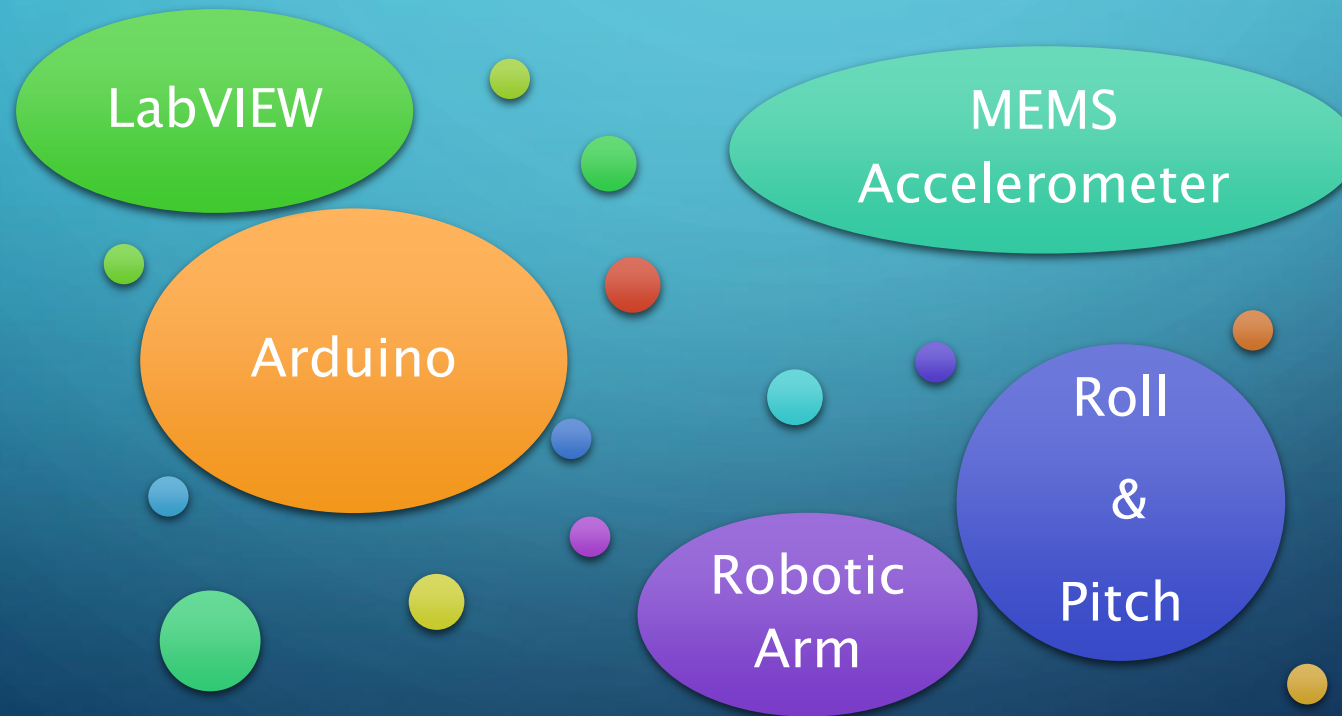# ROBOTIC ARM CONTROL BASED ON ACCELEROMETER USING ARDUINO WITH LABVIEW

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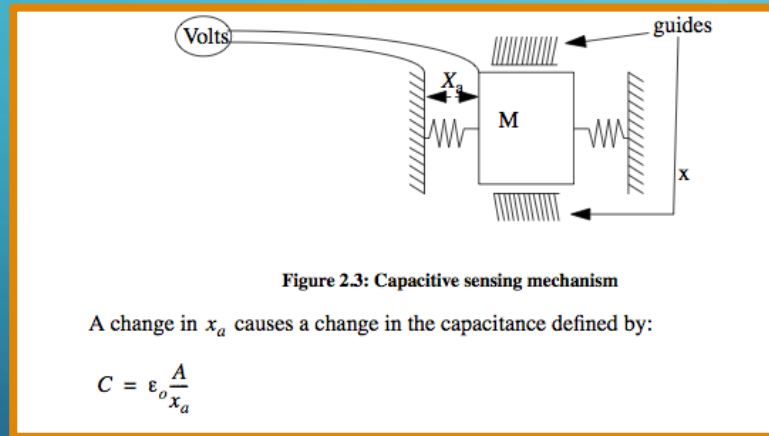
WHAT IS IT ABOUT?

- Its just a combination of all these:

LabVIEW

MEMS Accelerometer

Arduino

Roll & Pitch

Robotic Arm

HOW WE SENSE?

- Accelerometer Sensor: ADXL345(3 axis, ±2g sensitivity).
- Variation in Capacitive is converted into acceleration

Figure 2.3: Capacitive sensing mechanism

A change in x_a causes a change in the capacitance defined by:

$$C = \varepsilon_o \frac{A}{x_a}$$

- From this 3 axis position, we derive accileration.

CALCULATION & CONTROL

- We used Arduino-2560 board as controller.

- Used i2c communication to communicate with sensor

- Used 3 axis data to measure pitch and roll.

$$Pitch = arctan\left(\frac{x}{\sqrt{z^2 + y^2}}\right)$$

$$Roll = arctan\left(\frac{y}{\sqrt{z^2 + x^2}}\right)$$

- Utilized PWM pin to drive Servo motor.

- Drive servo in sweep mode to achieve smooth action.

- Push-buttons are provided to switch control between motors.

VISUALIZATION

- Provision to Analyze data Always enhance functionality.

- LabVIEW is a well accepted tool among professionals. And Its advantages can be Beneficial to this project.

- VISA communication tool used to communicate arduino with LabVIEW.

- Waveform and table type demonstratio are implemented.

- Other controls like communication port etc also provide in frond end.

WHERE WE APPLY THIS?

- Robotic arm is a good area which can take benefit of all these features.

DEMO VIDEO