SOUND NAVIGATION AND RANGING (SONAR) USING ULTRASONIC SENSOR

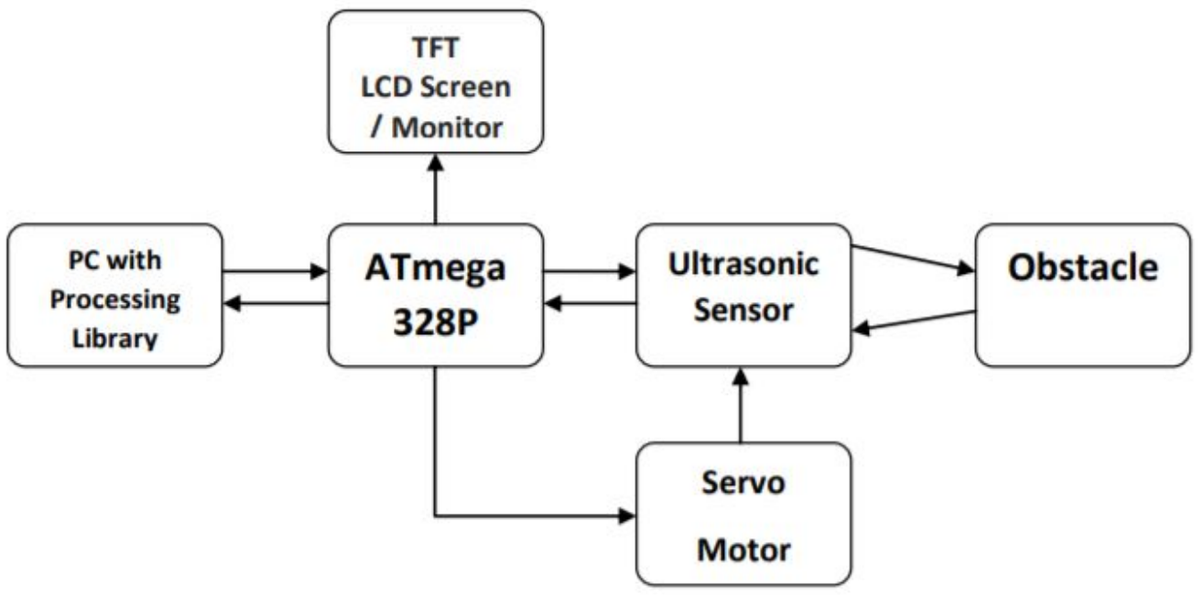
Problem Statement:-

- Target/object detection, recognition position, movement speed, etc. is easy when the object is near or easily visible. But, the same doesn't stand true especially when the object is far or not visible due to so many factors like weather conditions, day/night cycle, etc.
- Therefore, Radio Detection and Ranging (RADAR) was invented, which uses radio waves to determine the range, angle, or velocity of objects. But, it uses long time to detect, has short detection range, not target specific because of wide range, oversensitive, costly, etc.
- A cheaper, easy and effective alternate solution is to use ultrasonic sensor which use sound waves for detection and ranging (SONAR)

