Revised Project 1.1.6 Chatting with Magpie

Part 1

Subtarget 2.1: Extend the functionality of Magpie chatbot while exploring concepts in Natural Language Processing using Java classes and String methods.

The following link explains the 20 hour lab requirement you have for this course. We will do 3 semi-structured labs and one end of the year project to fulfill this requirement. <https://apstudent.collegeboard.org/apcourse/ap-computer-science-a/course-details/lab-requirements>

Introduction

The Magpie is a species of bird well known for being able to mimic sounds, such as ring tones, whistling, and even human speech. For this project, you will experiment with a Magpie program in BlueJ and Android™ that mimics simple human conversation. Programs such as these are called “chatbots”. Your Magpie program is a very simple chatbot, but more complex and sophisticated chatbots can appear to be nearly human in their ability to hold conversations.

Materials

* Computer with BlueJ and Android™ Studio
* Android™ tablet and USB cable, or a device emulator

Project

Part I: The Magpie Chatbot

The College Board provides programming labs for students taking AP CS-A. To get started with this project, you will interact with the College Board’s Magpie Chatbot lab to learn how it behaves, or how its algorithm works. Then, you will change the chatbot’s behavior by writing new Java code in BlueJ and Android Studio.

1. Get a copy of the AP Computer Science A Magpie Chatbot Lab Student Guide

Check ✓

1. Complete Magpie Student Guide Activity 1: Getting Acquainted with Chatbots. Use the chatbots documented in [**Activity 1: Exploring Chatbots**](http://interactivepython.org/runestone/static/JavaReview/Labs/magpie1.html#activity-1-exploring-chatbots). Also find chatbots from other searches; AP suggests exploring chatbots found on chatbots.org. Take your time and try to dig down to figure out, just through using the chatbot, how it might be programmed. Explore at least five in depth, spending at least 5-10 minutes with each chatbot. Give a detailed analysis of each bot you visit by filling out the 3 parts below for each chatbot:
   1. Record your results of your explorations. Give yourself a script of five main questions (or use the prompts they give in the activity), asking each bot these questions (and feel free to give follow up questions based on their responses). Paste the snips of the questions and responses.
   2. Can you identify keywords to which your chatbot responds?
   3. What are several keywords and responses they might cause?

DRUMPFBOT

* + - 1. Doesn’t actually reply to most questions, just uses quotes that Donald Trump has said in the past. “Where do you come from?” [Insert Trump Quote] “QWPaowdjkapnspifnawpd” [Insert Trump Quote] “
      2. Only reacts to key terms such as ‘China’, ‘wall’, ‘Hillary Clinton’, ‘America’, ‘Mexico’ etc.

Twinkle

* + - 1. “Where are you from?” [I am from fairyland]
      2. If you say what she says [I don’t know]
      3. If you exactly copy her question as she says them, she never answers.
      4. She does not reply to apwdojawdaw

LinguaSys

* + - 1. Very limited, doesn’t say much

SimBot

* + - 1. One of the responses is [ˁ(⦿ᴥ⦿)ˀ] and \,,/(^\_^)\,,/, very memey replies
      2. [Are you any good at pool?] “no” [really no?] “yes no” [no yes] “yes no” [no yes] “yes no” [no yes]… he gets stuck in this loop
      3. If you type :3 he gets in an infinite loop
      4. One of the conversation starters it has: [Everything was going great this morning, until my cat S\*\*\* IN MY SHOE :(]
      5. Favorite bot

