|  |  |
| --- | --- |
|  | **MINISTRY OF EDUCATION AND TRAINING** |

**FPT UNIVERSITY**

|  |
| --- |
| Capstone Project Document |
| Designing a mobile robot navigation and  target tracking system   |  |  | | --- | --- | | **Group 2 – Embedded System** | | | **Group Members** | Bui Ha Duong Leader SE60772  Tran Vo Hoang Member SE60814  Truong Buu Hoang Duy Member SE60672  Duong Minh Tuan Member SE60642  Nguyen Huu Tai Member 60042 | | **Supervisor** | Tran Khanh Ninh | | **Ext Supervisor** | N/A | | **Capstone Project Code** | RNT | |

Ho Chi Minh City, 01/2014

# Introduction

## Scenario

## Existing Solutions

## Proposed Solution and Approach

Our team proposed an autonomous mobile robot system has some advantages like:

* Can perform with a high degree of autonomy, which is particularly desirable in fields such as space exploration, cleaning floors…
* Gain information about the environment
* Work for an extended period with/without human intervention
* Move either all or part of itself throughout its operating environment with/without human assistance
* Easy implementation
* Respond quickly with commands
* Efficient real-time solution for tracking object

So that, we have our approach:

* Hardware: Based on quality and cost, we mainly use products of Texas Instruments.
* Firmware: We use the TIVA™ C Series TM4C123G LaunchPad for the mobile robot’s brain.
* Software: We use C# and EmguCV library for GUI and Image Processing.

## Project Overview

### Technology Overview

### System Overview

## Scope of Project

The scope of this project is a prototype of an “Autonomous Mobile Robot”, includes hardware, firmware and software.

**Hardware – Mobile Robot:**

* Creating a Two-wheeled mobile robot
* Creating an Encoder system for mobile robot
* Creating a Driver circuit for dc servo motor
* Creating a Multi-sensor navigation system for the autonomous mobile robot

**Firmware:**

* Developing a motion control system for two-wheeled mobile robot
  + Go Ahead
  + Go Back
  + Turn Left
  + Turn Right
* Developing PID Algorithm for speed control
* Developing Communication between mobile robot and software
* Developing Communication between mobile robot and sensors

**Software:**

* Developing an integrated software environment for mobile robot navigation and path planning.
* Applying Computer Vision for tracking object(s)
* Applying Computer Vision for obstacles detection and avoidance.
* Applying Computer Vision for navigation and path planning.

## Team Introduction

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Roles and Responsibility** | | | | |
| **No** | **Full Name** | **Role** | **Position** | **Contact** |
| 1 | Trần Khánh Ninh | Project Owner | Instructor | NinhTK@fpt.edu.vn |
| 2 | Bùi Hà Dương | Project Manager/Developer | Team leader | DuongBHSE60772@fpt.edu.vn |
| 3 | Trần Võ Hoàng | Developer/Tester | Team member | HoangTVSE60814@fpt.edu.vn |
| 4 | Trương Bửu Hoàng Duy | Developer/Tester | Team member | DuyTBHSE60672@fpt.edu.vn |
| 5 | Dương Minh Tuấn | Developer/Tester | Team member | TuanDMSE60642@fpt.edu.vn |
| 6 | Nguyễn Hữu Tài | Developer/Tester | Team member | TaiNH60042@fpt.edu.vn |