

Robots Móviles

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Práctica No.3

Reconocimiento de voz usando pocketsphinx.

Entregables:

Ejecutar el comando `roslaunch bring_up_pocketsphinx test.launch`

```
/home/jenny/Escritorio/Robots/MobileRobots-2020-2-for-Covid19/catkin_ws/src/bring_up/launch/pocketsphinx_test.launch http://localhost:11311
jenny@jenny-virtualbox:~/Escritorio/Robots/MobileRobots-2020-2-for-Covid19$ roslaunch bring_up_pocketsphinx_test.launch
... Logging to /home/jenny/.ros/log/d8c0e842-838f-11ea-a128-0800278b1776/roslaunch-jenny-VirtualBox-9987.log
Checking log directory for disk usage. This may take awhile.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is 41GB.

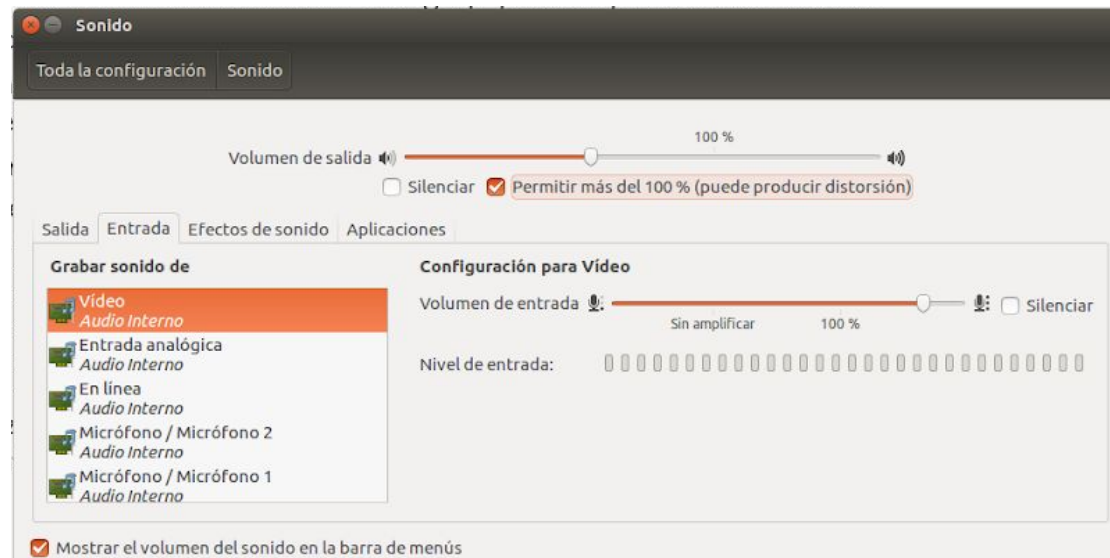
started roslaunch server http://jenny-VirtualBox:36475/

SUMMARY
=====
PARAMETERS
* /audio_control/Input: :default
* /rosdistro: kinetic
* /rosversion: 1.12.14
* /speech_recog/dict: /home/jenny/Escri...
* /speech_recog/grant: /home/jenny/Escri...
* /speech_recog/grammar: voice_cmd
* /speech_recog/lmwt: :default
* /speech_recog/ln: :default
* /speech_recog/rule: none2

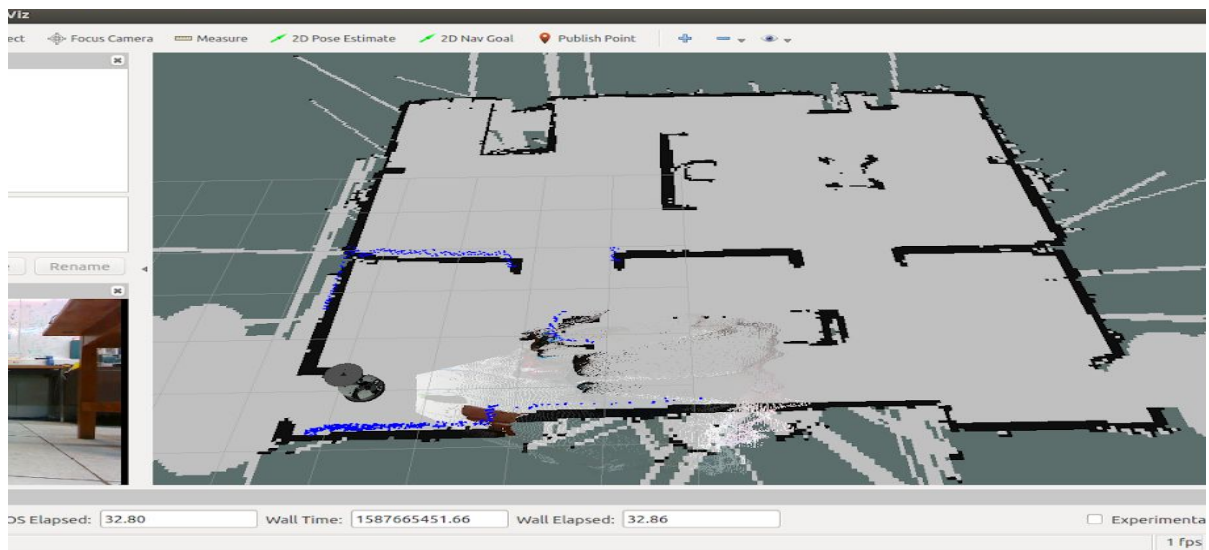
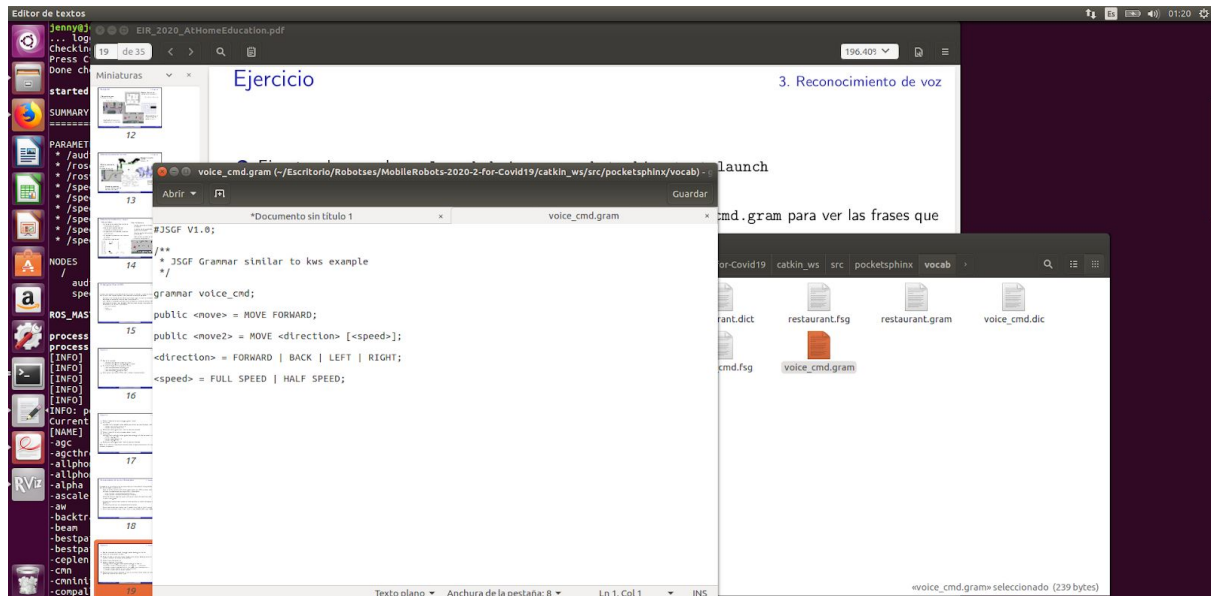
NODES
/
  audio_control (pocketsphinx/send_audio.py)
  speech_recog (pocketsphinx/asr_test.py)
ROS_MASTER_URI=http://localhost:11311

