKY TAKE PICTURE

WHERE IS THE NEAREST MCDONALD’S WHATISGENERALRELATIVITY WHATTIMEISTHEBASEBALLALLSTARGAMEONTVTOMORROW MYPHONEISMESSEDUP

DOYOUHAVEAFAMILY DOYOULIKECOUNTRYMUSIC CHECKMYCALENDAR WHATMOVIECOMESOUTTODAY HOWISTHEWEATHERTOMORROW IAMNOTADUDE

WHOISTHEPRESIDENTOFTHEUNITEDSTATESOFAMERICA UPDATEMYFACEBOOK

OPENFACEBOOKAPP SHOWMEAPICTUREOFJUSTINBIEBER WHATISMYSONSNAME

TIRESHOPSINSANTAROSACALIFORNIA SETALARMFOR9AM

SHUTUP IAMPREGNANT

WHYISPLUTONOTAPLANET ANYGOODPLACESTOEATAROUNDHERE DOYOUREMEMBERWHATMYNAMEIS ILIVEINCHICAGO MYNAMEISBENJAMIN DOYOULIKEBEER CANYOUTELLMEAJOKE

CALLWIFE MYHOBBIESARESKATEBOARDINGANDREADINGBOOKS WHATTIMEISIT

TEXTBABYILOVEYOU WHOISTHERICHESTPERSONINTHEWORLD WHOISSTEVENSEAGAL

WHOISSPOCK WHATISYOURFAVORITETVSHOW AREYOUALIVE DOYOULIKEFISHSTICKS IAM25 MYHOROSCOPESIGNISLEO WHATISYOURNAME IAM34YEARSOLD BROWSETONEWYORKTIMES

ACTUALLYIWASBORNMARCH13TH1963 WHATISTHEBATTERYLEVEL AREYOUMALEORFEMALE WHEREISWALMART

WHATISTODAY’S WEATHER BATTERY LEVEL

WHO WAS ALBERT EINSTEIN

MY DATE OF BIRTH IS 25TH JUNE 1981 I AM A LEO

WIKIPEDIA

HOW OLD IS BARACK OBAMA WHAT IS YOUR FAVOURITE FILM

WHAT ANIMAL IS ON THE FLAG OF SRI LANKA

WHAT IS THE WEATHER FORECAST FOR MY LOCATION OPEN NETFLIX

REMIND ME TO GO SHOPPING TOMORROW WHAT IS TODAY

WILL IT RAIN TODAY

DO YOU LIKE RAP MUSIC ARE YOU BETTER THAN SIRI

HOW MANY CALORIES ARE IN AN APPLE WHEN IS DAYLIGHT SAVINGS

SEND AN EMAIL OPEN ANGRY BIRDS

DO YOU HAVE A BODY TURN OFF WIFI

HOW MANY STARS ON THE FLAG OF NEW ZEALAND HOW CAN I IMPROVE MY ENGLISH

I WANT TO PLAY TIC TAC TOE I WAS BORN IN 1990

WHAT IS THE PRICE OF GOLD

WHAT IS YOUR FAVORITE ICE CREAM DIAL 2125551212

WHAT IS YOUR FAVORITE LANGUAGE SET ALARM

WHAT IS YOUR FAVORITE BAND HELLO

WHEN IS THE NEXT BASEBALL GAME WHAT FUNCTIONS DO YOU HAVE

MY FRIEND’SPUPPYISVERYILL YOUCANTAKETHENIGHTOFF WHATISTHEWEATHERININDIANAPOLISINDIANA MYFAVORITEBANDISTHEBEATLES WHATDAYISIT

WHOISSPIDERMAN WHATISTHEREALNAMEOFJENNIFERLOPEZ WHOISDAVIDCAMERON WHATISMYCURRENTLOCATION MYBOYFRIEND’S NAME IS DANNY DEFINE CONSTITUTION

NEAREST PIZZA HUT

## Conclusion

#### We see the inherent flaws and features of a chatbot, implementing basic functionalities in a closed environment.