



UNIVERSIDAD NACIONAL AUTÓNOMA DE
MÉXICO

FACULTAD DE INGENIERÍA



ROBOTS MOVILES Y AGENTES INTELIGENTES

Grupo: 2

Práctica 4. Reconocimiento de voz usando pocketsphinx.

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Semestre 2020-2

◦ Ejemplos de frases que se pueden reconocer de acuerdo con la gramática 'restaurant.gram'

1. JUSTINA YES
2. JUSTINA START
3. JUSTINA TAKE A ORDER
4. I WANT CHIPS AND PASTA
5. JUSTINA WAIT
6. I WANT A WATER
7. JUSTINA THIS IS THE ORDER

◦ Explicación breve de lo que significan los cuatro parámetros mencionados en el punto 5 de la diapositiva 19.

GRAM: Es una referencia hacia la gramática que se va a ocupar.

DICT: Es una referencia hacia la ubicación del archivo (.dict).

GRAMMAR: El nombre de la gramática a ocuparse

RULE: Las regla que se utilizara

◦ Capturas de pantalla donde se observen las frases reconocidas.

Observo primero el contenido de la gramática para ver cuales podrá reconocer.

```

rodrigo@rodrigo-Vostro-3458: ~/MobileRobots-2020-2-for-
File Edit View Search Terminal Tabs Help
/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/p... x rodrigo@r
GNU nano 2.9.3 voice_cmd.o

#JSFG V1.0;

/**
 * JSFG Grammar similar to kws example
 */

grammar voice_cmd;

public <move> = MOVE FORWARD;

public <move2> = MOVE <direction> [<speed>];

<direction> = FORWARD | BACK | LEFT | RIGHT;

<speed> = FULL SPEED | HALF SPEED;

```

Ejecutamos mediante la voz las gramáticas aceptables:

```

/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/pocketsphinx_test.launch http://localhost:11311
File Edit View Search Terminal Tabs Help
/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/p... x rodrigo@rodrigo-Vostro-3458: ~/MobileRobots-2020-2-for-Covid19/catkin_ws/src/p... x
INFO: fsg_search.c(859): 151 frames, 2740 HMMs (18/fr), 7319 senones (48/fr), 971 history entries (6/fr)
INFO: fsg_search.c(869): fsg 0.26 CPU 0.171 xRT
INFO: fsg_search.c(871): fsg 4.68 wall 3.078 xRT
[INFO] [1590089042.732030]: OUTPUT: "MOVE FORWARD FULL SPEED"
INFO: cmn_live.c(120): Update from < 60.90 -2.22 -0.85 5.71 3.00 3.65 -4.54 -1.99 2.56 -4.44 0.44 1.48 -2.29 >
INFO: cmn_live.c(138): Update to < 60.48 -1.83 -2.11 4.97 2.60 3.65 -4.70 -1.91 2.47 -4.16 0.82 0.56 -2.82 >
INFO: fsg_search.c(859): 88 frames, 1038 HMMs (11/fr), 3544 senones (40/fr), 404 history entries (4/fr)
INFO: fsg_search.c(869): fsg 0.25 CPU 0.276 xRT
INFO: fsg_search.c(871): fsg 6.40 wall 7.194 xRT
[INFO] [1590089049.138791]: OUTPUT: "MOVE BACK"
INFO: cmn_live.c(120): Update from < 60.48 -1.83 -2.11 4.97 2.60 3.65 -4.70 -1.91 2.47 -4.16 0.82 0.56 -2.82 >
INFO: cmn_live.c(138): Update to < 60.75 -0.30 -2.38 3.45 0.97 2.32 -3.80 -2.08 2.90 -4.71 0.21 1.25 -2.88 >
INFO: fsg_search.c(859): 113 frames, 1587 HMMs (14/fr), 5124 senones (45/fr), 642 history entries (5/fr)
INFO: fsg_search.c(869): fsg 0.22 CPU 0.195 xRT
INFO: fsg_search.c(871): fsg 2.91 wall 2.553 xRT
[INFO] [1590089052.852391]: OUTPUT: "MOVE FORWARD"
INFO: cmn_live.c(88): Update from < 60.75 -0.30 -2.38 3.45 0.97 2.32 -3.80 -2.08 2.90 -4.71 0.21 1.25 -2.88 >
INFO: cmn_live.c(105): Update to < 60.92 -0.38 -2.57 4.50 0.98 2.20 -4.62 -2.45 3.43 -5.16 -0.02 1.28 -2.59 >
INFO: cmn_live.c(120): Update from < 60.92 -0.38 -2.57 4.50 0.98 2.20 -4.62 -2.45 3.43 -5.16 -0.02 1.28 -2.59 >
INFO: cmn_live.c(138): Update to < 59.99 -0.87 -2.16 4.02 0.48 2.65 -4.37 -2.23 3.71 -4.80 -0.59 1.60 -2.09 >
INFO: fsg_search.c(859): 97 frames, 1796 HMMs (18/fr), 5235 senones (53/fr), 625 history entries (6/fr)
INFO: fsg_search.c(869): fsg 0.20 CPU 0.201 xRT
INFO: fsg_search.c(871): fsg 3.41 wall 3.480 xRT
[INFO] [1590089055.466034]: OUTPUT: "MOVE LEFT"
INFO: cmn_live.c(120): Update from < 59.99 -0.87 -2.16 4.02 0.48 2.65 -4.37 -2.23 3.71 -4.80 -0.59 1.60 -2.09 >
INFO: cmn_live.c(138): Update to < 59.00 -0.40 -2.20 2.90 0.65 2.28 -3.81 -1.70 3.55 -4.50 -0.91 2.03 -1.68 >
INFO: fsg_search.c(859): 103 frames, 1371 HMMs (13/fr), 4677 senones (45/fr), 457 history entries (4/fr)
INFO: fsg_search.c(869): fsg 0.19 CPU 0.180 xRT
INFO: fsg_search.c(871): fsg 2.42 wall 2.324 xRT
[INFO] [1590089057.884874]: OUTPUT: "MOVE RIGHT"