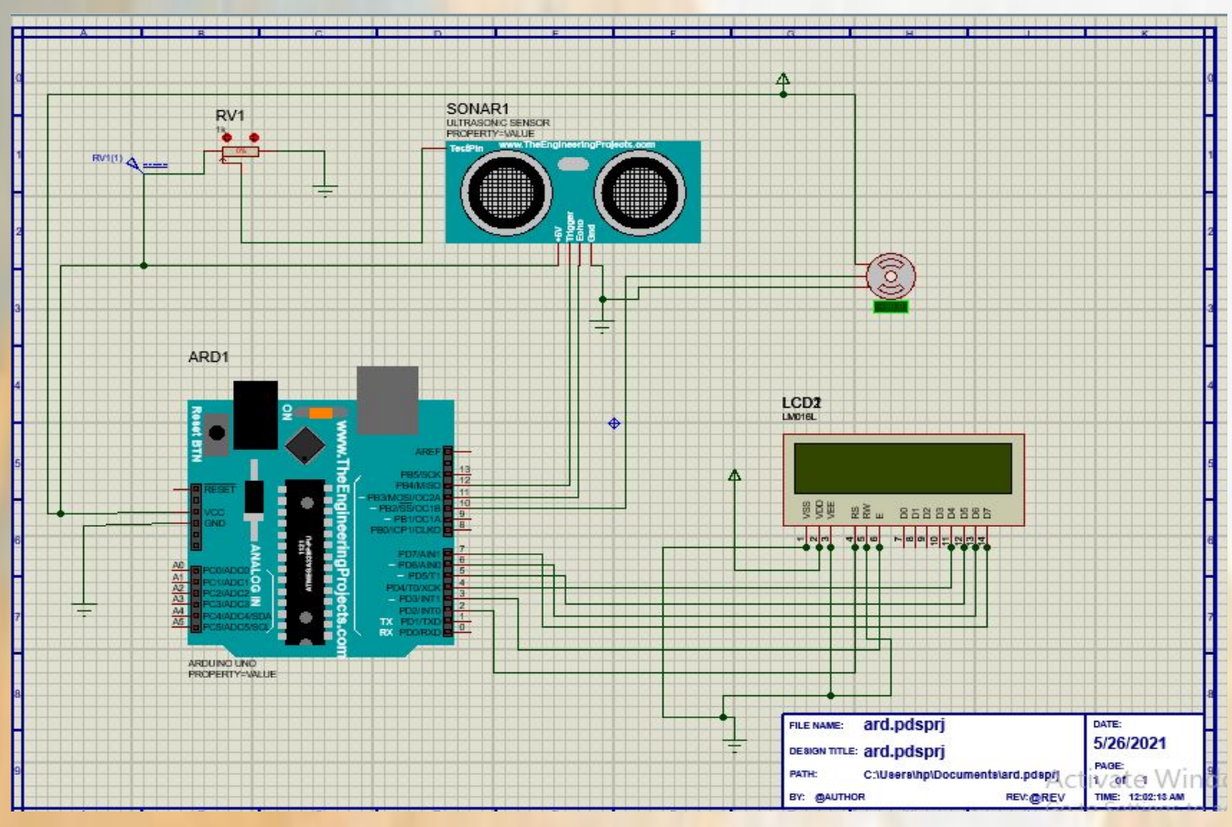
Objective:-

- The basic objective of our design is to ascertain the distance position and speed of the obstacle set at some distance from the sensor.
- Ultrasonic sensor sends the ultrasonic wave in various ways by rotating with help of servo motors. This wave goes in air and gets reflected back subsequent to striking some object.
- This wave is again detected by the sensor and its qualities is analyzed and output is shown in screen indicating parameters, for example, distance and position of object.

