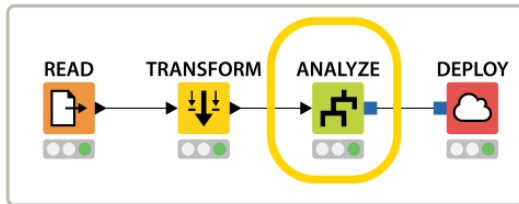
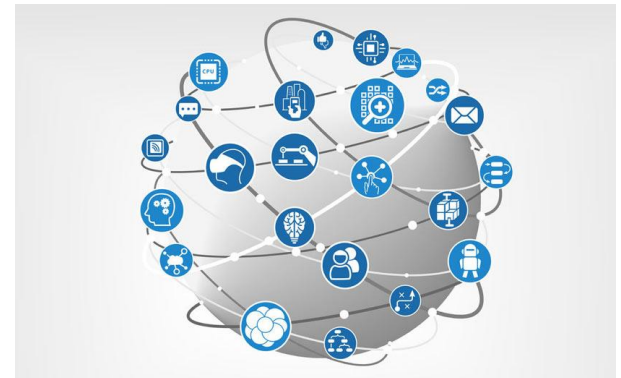


Predictive Analytics and Machine Learning Basics

Class 4: Machine Learning Lab – Google AIY Voice Kit



July 19, 2018
Don Wilcher

Class 4: Machine Learning Lab – Google Voice Kit



Agenda

- What is Google Assistant?
- Lab Project: Build Google Voice Kit: An Intelligent Speaker.

What is Google Assistant?



- **The Google Assistant** is a virtual assistant using Artificial Intelligence.
- A voice-activated virtual assistant.
- Developed by Google for mobile and smart home devices.
- Google Assistant can engage in two way conversation.
- Google Assistant uses natural language processing algorithm.

Source:

https://en.wikipedia.org/wiki/Google_Assistant

What is Google Assistant? . . .



Natural Language Processing:

An area of computer science and artificial intelligence that works between human (natural) languages and computer interactions is called Natural Language Processing (NLP). The goal of NLP is computer programs are used to process and analyze large amounts of natural language data.



Google Assistant Icon:

Source:

https://en.wikipedia.org/wiki/Natural_language_processing

Question 1:



What is Google Assistant?

Lab Project: Build a Google Voice Kit: An Intelligent Speaker



Lab Project Objectives:

- a. Learn about Intelligent (Smart) Speakers.
- b. Learn how to build an Intelligent Speaker.
 - i. The Intelligent Speaker Build and Test Workflow
- c. Learn how to execute the Google Assistant Demo.

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



What is an Intelligent (Smart Speaker)?

- a. An intelligent or smart speaker that is hands-free and voice activated.
- b. It's a wireless connected speaker.
- c. An integrated virtual assistant that uses artificial intelligence that provides interactive actions.

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



What is an Intelligent (Smart Speaker)?

d. A smart device that uses WiFi, Bluetooth and other wireless protocol standards to extend usage beyond audio playback.

Question 2:

True or False: The goal of NLP is computer programs are used to process and analyze small amounts of natural language data?

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



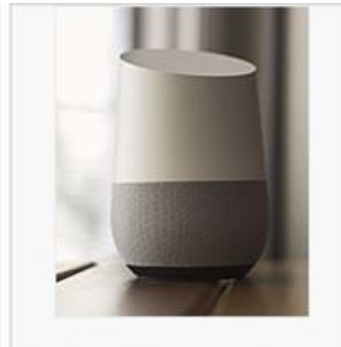
What is an Intelligent (Smart) Speaker?



