NeuroClone

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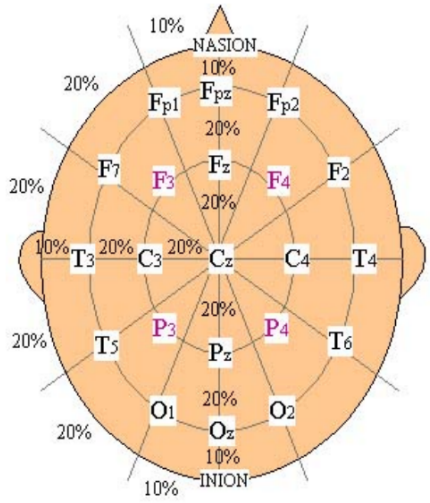
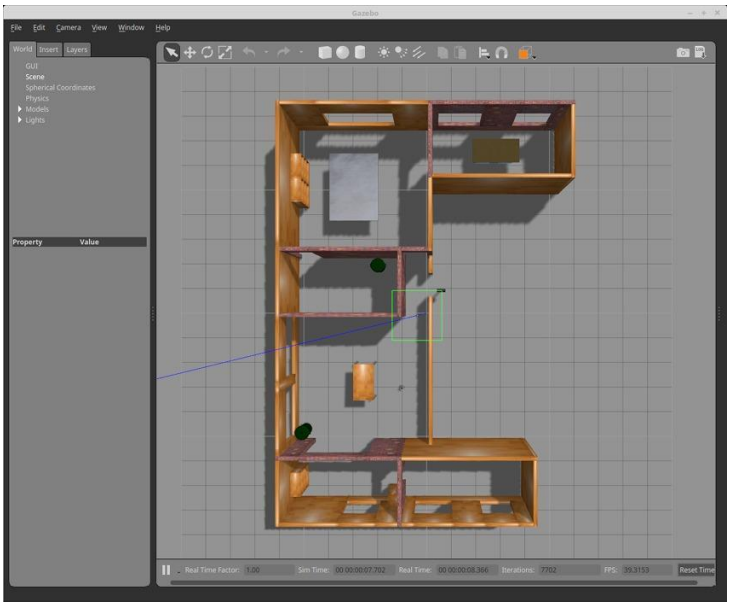



```
47          rospy.sleep(1)
48
49  def move_zero():
50          arm_group.set_named_target("zero")
51          print "Executing Move: Zero"
52          plan1 = arm_group.plan()
53          arm_group.execute(plan1, wait=True)
54          arm_group.stop()
55          arm_group.clear_pose_targets()
56          variable = arm_group.get_current_pose()
57          print (variable.pose)
58          rospy.sleep(1)
59
60  def move_position1():
61          arm_group.set_named_target("position1")
62          print "Executing Move: Position1"
63          plan1 = arm_group.plan()
64          arm_group.execute(plan1, wait=True)
65          arm_group.stop()
```

About

- The project aims at reading Brain Waves and converting them into commands for a robot, thus, giving full control to even a paralysed person just by thoughts.
- The main motivation was to help out paralyzed people by giving them a *sense* of entering into a new body that they can control completely. We want to give the controller an audio-visual feedback to make the process more realistic
- We did it via this route:
    - Researched and found the best possible dataset online
    - Trained a pre trained model using CNN with some changes
    - Used the turtlebot open manipulator and open manipulator-X as the hand robot.
    - Learn ROS so that we may get a better understanding of the codes and working of hand robot.
    - Combined the Deep learning with ROS to give the output
- In our project if we give a dataset of EEG recorded during imagining hand movements to the program the bot can do the exact hand movement in a virtual environment. We didn't achieve exactly what we dreamt of, but were quite close to it.

  Link to main doc: Copy of Final Documentation Template



Learnings/Key Takeaways/Experience

Some of our takeaways are mentioned as below::

- **Brain Study**
  This was the first thing we did, because we needed information regarding the electrodes, specific parts of the brain that control specific movements etc.
- **Learning Python**
  Python was one of the most basic tools and it helped us with the proper formulations and debugging of code.
- **Machine Learning and Deep learning**
  We used this in order to interpret the eeg datasets cleanly and noise free.
- **Train a pre trained model**
  As a healthy practice and for debugging the real code, we implemented this on a dummy bot.
- **Extract EEG datasets responsible for hand movements.**
  Due to the lack of time and experience, we restricted ourselves to searching for EEG datasets for hand motions
- **Configuring ubuntu environment for the first time**
  As we were very new to this, we gathered all basic knowledge about it .
- **Dealing with turtlebot and open manipulator-x**
  We took turtlebot as our primary bot and open manipulator as a hand robot, So we went through slam, navigation and simulation of bots.
- **Combining Deep learning with working of hand robot**
  Our last step was to combine deep learning with the open manipulator, this required a lot of debugging and corrections which improved our understanding of codes.
- **Creation of Github repo**
  We also created a github repo which contains all our codes and description of the project.