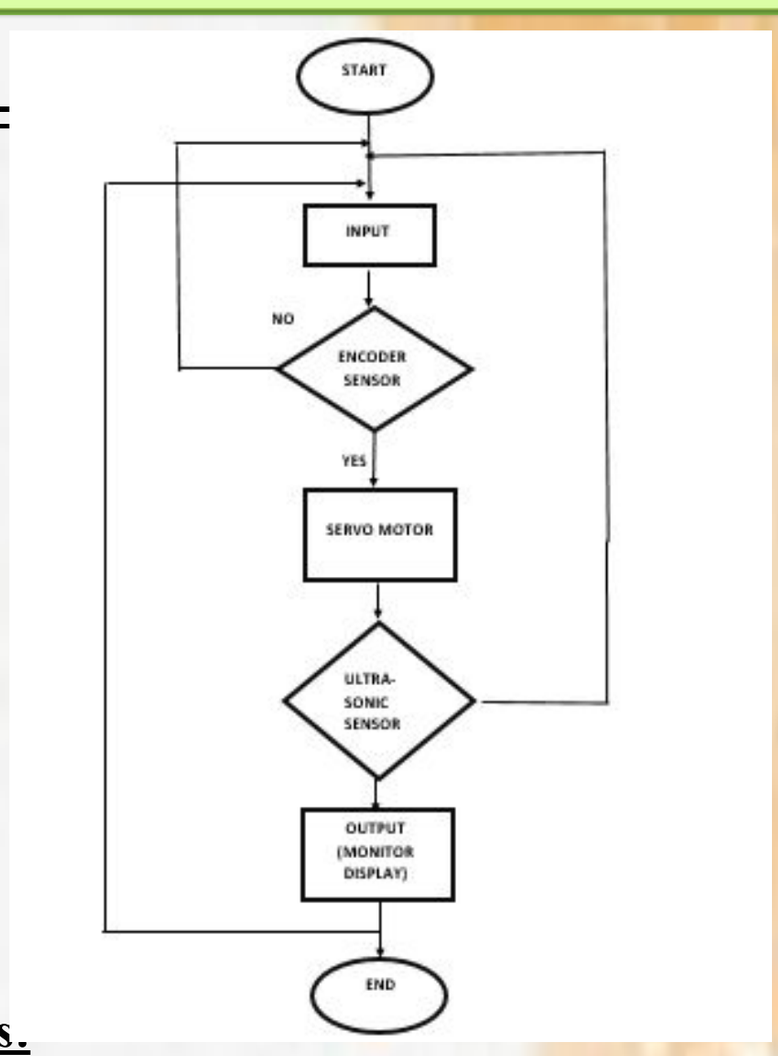
Block Diagram:-



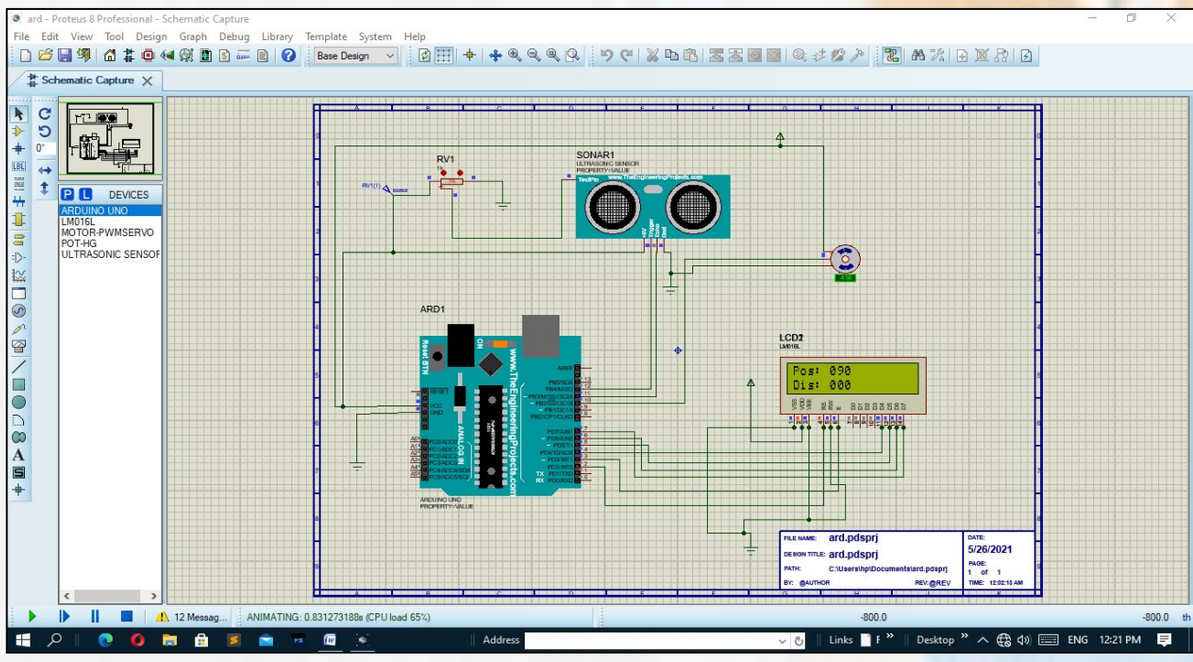
Circuit Diagram:-

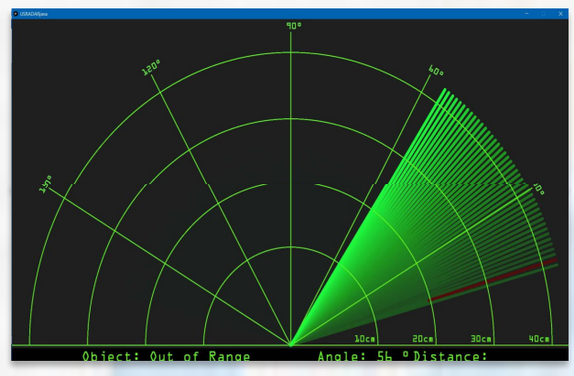


Algorithms Used :-



Simulation Results.





Conclusion:-

SONAR system with a generic configuration to provide real-time updates to its user and hence cancelling out the extra time taken for the communication. The combination of Hardware and Software together governed with a comprehensive algorithm allows the SONAR system to switch between conventional system and smart system with the help of automation which ultimately adds in the ability to establish remote communication without any additional motors or actuators and also saving some room for other features.This also makes the SONAR capable of graphically representing any object within its range. Additionally the Processing app-based range feature helps to map the environment around the system. Furthermore, this data visualization technique saves time on understanding the collected data effectively. So that proper methods can be devised to ease down the problems encountered.

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