The first-generation Amazon Echo smart speaker in black



An Apple HomePod speaker



The Google Home smart speaker idle on a table



The Amazon Echo Show smart speaker in white



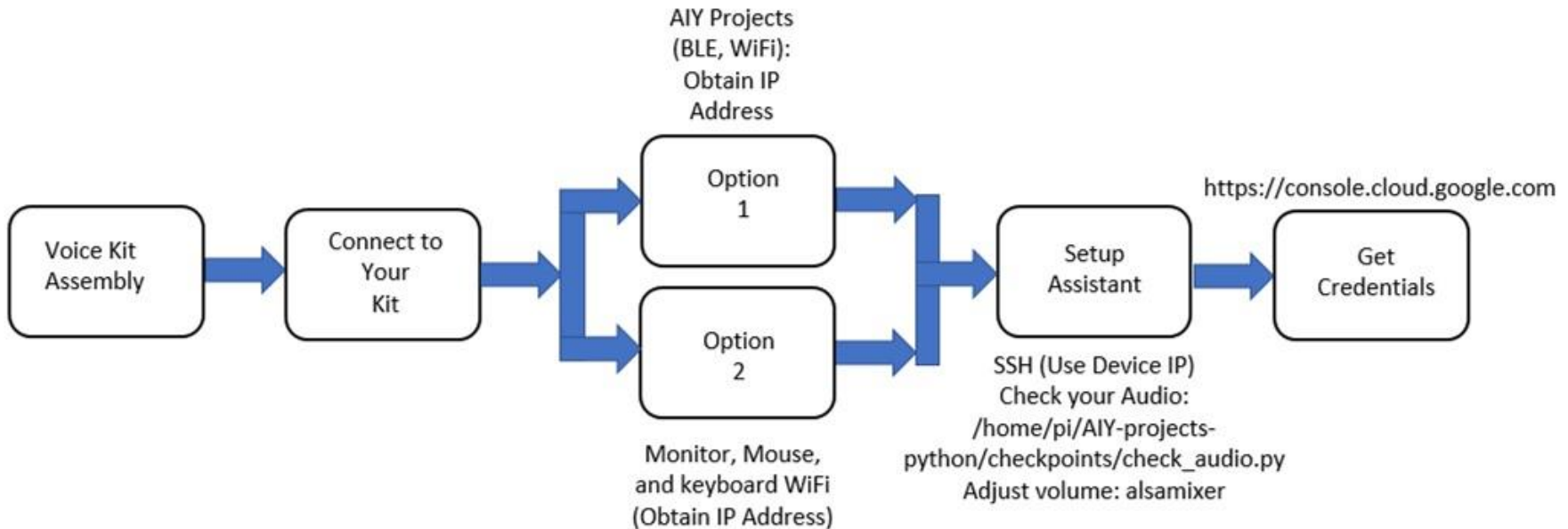
The Harman Kardon INVOKE smart speaker in graphite

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Intelligent (Smart) Speaker Build Workflow