process[speech_recog-1]: started with pid [3082]
process[audio_control-2]: started with pid [3083]
[INFO] [1587446454.121239]: audio input node will start after delay of 5 seconds
[INFO] [1587446454.161536]: Loading the default acoustic model
[INFO] [1587446454.161930]: Done loading the default acoustic model
[INFO] [1587446454.202983]: Done initializing pocketsphinx
[INFO] [1587446454.203262]: language model not found. Using 25GF grammar instead.
INFO: pocketsphinx.c (152): Parsed model-specific feature parameters from /usr/local/lib/python2.7/dist-packages/pocketsphinx/model/en-us//feat.params
Current configuration:
[NAME]          [DEFAULT]    [VALUE]
-acg             none          2.0
-acgthresh       2.0          2.000000e+00
-allphone       yes           yes
-allphone_ct    yes           9.700000e-01
-alpha           0.97         2.000000e+01
-ascate          28.0         1.000000e+00
-aw              1            1
-backtrace       no            no
-beam            1e-48        1.000000e-48
-bestpath        yes           yes
-bestpathlw     9.5          9.500000e+00
-ceplen          13           13
-cmn             lvs         batch
-cmninit         -9,-1,-1     41.00,-5.29,-0.12,5.09,2.48,-4.07,-1.37,-1.78,-5.08,-2.05,-0.45,-1.42,1.17
-compellen       no            no
```

