

Extend the Utilization of Joystick for Visualization, Telemetry and Control on Unmanned Vehicle Development

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Abstract. In this paper, we suggest a different way to improve the utilization of joystick in our daily life, especially for those who commonly use joystick in matlab simulink environment as a controller. By modifying potentiometer that acts as a variable resistor we can process signal from joystick with interfacing it on block in simulink to change to another function (ex. Low-cost sensor) or extend the limitation joystick itself when acts as a controller. With some applied mathematical calibration regarding the functionality for certain condition then the low-cost development approach for unmanned vehicle could be achieved.

Introduction

One of the most popular areas for development on robotics world is unmanned vehicle. Among unmanned vehicle areas there are some category upon the environment that they explore, such as unmanned aerial vehicle, unmanned ground vehicle, unmanned surface vehicle, unmanned underwater vehicle, and unmanned space vehicle. Although, there are some unmanned vehicle that can performed an action on two or more environment [1]. Every unmanned vehicle in order to successfully explore the environment and do their task they must equip themselves with an ability to know the environment or an ability to sense the condition surround them, so they can respond to whatever their sensing sense during the exploration. However, most of the equipment that has a good sensing ability usually expensive and also to interface it need other equipment like microcontroller which cost more for it. Because of that many researcher do the research more deep on how to build more accurate sensor that cheaper than they should be, but some researcher just look around the things around us that the function could be hack to get needed function. Like nowadays researcher begun to look at wii remote controller (wii mote) from Nintendo wii [2]. Actually from wii remote we can get infrared camera tracker, 3-axis accelerometer, vibration motor and Bluetooth connectivity for just only around \$80 dollar. A finger and object tracking could be performed from wii mote [2], from there controlling uav also could be achieved [3]. From their research, curiosity became more and more to explore the things around us and now has been discovered that playstation joystick could play a role more than we think. This paper shows a novel use of playstation joystick for low-cost visualization, telemetry and control for low-cost unmanned vehicle development using joystick input from simulink

The rest of this paper is organized as follows. Section 2 describes experimental procedure. Section 3 describes the results and discussion. Finally, the summary of our work is described in section 4.

Experimental Procedure

The utilization of joystick in unmanned vehicle are extend for:

Visualization and Telemetry. This experiment used common USB playstation joystick as shown in Fig.1. and common rotational potentiometer. First, disassembly the joystick and then connect the potentiometer to the analog button circuit that basically is also a potentiometer. With help joystick input block from simulink the signal from potentiometer could be read and calibrate.