```

Cambiando los parámetros para poder trabajar con una diferente gramática: "Restaurant"

```
rodrigo@rodrigo-Vostro-3458: ~/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch
File Edit View Search Terminal Tabs Help
rodrigo@rodrigo-Vostro-3458: ~ x rodrigo@rodrigo-Vostro-3458: ~/MobileRobots-2020-2-for-Covid19/catkin_ws/src/br... x
GNU nano 2.9.3 pocketsphinx_test.launch Modified

<launch>
  <node name="speech_recog" pkg="pocketsphinx" type="asr_test.py" output="screen">
    <remap from="jsrf_audio" to="sphinx_audio" />
    <param name="gram" value="$(find pocketsphinx)/vocab/restaurant"/>
    <param name="dict" value="$(find pocketsphinx)/vocab/restaurant.dict"/>
    <param name="grammar" value="restaurant"/>
    <param name="rule" value="command"/>
    <param name="lm" value=":default"/>
    <param name="hmm" value=":default"/>
  </node>

  <node name="audio_control" pkg="pocketsphinx" type="send_audio.py" output="screen">
    <param name="input" value=":default"/>
  </node>
</launch>

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos ^U Undo ^A Mark Text ^] To Bracket
^X Exit ^R Read File ^L Replace ^U Uncut Text ^T To Spell ^_ Go To Line ^E Redo ^M Copy Text ^_ WhereIs Next
```