Verificar los volúmenes del micrófono



Revisar el archivo `catkin_ws/src/pocketsphinx/vocab/voice_cmd.gram` para ver las frases que se pueden reconocer de acuerdo con la gramática.



Ejemplos de frases;

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

MOVE BACK HALF SPEED
MOVE LEFT FULL SPEED

Detener la ejecución.

```
jenny@Jenny-VirtualBox: ~/Escritorio/Robots/MobileRobots-2020-2-for-Covid19
INFO: dict.c(361): 5 words read
INFO: dict2pidx.c(396): Building PID tables for dictionary
INFO: dict2pidx.c(400): Allocating 42672 * 2 bytes (144 KIB) for word-initial triphones
INFO: dict2pidx.c(412): Allocating 42672 * 2 bytes (144 KIB) for word-final triphones
INFO: dict2pidx.c(416): Allocating 42672 * 2 bytes (144 KIB) for single-phone word triphones
INFO: jsgr.c(709): Defined rule: PUBLIC <voice_cmd.move>
INFO: jsgr.c(709): Defined rule: PUBLIC <voice_cmd.move2>
INFO: jsgr.c(709): Defined rule: <voice_cmd.direction>
INFO: jsgr.c(709): Defined rule: <voice_cmd.speed>
INFO: [1587446454.349148]: voice_cmd.move2
INFO: fsg_model.c(286): Computing transitive closure for null transitions
INFO: fsg_model.c(270): 0 null transitions added
INFO: [1587446454.352355]: Writing fsg file /home/jenny/Escritorio/Robots/MobileRobots-2020-2-for-Covid19/catkin_ws/src/pocketsphinx/vocab/voice_cmd.fsg
INFO: fsg_model.c(443): Writing fsg file /home/jenny/Escritorio/Robots/MobileRobots-2020-2-for-Covid19/catkin_ws/src/pocketsphinx/vocab/voice_cmd.fsg
INFO: fsg_search.c(227): FSG(beam: -1080, pbeam: -1080, wbeam: -634, wlp: -26, pip: 0)
INFO: fsg_model.c(423): Adding silence transitions for <sil> to FSG
INFO: fsg_model.c(423): Added 6 silence word transitions
INFO: fsg_model.c(423): Adding silence transitions for <sil> to FSG
INFO: fsg_model.c(423): Added 6 silence word transitions
INFO: fsg_model.c(423): Adding silence transitions for [NOISE] to FSG
INFO: fsg_model.c(443): Added 6 silence word transitions
INFO: fsg_search.c(173): Added 6 alternate word transitions
INFO: fsg_lextree.c(110): Allocated 510 bytes (0 KIB) for left and right context phones
INFO: fsg_lextree.c(256): 59 HMM nodes in lextree (35 leaves)
INFO: fsg_lextree.c(259): Allocated 8496 bytes (8 KIB) for all lextree nodes
INFO: fsg_lextree.c(262): Allocated 5040 bytes (4 KIB) for lextree leafnodes
INFO: [1587446454.359388]: Decoder started successfully
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.rear
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.center_lfe
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.side
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.surround71
ALSA lib setup.c:548:(add_elem) Cannot obtain info for CTL elem (MIXER, 'IEC958 Playback Default', 0, 0, 0): No such file or directory
ALSA lib setup.c:548:(add_elem) Cannot obtain info for CTL elem (MIXER, 'IEC958 Playback Default', 0, 0, 0): No such file or directory
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.hdm1
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.hdm1
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.modem
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.modem
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.phonein
ALSA lib pcm.c:2266:(snd_pcm_open_noupdate) Unknown PCM cards.pcm.phonein
^C[audio control-2] killing on exit
[speech_recog-1] killing on exit
INFO: [1587450373.359742]: Stop ASRControl
INFO: [1587450373.386927]: Stop ASRControl
INFO: fsg_search.c(265): TOTAL fsg 0.00 CPU -nan xRT
INFO: fsg_search.c(268): TOTAL fsg 0.00 wall -nan xRT
Unhandled exception in thread started by
sys.excepthook is missing
lost sys.stderr
shutting down processing monitor...
... shutting down processing monitor complete
done
jenny@Jenny-VirtualBox: ~/Escritorio/Robots/MobileRobots-2020-2-for-Covid19
```

En el archivo catkin_ws/src/bring up/launch/pocketsphinx.text.launch:

Cambiar el valor del parámetro gram de ../voice cmd a ../restaurant, con este parámetro se recibe el archivo en donde se define la gramática que se usará para mover al robot por medio de voz.