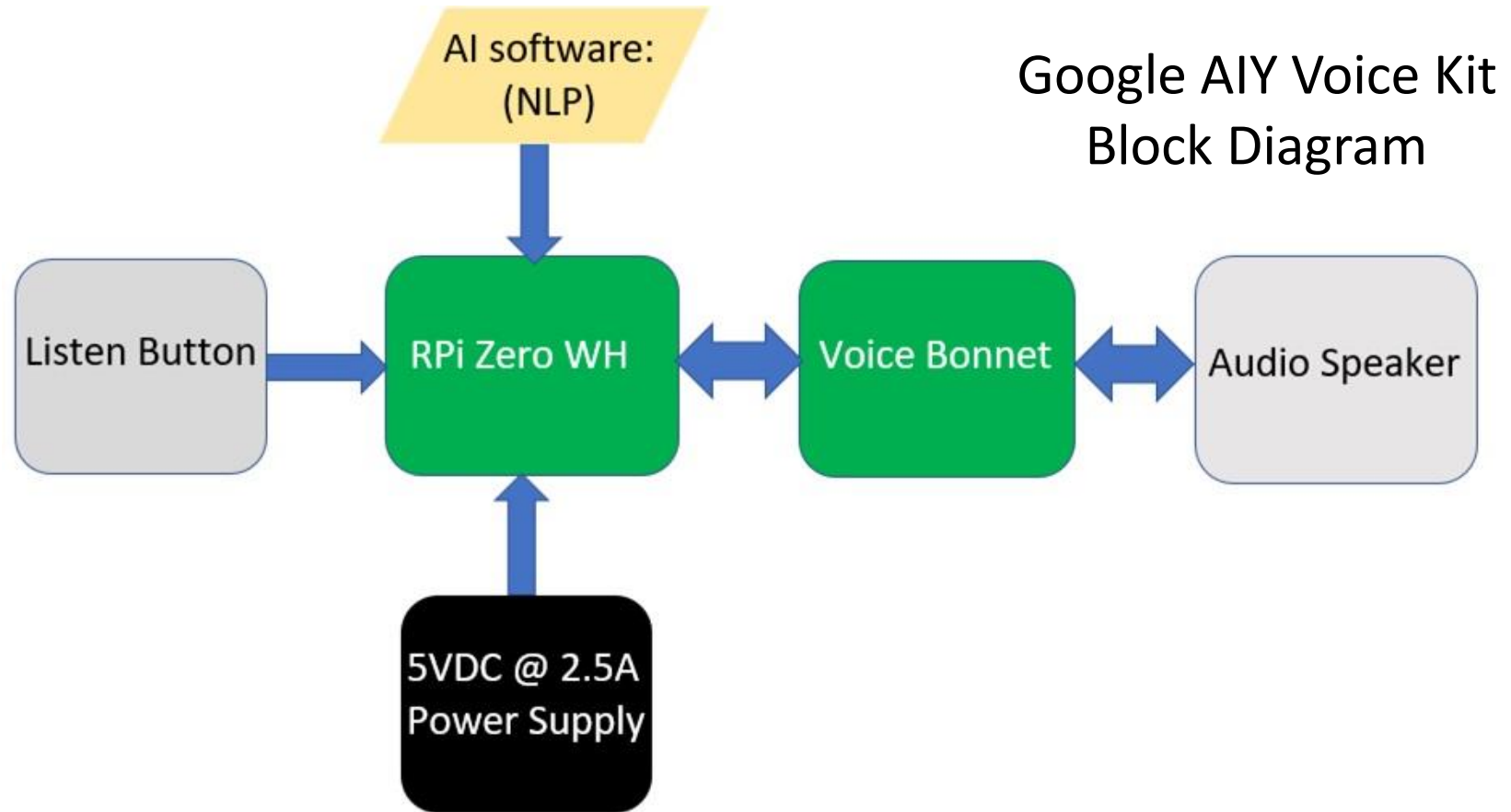
Google AIY Voice Kit



Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow



Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . . Intelligent Speaker Build Workflow



Voice Kit
Do-it-yourself intelligent speaker. Experiment with voice recognition and the Google Assistant.

VISION KIT VOICE KIT MODELS HELP

Meet your kit

1. Welcome! Let's get started
The AIY Voice Kit from Google lets you build your own natural language processor and connect it to the Google Assistant. All of this fits in a handy little cardboard cube, powered by a Raspberry Pi.
These instructions show you how to assemble your AIY Voice Kit, connect to it, and run the Google Assistant demo application.
Time required: 1.5 hours
available at @.com
If you have any issues while building the kit, check out our [FAQ page](#) or contact us at aiy@elementsofgoogle.com.

2. Check your kit version
These instructions are for Voice Kit 2.0. Check your kit version by looking on the back of the white box sleeve in the bottom-left corner.
If it says version 2.0 proceed ahead. If it doesn't have a version number, [follow the assembly instructions for the earlier version](#).

Assembly information pages will be referenced from the Makers guide document.

Source:

<https://aiyprojects.withgoogle.com/voice/#makers-guide-build-on-android-things>

Question 3 :



On slide 11 where does one go on the web to obtain credentials for using the Google Assistant API?