Trabajando con nuevos parámetros y una nueva gramática, estos fueron los resultados:

```
/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/pocketsphinx_test.launch http://localhost:11311
File Edit View Search Terminal Tabs Help
/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/p... x rodrigo@rodrigo-Vostro-3458: ~/MobileRobots-2020-2-for-Covid19/catkin_ws/src/br... x

INFO: fsg_search.c(869): fsg 0.31 CPU 0.186 xRT
INFO: fsg_search.c(871): fsg 5.88 wall 3.643 xRT
[INFO] [1590990488.428514]: OUTPUT: "JUSTINA START"
INFO: cmn_live.c(88): Update from < 59.81 0.45 -1.53 7.07 1.27 0.56 -4.01 -1.80 5.32 -7.62 5.05 -1.23 0.96 >
INFO: cmn_live.c(105): Update to < 60.45 0.60 -1.56 6.99 1.35 -0.26 -3.73 -3.15 4.23 -8.55 5.13 -1.15 0.45 >
INFO: cmn_live.c(120): Update from < 60.45 0.60 -1.56 6.99 1.35 -0.26 -3.73 -3.15 4.23 -8.55 5.13 -1.15 0.45 >
INFO: cmn_live.c(138): Update to < 59.07 1.11 -1.60 6.29 1.06 0.29 -2.81 -2.42 3.79 -8.05 4.19 -0.76 0.92 >
INFO: fsg_search.c(859): 213 frames, 1782 HMMs (7/fr), 6347 senones (29/fr), 467 history entries (2/fr)

INFO: fsg_search.c(869): fsg 0.31 CPU 0.144 xRT
INFO: fsg_search.c(871): fsg 3.82 wall 1.786 xRT
[INFO] [1590990492.254587]: OUTPUT: "JUSTINA TAKE A ORDER"
INFO: cmn_live.c(88): Update from < 59.87 1.11 -1.60 6.29 1.06 0.29 -2.81 -2.42 3.79 -8.05 4.19 -0.76 0.92 >
INFO: cmn_live.c(105): Update to < 61.30 1.44 -0.60 6.49 -1.29 1.59 -3.39 -4.72 4.33 -12.45 5.63 -2.32 -1.19 >
INFO: cmn_live.c(120): Update from < 61.30 1.44 -0.60 6.49 -1.29 1.59 -3.39 -4.72 4.33 -12.45 5.63 -2.32 -1.19 >
INFO: cmn_live.c(138): Update to < 60.00 0.46 0.07 6.06 -1.41 2.00 -2.69 -4.40 4.19 -11.34 5.20 -2.11 -0.94 >
INFO: fsg_search.c(859): 294 frames, 5113 HMMs (17/fr), 16308 senones (55/fr), 1023 history entries (3/fr)

INFO: fsg_search.c(869): fsg 0.52 CPU 0.177 xRT
INFO: fsg_search.c(871): fsg 4.68 wall 1.586 xRT
[INFO] [1590990496.936552]: OUTPUT: "I WANT PRINGLES AND COOKIES"
INFO: cmn_live.c(88): Update from < 60.00 0.46 0.07 6.06 -1.41 2.00 -2.69 -4.40 4.19 -11.34 5.20 -2.11 -0.94 >
INFO: cmn_live.c(105): Update to < 61.50 1.28 -0.48 7.50 -2.41 1.26 -0.37 -6.26 6.49 -10.73 5.83 -2.24 -2.55 >
INFO: fsg_search.c(859): 172 frames, 6454 HMMs (37/fr), 16464 senones (95/fr), 1278 history entries (7/fr)

INFO: fsg_search.c(869): fsg 0.34 CPU 0.194 xRT
INFO: fsg_search.c(871): fsg 3.46 wall 2.000 xRT
[INFO] [1590990500.401255]: OUTPUT: "I WANT A TEA"
INFO: cmn_live.c(88): Update from < 61.50 1.28 -0.48 7.50 -2.41 1.26 -0.37 -6.26 6.49 -10.73 5.83 -2.24 -2.55 >