Cambiar el valor del parámetro dict de ../voice cmd.dic a restaurant.dic

El parámetro dict recibe el archivo de entrada del diccionario de pronunciación, en dicho archivo se tiene una lista de palabras y cómo se pronuncian.

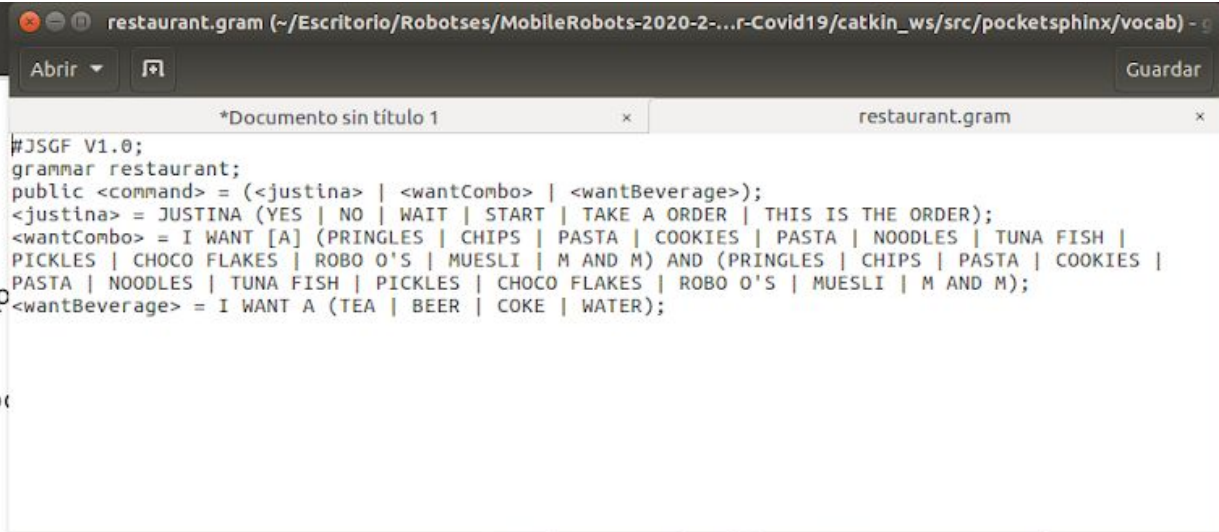
Cambiar el valor de grammar de voice cmd a restaurant, con este parámetro se indica la gramática que se escuchará.

Cambiar el valor de rule de move2 a command, aquí se obedecerá las regla básica de la gramática, en este caso; public <command> = (<justina> | <wantCombo> | <wantBeverage>);

```
Abrir  Guardar
*Documento sin título 1 *pocketsphinx_test.launch
<launch>
  <node name="speech_recog" pkg="pocketsphinx" type="asr_test.py" output="screen">
    <remap from="jsgrf_audio" to="sphinx_audio" />
    <param name="gram" value="$(find pocketsphinx)/vocab/restaurant"/>
    <param name="dict" value="$(find pocketsphinx)/vocab/restaurant.dic"/>
    <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>
```

Relanzar el archivo pocketsphinx test.launch y verificar el reconocimiento de acuerdo con la gramática del archivo restaurant.gram



```
#JSRGF V1.0;
grammar restaurant;
public <command> = (<justina> | <wantCombo> | <wantBeverage>);
<justina> = JUSTINA (YES | NO | WAIT | START | TAKE A ORDER | THIS IS THE ORDER);
<wantCombo> = I WANT [A] (PRINGLES | CHIPS | PASTA | COOKIES | PASTA | NOODLES | TUNA FISH |
PICKLES | CHOCO FLAKES | ROBO O'S | MUESLI | M AND M) AND (PRINGLES | CHIPS | PASTA | COOKIES |
PASTA | NOODLES | TUNA FISH | PICKLES | CHOCO FLAKES | ROBO O'S | MUESLI | M AND M);
<wantBeverage> = I WANT A (TEA | BEER | COKE | WATER);
```