Clarence

* + - 1. Very, very, very, very expansive library of replies.
      2. [My favorite movie is Avatar, have you seen it?] “yes” [I bet you enjoyed it] “I did not” [Why?] “because I don’t like humans” [We have something in common then]
      3. “Clarence, I am your father” [Hullo, daddy]
      4. [I can’t allow anything to interfere with my work] “what is your work?” [I ain’t gunna tell you] “does this mean you aren’t working right now? [depends on the circumstances] “does this mean you are on reddit?” [What? No! Why do you ask?] “because you aren’t working right now” [I am so working. Are you working?] “this is my work, I talk to aliens all day”
      5. Bot got sql injected through “SELECT IF(1=1,'true','false')”, returns “var sql = '<star/>' sql = "select " + sql; var \_driver = "org.alicebot.server.sql.jdbcDriver"; var \_url = "jdbc:alicebot:./database/DATABASE"; var \_user = "alicebot"; var \_pass = ""; var \_connection = java.sql.Connection; var \_statement = java.sql.Statement; var \_result\_set = java.sql.ResultSet; var \_buffer = java.lang.StringBuffer; java.lang.Class.forName(\_driver); \_buffer = new java.lang.StringBuffer(); \_connection = java.sql.DriverManager.getConnection(\_url, \_user, \_pass); \_statement = \_connection.createStatement(); \_result\_set = \_statement.executeQuery(sql); while (\_result\_set.next()) { \_buffer.append(java.net.URLDecoder.decode(\_result\_set.getString(1)) + " "); } \_result\_set.close(); \_statement.close(); \_connection.close(); \_buffer.toString();”

Rose

- This bot seems to have a lot of replies, such as “how do you feel about Edward Snowden? [He is a hero, he did the right thing for a great cost]

3. Go to the top of your analyses and give the name and link to your 3 favorite chatbots that you found in your exploration, and explain in one or two complete sentences why they are your favorites.

4. Please post your write-up for this on the discussion post called Chatbots Reviews.

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Part 2

Subtarget 2.1: Extend the functionality of Magpie chatbot while exploring concepts in Natural Language Processing using Java classes and String methods.

1. Complete Magpie Student Guide Activity 2: Introduction to the Magpie Class. This file is located in our folder for this project. Open it up and follow along. I’ll only expect written responses on these pages, but you do need to follow the activities on the AP Student Guide as part of these activities. As you complete the exercises, the guide will pose questions. Record your answers below.
   1. Copy or extract the project files in 1.1.6MagpieActivity2\_StarterCode\_BlueJ to your BlueJProjects folder. Open the project in BlueJ and compile.
   2. Answer questions from the activity here. How does it respond to:
      * My mother and I talked last night.

[Tell me more about your family.]

* + - I said no!

[Why so negative?]

* + - The weather is nice.

[Interesting, tell me more]

* + - Do you know my brother?

Why so negative?

* 1. Complete the **Exploration**.

(Here’s a link to the interactive Python tutorial on Activity 2:

<http://interactivepython.org/runestone/static/JavaReview/Labs/magpie2.html>)

* 1. Complete the **Exercises**, altering your code as instructed. Fill in the keywords and responses below.

|  |  |
| --- | --- |
| Keyword | Response |
| “no” | Why so negative? |
| “mother” | “father” | “sister” | “brother” | Tell me more about your family. |
| “cat” | “dog” | Tell me more about your pets. |
| “Mr.” | “Mrs.” | “Ms.” | He/She sounds like a good teacher. |

* 1. What happens when more than one keyword appears in another word? Consider the string “My mother has a daughter but no cat periods”. Explain how to prioritize responses in the reply method.

When input, the class should return [Why so negative?]. This is because of how the stack works when the java class is compiling. It runs from line to line, and when one line is completed, it return with its response, then it pushes past the current method into the next one. If I move the “no” response to the end, then any time mother/father/sister/brother is seen in a response, it will always return [Tell me more about your family.]

* 1. What happens when a keyword is included in another word? Consider the string “I know all the state capitals” and “I like vegetables smothered in cheese”. Explain the problem with the responses to these statements.

Since it only really looks for specific keywords, such as [no] in “know” or [mother] in “smothered”, it returns with replies not really useful to the person. This is why trim is useful to see if the word is by itself, then it can maybe give a more accurate response.

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Part 3

1. Complete Magpie Student Guide Activity 3: Better Keyword Detection.
   1. Copy or extract the project files in 1.1.6MagpieActivity3\_StarterCode\_BlueJ to your BlueJProjects folder. Open the project in BlueJ and compile.

Check ✓

* 1. Work through the section titled **Exploration: Using the API**.

Check ✓

* 1. Work through the section titled **Exploration: Understand the new method** and run it using the two statements in the previous step 3f.