INFO: cmn_live.c(105): Update to < 62.20 1.48 -0.37 8.74 -2.86 0.45 -1.15 -6.90 6.91 -12.34 6.32 -2.78 -2.97 >
INFO: cmn_live.c(120): Update from < 62.20 1.48 -0.37 8.74 -2.86 0.45 -1.15 -6.90 6.91 -12.34 6.32 -2.78 -2.97 >
INFO: cmn_live.c(138): Update to < 60.80 1.25 -0.22 7.77 -1.99 0.73 -0.84 -5.61 6.49 -11.12 5.08 -2.86 -2.06 >
INFO: fsg_search.c(859): 156 frames, 1090 HMMs (6/fr), 4790 senones (30/fr), 314 history entries (2/fr)

INFO: fsg_search.c(869): fsg 0.26 CPU 0.167 xRT
INFO: fsg_search.c(871): fsg 3.00 wall 1.908 xRT
[INFO] [1590990503.400193]: OUTPUT: "JUSTINA WAIT"
INFO: cmn_live.c(88): Update from < 60.80 1.25 -0.22 7.77 -1.99 0.73 -0.84 -5.61 6.49 -11.12 5.08 -2.86 -2.06 >
INFO: cmn_live.c(105): Update to < 61.90 0.67 1.27 6.81 -1.88 0.13 -1.16 -6.48 7.18 -12.76 5.10 -2.59 -2.94 >
INFO: cmn_live.c(120): Update from < 61.90 0.67 1.27 6.81 -1.88 0.13 -1.16 -6.48 7.18 -12.76 5.10 -2.59 -2.94 >
INFO: cmn_live.c(138): Update to < 61.19 0.34 1.73 4.28 -2.47 0.54 -1.58 -5.68 7.20 -10.23 4.89 -1.65 -2.44 >
INFO: fsg_search.c(859): 324 frames, 4697 HMMs (14/fr), 15042 senones (46/fr), 957 history entries (2/fr)

INFO: fsg_search.c(869): fsg 0.53 CPU 0.163 xRT
```

```
/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/pocketsphinx_test.launch http://localhost:11311
File Edit View Search Terminal Tabs Help
/home/rodrigo/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/p... x rodrigo@rodrigo-Vostro-3458: ~/MobileRobots-2020-2-for-Covid19/catkin_ws/src/br... x
INFO: cmn_llve.c(120): Update from < 62.28 1.48 -0.37 8.74 -2.86 0.45 -1.15 -6.90 6.91 -12.34 6.32 -2.78 -2.97 >
INFO: cmn_llve.c(138): Update to < 60.80 1.25 -0.22 7.77 -1.99 0.73 -0.84 -5.61 6.49 -11.12 5.08 -2.86 -2.86 >
INFO: fsg_search.c(859): 156 frames, 1090 HMMs (6/fr), 4790 senones (30/fr), 314 history entries (2/fr)

INFO: fsg_search.c(869): fsg 0.26 CPU 0.167 xRT
INFO: fsg_search.c(871): fsg 3.00 wall 1.908 xRT
[INFO] [1590890503.400193]: OUTPUT: "JUSTINA WAIT"
INFO: cmn_llve.c(88): Update from < 60.80 1.25 -0.22 7.77 -1.99 0.73 -0.84 -5.61 6.49 -11.12 5.08 -2.86 -2.86 >
INFO: cmn_llve.c(105): Update to < 61.98 0.67 1.27 6.81 -1.88 0.13 -1.16 -6.48 7.18 -12.76 5.10 -2.59 -2.94 >
INFO: cmn_llve.c(120): Update from < 61.98 0.67 1.27 6.81 -1.88 0.13 -1.16 -6.48 7.18 -12.76 5.10 -2.59 -2.94 >
INFO: cmn_llve.c(138): Update to < 61.19 0.34 1.73 4.28 -2.47 0.54 -1.58 -5.68 7.20 -10.23 4.89 -1.65 -2.44 >
