Artificial Nose

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1 Introduction

In this project a real-time application is developed to recognize smells from an artificial nose. The sensor used for the application is an air quality gas sensor.

The rest of the documentation is structured in the following way: in section 2 the tasks are explained one at a time, in the section 3...

2 The tasks

In our application we have 7 periodic tasks: graphic task, sensor task, neural network task (made with Tensorflow), keyboard task and the store image task.

The main function sets everything up for the tasks, except for the store image task. The keyboard task is in charge to execute the store image task when the `ENTER` key is pressed. If the store image task is already in execution and the `ENTER` key is pressed this it's terminated.

Before start the store image task it's possible to write the name of the directory in which the images will be saved; if no name it's writed the images will be saved into *image_neural_network* directory.

The sensor is readed by an Arduino M0 pro; the sampled data readed by arduino are sent via the serial port to our application and readed by the sensor task. All the tasks are terminated by the keyboard task when the user presses the `ESC` key.

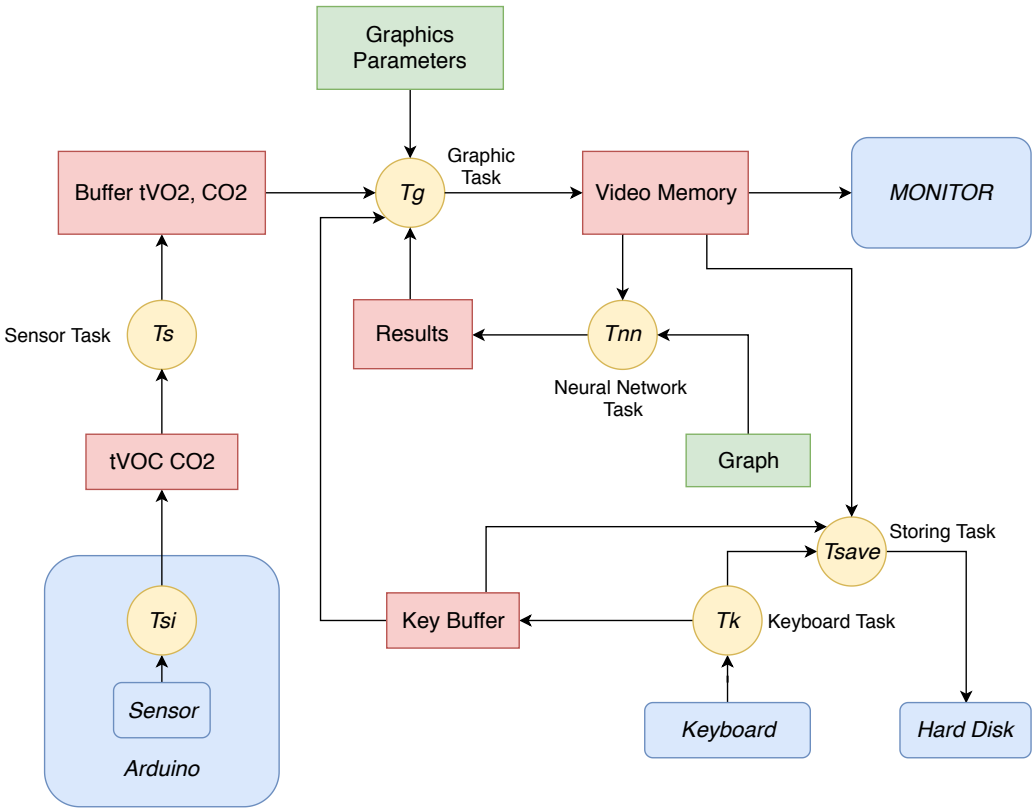

Figure 1: Task diagram

2.1 Main function

In the main function(algorithm 1) all the tasks, except the store image task, are started and the mutexes initialized. The mutexes are two, one for the data readed from the sensor and the other for the results given by the neural network. The main also starts allegro and waits for the termination of the keyboard task. Once the keyboard task terminates the main cancels all other task and wait for their termination.

2.2 Graphic Task

Algorithm 1 Main

```
T ← tasks to be started
Mutexes and allegro inizialization
for t ∈ T do
    start t
end for
loop wait for termination of keyboard task
end loop
for t ∈ T do
    cancel and join t
end for
```