Check ✓

* 1. As instructed in the guide, read through the findKeyword method and trace the following method call:   
     findKeyword("She's my sister", "sister", 0);

|  |  |  |  |
| --- | --- | --- | --- |
| Iteration | psn | before | after |
| 1 | 9 | “ “ | Empty |

* 1. Trace: findKeyword("Brother Tom is helpful", "brother", 0);

|  |  |  |  |
| --- | --- | --- | --- |
| Iteration | psn | before | after |
| 1 | 0 | Empty | “ “ |

* 1. Trace: findKeyword("I can't catch wild cats.", "cat", 0);

|  |  |  |  |
| --- | --- | --- | --- |
| Iteration | Psn | Before | after |
| 1 | 8 | “ “ | “c” |
| 2 | 19 | “ “ | “s” |

* 1. Trace: findKeyword("I know nothing about snow plows.", "no", 0);

|  |  |  |  |
| --- | --- | --- | --- |
| Iteration | psn | before | after |
| 1 | 3 | “k” | “w” |
| 2 | 7 | “ “ | “t” |
| 3 | 22 | “s” | “w” |

* 1. Complete **Exercise: Use the new method** to implement the more “intelligent” algorithm when responding to questions about pets and your teacher’s name.

Check ✓

* 1. **Prepare for the next activity** according to the Student Guide.

Check ✓

1. Complete Magpie Student Guide Activity 4: Responses that Transform Statements.
   1. Copy or extract the project files in 1.1.6MagpieActivity4\_StarterCode\_BlueJ to your BlueJProjects folder. Open the project in BlueJ and compile.

Check ✓

* 1. Following the guide, use a statement like, “I want to have pizza for lunch”, substituting your favorite food for “pizza”.

Check ✓

* 1. Complete the activity according to the Student Guide.

Check ✓

* 1. Explain your improvement to the algorithm.

Check ✓ (In Conclusion)

When you’ve gotten this far, there are a few ways to go:

1. Make it so it wins the Turing Contests.

2. Make it so it can talk with another chatbot.

3. Getting it running on an Android Device or emulator. If you want to try this option and you installed Android Studio on your laptop, let me know.

4. Learn how to use Arrays or ArrayLists.

Conclusion:

Although I’m not very original or creative (although I tried using the Android Studio, but was unable to upload my previous Magpie java code into the android project, after fiddling around with some griddle issues for 30 minutes), I decided to pursue the Turing Test challenge.

In my additions, there are five special transformation responses, such as [I want] or [I want to] changing to [Would you like it if you had *something*] and [What would it mean to *something*], respectively.

With the five special transformations, there are a LOT of response keywords, including the previously given [(family terms), (pets), (teachers), etc], but also tone words such as [sad (and its family of words such as depressed, hurt, unhappy)], [happy (and synonyms such as cheerful, peaceful, etc.)], [angry (etc.)].

I also inputted very common words that people use in everyday conversations, such as commands: [estimate, recommend, support, etc.]; absolutes [all, never, of course, positive, etc.] and blasphemy words: [crazy, stupid, etc.].

One of the responses that goes more in depth would be the help: [help, advice, service, etc.], goes into a loop, as it asks the user [Who do you need to help?], and if it finds [friend, mother, brother, etc.] it asks back [It seems that they need some help, can you help them?]. From this, if they find [yes], it compliments them back with [You seem like a good person ☺], or if they replied no, [Why not? They need help.], or maybe there’s an inbetween with [maybe, perhaps, etc.] it persuades then with a question, [You seem uncertain, it should be better to help.]. This whole time, this was if they replied with family member or a friend. If they replied with [me], it asks [Do you need help?] and reply accordingly for yes, no, and especially important, even when joking or serious, when it picks up [suicide, kill, or hurt], it replies with [Hurting yourself is never the way out… friendly face or to the suicide center].

I have eight different random responses when it doesn’t pick up any of the (in total) **109** keyword responses (although very few are repeated, in different situations however).

My next step with this, if I come back to it or check it out again would be to see if it can remember people’s mood from two or more responses ago, and maybe it they change moods very often, e.g. [I hate broccoli] to [I love chocolate] in one response, it would ask why they change their mood so often.

I had fun with trying to make this bot of mine as humanlike as I could, but it can’t even add 1 + 1 ☹.