

ECEN 345/ECEN 3450-001

Mobile Robotics I

Prof. A. Gilmore (Instructor)

Sajjad Alhassan (TA)

Laboratory Assignment #1

Lab 1 - Intro to CEENBoT API [Report]

Written by :

Nelson Lefebvre 03137910

**Department of Electrical and
Computer Engineering (ECE)
University of Nebraska
Lincoln/Omaha**

Due: 09/11/2022

- Introduction :

The main lesson of this lab is to make us understand how the CEENbot API works and to familiarize ourselves with it so that we can later implement our own more elaborate code. So we have to install the different software Microship studio/ CEENbot Utility Tool. And install a simple code in which we display on the LCD screen "HollyDolly". It was solitary work and so I didn't have any pair. And I used the documents provided for the installation (The CEENBoT-API: Getting Started with Atmel Studio 7). The workshop was successfully completed. With some small problem corrected outside the Lab (During the CEENBot installation, 30min more following the reception of the mail to correct the bug of the unfeasible transfer), So I estimate to have spent 3h30 to the realization of the lab.

- Background :

Here for the background we don't really need to discuss the topics that will often be discussed (like odometry or dead reckoning). But it is interesting to define what odometry is for the next LAB to come.

Odometry : Technique to determine the position of the robot when it moves (often with sensors).

Dead reckoning : The process of calculating the current position of some moving object by using a previously determined position.

- Procedure :

We can divide this Lab in 3 parts. In the 1st part we set up the Atmel Studio 7 project Template in which we have our space to code with the template that we prepare in this step. In the 2nd part we test the CEENBot-API project template. In particular by checking that the code compiles well. Then in part 3 we use CEENBot utility tools to transfer our compiled and converted program to HEX format and then test it on the robot itself.

- Source Code Discussion :

```
#include "capi324v221.h"
void CBOT_main( void ) {

    // Open the LCD subsystem module.
    LCD_open();

    // Clear the LCD display.
    LCD_clear();

    // Say "Hello".
    LCD_printf( "Hello, Dolly!\n" );

    // Loop forever.
    while( 1 );
}

// end CBOT_main()
```

Here is the code we had to implement. It is a simple code to test that the API is well installed and that our working environment is operational. We will just display a message on the LCD screen, for this we open the LCD subsystem module, then we clear the past messages and display what we want. Here we have chosen "Hello, Dolly!" Then we make an infinite loop so that the message remains displayed.

- Results :

We done well the lab, we have on the screen the message "Hello, Dolly" which is displayed and thus we have well our operational development environment with what to code and compile the code in particular with Atmel and also what to transfer this code directly in our CEENBot with the software CEENBot Utility Tool.

- Conclusion :

We can therefore conclude that our development environment is operational and in the future we will be able to move on to more advanced descriptions during our reports. In particular on odometry.