Weekly Report Three

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Course: CSC461 Course Project

Title:

Install support application and python library

description:

This week we need to install that support application and python library on both computers. For example, we need to install OpenCV and Numpy library to let the Picar allow us to write a function that makes the camera track the object and detecting the real-world environment.

Process:

First, we need to update and upgrade our software system on the Raspberry pi computer, and that make sure we are using the latest version updated software. Also, we need to enable some settings on the computer, and that makes us allow the use of those library functions in our system environment.

After that we need to install some software on the computer as the following list:

1. I2C-Tools - it using for check the external devices are connected successfully and are it working or not.
2. Python drive PCA9685 - it using to control the PWM servo/LED.
3. Python package Setuptools - it is a python package using for facilitating packaging.
4. Python package Wheel - it is a dynamicobject-oriented programming language.
5. Python package PyAudio - it is a python package for allowing us to use a microphone to accept our voice command.
6. Flac - it is to convert the sound to a .flac file for speech recognition and make the Picar follow our order.
7. Sphinxbase and Pocketsphinx - it is a part of CMU Sphinx Open Source Toolkit for Speech Recognition.
8. Bison - it is a program that can convert computer language grammar into a C language program and to make the computer can execute.
9. ALSA - Advanced Linux Sound Architecture is a software framework and part of the Linux kernel that provides an application programming interface (API) for sound card device drivers.

10. Swig - is used to connect computer programs or libraries written in C or C++ with Python in our project.
11. Python package SpeechRecognition - is a library for performing speech recognition, with support for several engines and APIs, online and offline.
12. Python package OpenCV - it is a library of Python bindings designed to solve computer vision problems.
13. Python package libatlas-base-dev libjasper-dev libqtgui4 python3-pyqt5 libqt4-test - re Python packages for FPV functions and sending jpeg stream to PC.
14. Python package zmq - it carries messages across inproc, IPC, TCP, TIPC, multicast.
15. Python package pybase64 - it provides a fast base64 implementation for base64 encoding/decoding.
16. Python package rpi_ws281x - is a Raspberry Pi library for controlling WS281X LEDs.

After we finish software installing on Raspberry pi computer, and we need to install the software on our desktop. In our desktop, we don't need to install that much software we just need some of them.

1. Setuptools
2. Wheel
3. SpeechRecognition
4. PyAudio
5. Swig
6. PocketSphinx
7. Numpy
8. OpenCV
9. Zmq
10. Pybase64

Now we finish the software installation part on both computers, and the next step for us is to test out how to use an ultrasonic sensor to detect the object on the front of Picar, and also we need to draw a 2D graph pictures for use to track the distance between the object and let the Picar keep a distance between the object and itself.

Technical challenges met:

In our survey of multimedia systems for cars, we found that many installers were not used correctly because some of Python's packets were outdated. And the computer and Raspberry pi can't match because the applications don't match each other.

solved and remaining：

We start with an outdated Python package and look for the original file. After exploring many official websites and technology websites, we found the latest package that can replace outdated Python package. For the matching problem between the computer and the Raspberry pi, we modified the environmental data according to the existing situation so that it can match.

Of course, we still need further testing to ensure that the data transfer between the two computers can be completed under any circumstances.

Conclusion:

This week we finished installed all software and requirement on the Picar, now we are ready to connect our Picar and test out and learn how the multimedia system works on the robot car. So, next week we will start to run the car and do the real testing on how to use an ultrasonic sensor draw 2D pictures and detecting the object on the front of the Picar.