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

List of materials

Google AIY Voice Kit



Source:

<https://aiyprojects.withgoogle.com/voice/#makers-guide-build-on-android-things>

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

Google AIY Voice Kit

IN YOUR KIT

1	Voice Bonnet	(x1)	6	Button Nut	(x1)
2	Raspberry Pi Zero WH	(x1)	7	Button Harness	(x1)
3	Speaker	(x1)	8	Standoffs	(x1)
4	Micro SD Card	(x1)	9	Micro USB Cable	(x1)
5	Push Button	(x1)	10	External Box	(x1)

Source:

<https://aiyprojects.withgoogle.com/voice/#makers-guide-build-on-android-things>

Question 4 :

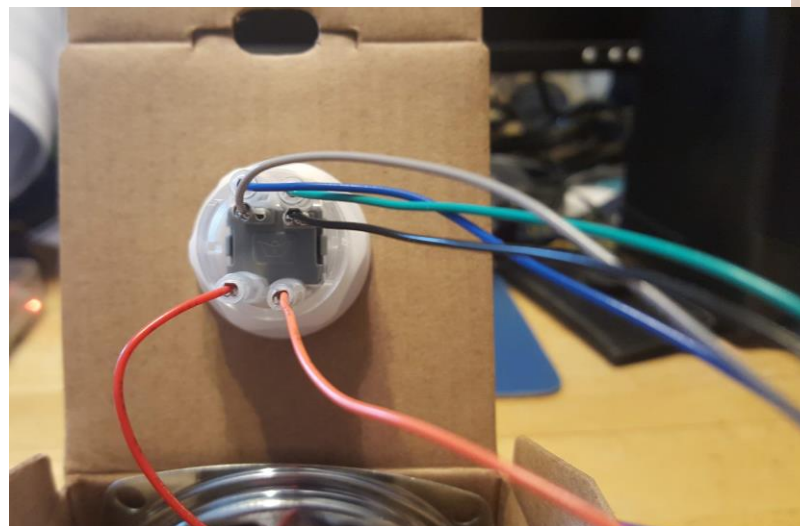


On slide 12 what component is used to listen to words on the Google AIY Voice Kit?

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Intelligent Speaker Build Workflow



Voice Kit Assembly

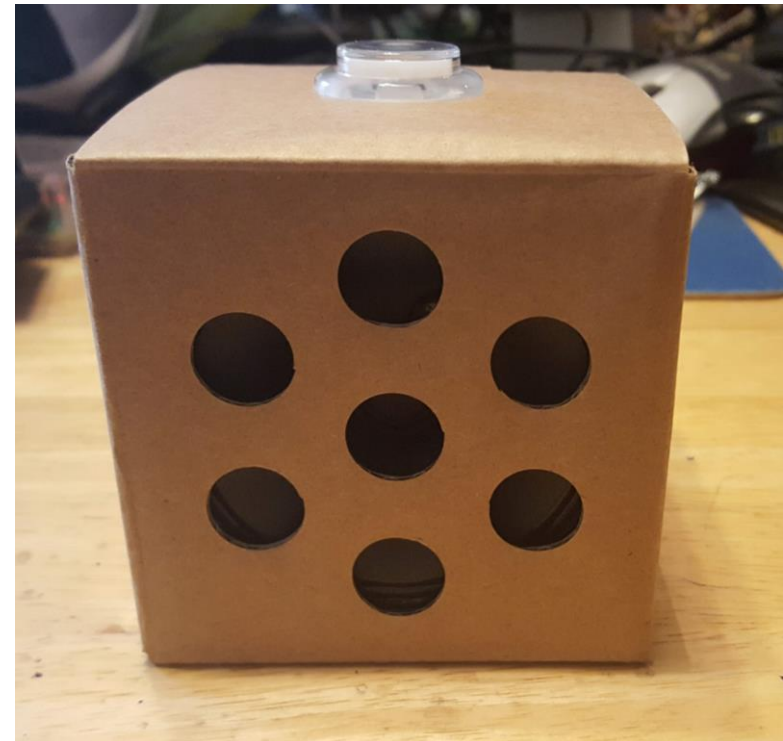
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Intelligent Speaker Build Workflow