INFO: fsg_search.c(859): 324 frames, 4697 HMMs (14/fr), 15042 senones (46/fr), 957 history entries (2/fr)

INFO: fsg_search.c(869): fsg 0.53 CPU 0.163 xRT
INFO: fsg_search.c(871): fsg 4.99 wall 1.535 xRT
[INFO] [1590890508.391954]: OUTPUT: "I WANT CHOCO FLAKES AND PASTA"
INFO: cmn_llve.c(88): Update from < 61.19 0.34 1.73 4.28 -2.47 0.54 -1.58 -5.68 7.20 -10.23 4.89 -1.65 -2.44 >
INFO: cmn_llve.c(105): Update to < 62.04 0.88 1.29 5.67 -0.96 -0.32 -2.85 -6.31 5.99 -10.71 3.22 -1.36 -2.96 >
INFO: cmn_llve.c(120): Update from < 62.04 0.88 1.29 5.67 -0.96 -0.32 -2.85 -6.31 5.99 -10.71 3.22 -1.36 -2.96 >
INFO: cmn_llve.c(138): Update to < 61.32 1.47 0.93 5.27 -0.77 -0.34 -2.77 -5.62 6.02 -10.62 2.42 -1.11 -2.70 >
INFO: fsg_search.c(859): 231 frames, 1355 HMMs (5/fr), 5640 senones (24/fr), 400 history entries (1/fr)

INFO: fsg_search.c(869): fsg 0.34 CPU 0.149 xRT
INFO: fsg_search.c(871): fsg 5.42 wall 2.336 xRT
[INFO] [1590890513.814151]: OUTPUT: "JUSTINA YES"
INFO: cmn_llve.c(120): Update from < 61.32 1.47 0.93 5.27 -0.77 -0.34 -2.77 -5.62 6.02 -10.62 2.42 -1.11 -2.70 >
INFO: cmn_llve.c(138): Update to < 62.12 0.99 0.42 7.16 0.50 -1.00 -3.19 -5.78 5.29 -11.83 0.71 -1.00 -3.28 >
INFO: fsg_search.c(859): 229 frames, 1096 HMMs (4/fr), 5825 senones (21/fr), 326 history entries (1/fr)

INFO: fsg_search.c(869): fsg 0.37 CPU 0.161 xRT
INFO: fsg_search.c(871): fsg 7.63 wall 3.317 xRT
[INFO] [1590890521.446074]: OUTPUT: "JUSTINA YES"
INFO: cmn_llve.c(88): Update from < 62.12 0.99 0.42 7.16 0.50 -1.00 -3.19 -5.78 5.29 -11.83 0.71 -1.00 -3.28 >
INFO: cmn_llve.c(105): Update to < 62.10 0.73 0.63 7.92 0.93 -1.38 -3.04 -5.69 5.03 -12.07 0.51 -1.61 -3.19 >
INFO: cmn_llve.c(120): Update from < 62.10 0.73 0.63 7.92 0.93 -1.38 -3.04 -5.69 5.03 -12.07 0.51 -1.61 -3.19 >
INFO: cmn_llve.c(138): Update to < 62.64 1.63 -0.33 8.68 1.23 -2.41 -5.42 -5.88 2.91 -12.37 -0.80 -2.51 -1.73 >
INFO: fsg_search.c(859): 203 frames, 1867 HMMs (9/fr), 7081 senones (34/fr), 473 history entries (2/fr)

INFO: fsg_search.c(869): fsg 0.51 CPU 0.248 xRT
INFO: fsg_search.c(871): fsg 13.38 wall 6.558 xRT
[INFO] [1590890534.828091]: OUTPUT: "JUSTINA THIS IS THE ORDER"
INFO: cmn_llve.c(88): Update from < 62.64 1.63 -0.33 8.68 1.23 -2.41 -5.42 -5.88 2.91 -12.37 -0.80 -2.51 -1.73 >
INFO: cmn_llve.c(105): Update to < 61.72 1.65 -0.48 8.72 0.26 -2.70 -5.48 -5.63 3.48 -11.86 0.72 -1.92 -1.34 >
INFO: cmn_llve.c(120): Update from < 61.72 1.65 -0.48 8.72 0.26 -2.70 -5.48 -5.63 3.48 -11.86 0.72 -1.92 -1.34 >
```