Robot Arm That Can Move using the Smart phone Accelerometer.

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Abstract— **The paper presents the idea to develop a prototype of a robotic arm that can repeat some specific movements by using the accelerometer form any smart phone. The finality of this prototype is helping people with physical problems or discapacities.**

I. INTRODUCTION

A robotic arm can be really helpful and versatile, because you only have to program the robot arm and this it will do whatever you want, now imagine some robot that can follow a certain movement, you don't have to be an expert programmer, actually you don't need to know anything about programming, you only have to teach once the move to the robot and is going to repeat it over and over again, until the user decides to teach a new movement.

II. OBJECTIVES

i. Develop a system to let the user control the robot arm

ii. Design a controller to make the robot can do the movements the most precisely as possible.

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III. THEORETICAL FRAMEWORK

We are going to control the movements of a robotic arm using a PID, this controller it will run with the help of a PIC18, also we are going to use the NI myRio board to process the information from the movements of the arm.

A brief explanation of the functionality of a PID

.P: Actions from the proportional controller. This controller is in charge of give an output proportional to the error.[1]

.I: Actions from the integral controller, that give us an output proportional to the accumulated error.[1]

.D: This controller help us to make the error tend to zero. [1]
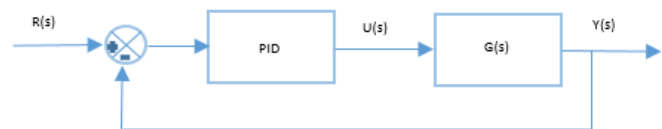
A PID controller will help us to make a precise movement.

III. BODY

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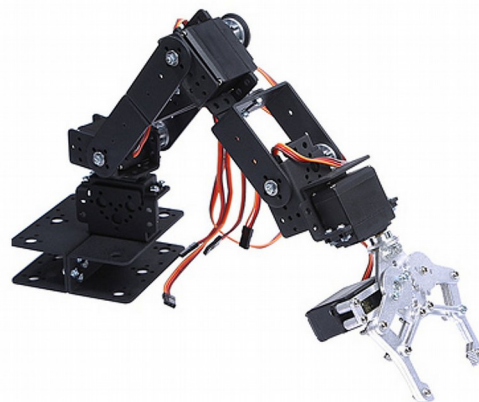
Six Degree of foredoom Robot arm.

Using the position and the coordinates of the arm, we are going to be able of reproduce the movement in such way that the robot can copied it several times. We are going to use the NI board to process and save this information, so finally the robot can repeat the movement. To obtain the position we use an accelerometer and we know the position of the arm in three axes x, y z.
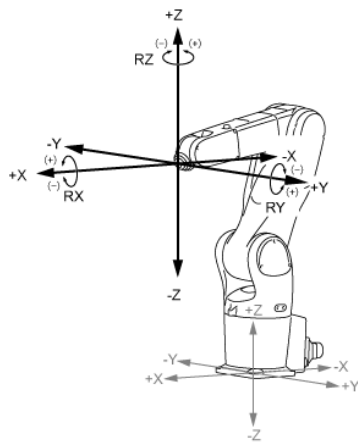
Accelerometer Axis.

We create an Application using AI2 Companion that allows you to obtain the values from the phone accelerometer in which this application is running after that the information is sending via bluetooth to the microcontroller, this one send the value to MyRio using USART communication.
Finally we have created a labview application that gives the proportional PWM according to the value of the coordinate from the smart phone accelerometer, so the user can wear a Sport-band to make this movement more real and feel like he's moving the robot arm with his own arm.

Screenshot from the AI2 app.

As additional functions, we implemented several modules like an emergency button using an ultrasonic sensor, frames to control the area of the movement, in this case we used a web cam and a red dot sticker to do the pattern match and stop the arm only if this one gets out from the limit frame.

IV. CONCLUSION

With this project we can develop a system that can help people with discapacities to do daily tasks, and the best is that you didn't need programing knowledge, because you can control it from any smartphone.

V. REFERENCES

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