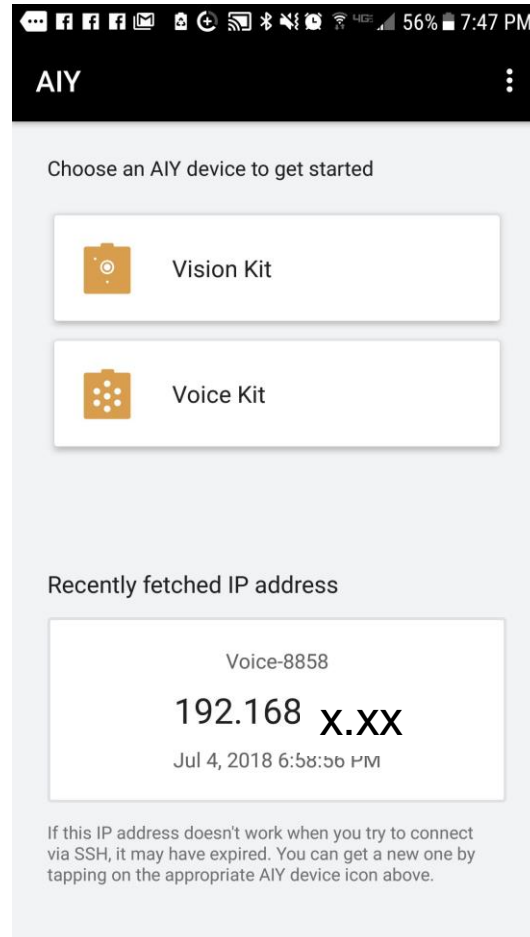
Voice Kit Assembly



Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow



Connect to Your Kit: Option 1
(pp. 24-25/74)

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

Setup Assistant

```
Linux raspberrypi 4.9.59+ #1047 Sun Oct 29 11:47:10 GMT 2017 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Build info: Thu Feb 22 01:10:07 UTC 2018 @ 3368a38
Last login: Fri Jul  6 23:11:44 2018

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.
```

SSH into the Google AIY Voice Kit
via Putty(pp 29-32/74)

Source:

<https://aiyprojects.withgoogle.com/voice/#makers-guide-build-on-android-things>

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

Setup Assistant

```
pi@raspberrypi: ~/AIY-voice-kit-python
pi@raspberrypi:~/AIY-projects-python/checkpoints $ cd
pi@raspberrypi:~ $ /home/pi/AIY-projects-python/checkpoints/check_audio.py
Playing a test sound...
Did you hear the test sound? (y/n) y
When you're ready, press enter and say 'Testing, 1 2 3'...
Recording...
Playing back recorded audio...
Did you hear your own voice? (y/n) y
The audio seems to be working.
Press Enter to close...
```

Testing Audio function of Google
AIY Voice Kit (p.33-34/74)

Source:

<https://aiyprojects.withgoogle.com/voice/#makers-guide-build-on-android-things>

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

Setup Assistant

<https://console.cloud.google.com>



(pp. 35-46/74)

Source:

<https://aiyprojects.withgoogle.com/voice/#makers-guide-build-on-android-things>

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

Get Credentials (pp. 35-46/74)

- a. Login using Google Account
- b. Agree to the Terms of Service
- c. Navigate to the Library
- d. Turn on the Google Assistant API
- e. Enable the Google Assistant API
- f. Create Credentials
- g. Download the Credentials (client_id.json file)
- h. Add to assistant.json (use nano text editor)
- i. Confirm assistant .json file was created
- j. Move to the demos folder (cd AIY-voice-kit-python)
- k. Run assistant demo (src/examples/voice/assistant_grpc_demo.py

Presented by:

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow

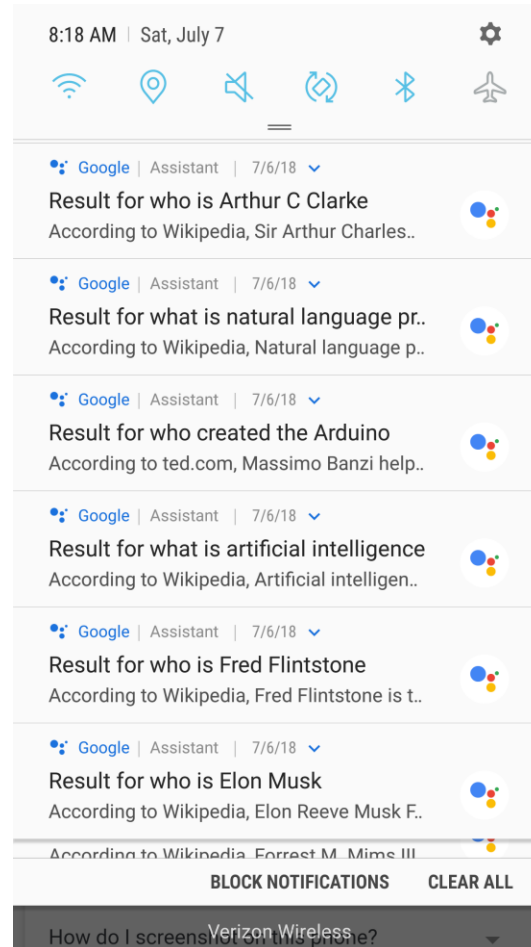
Assistant Demo running

```
pi@raspberrypi: ~/AIY-voice-kit-python
[2018-07-06 23:33:12,745] INFO:speech:transcript: what is Don
[2018-07-06 23:33:12,789] INFO:speech:transcript: what is down
[2018-07-06 23:33:12,833] INFO:speech:transcript: what is Donald
[2018-07-06 23:33:12,848] INFO:speech:transcript: what is download
[2018-07-06 23:33:12,856] INFO:speech:transcript: what is Don wilcher
[2018-07-06 23:33:12,974] INFO:speech:transcript: what is Don wilcher late
[2018-07-06 23:33:12,982] INFO:speech:transcript: what is Don wilcher later
[2018-07-06 23:33:12,990] INFO:speech:transcript: what is Don wilcher latest
[2018-07-06 23:33:12,998] INFO:speech:transcript: what is Don wilcher latest
[2018-07-06 23:33:13,107] INFO:speech:transcript: what is Don wilcher latest
[2018-07-06 23:33:13,350] INFO:speech:transcript: what is Don wilcher latest bo
ok
[2018-07-06 23:33:13,601] INFO:speech:transcript: what is Don wilcher latest bo
ok
[2018-07-06 23:33:13,970] INFO:speech:transcript: what is Don wilcher latest boo
k
[2018-07-06 23:33:14,163] INFO:speech:event_type: 1
[2018-07-06 23:33:14,205] INFO:speech:transcript: what is Don wilcher latest boo
k
You said " what is Don wilcher latest book "
Press the button and speak
Listening...
[2018-07-06 23:33:44,084] INFO:speech:transcript: who
[2018-07-06 23:33:44,133] INFO:speech:transcript: who is
```

Lab Project: Build a Google Voice Kit: An Intelligent Speaker. . .



Intelligent Speaker Build Workflow



Assistant Demo running:
The AIY app sends notifications via bluetooth from the Google Voice Kit to your Android Smart phone!

Question 5 :



On slide 23 what file must be downloaded to acquire credentials to use the Google Assistant API with the Google AIY Voice Kit?