Introduction: -

The professions relating to construction, such as architecture, surveying, carpentry, masonry, locksmiths, etc require a very important system which can calculate distance and proximities between an object and a target. This distance can be in form of height, sorting, diameter, positioning, dimensioning and many more. One such application where distance needs to be calculated is of object detection system. In this, objects can be detected for security, counting, inventory or robotic obstacle avoidance. A sensor which can be used for farness determination is ultrasonic sensor. Thus, in this project we calculate distance using ultrasonic sensor and a microcontroller.

Research: -

https://www.keyence.com/ss/products/sensor/sensorbasics/ultrasonic/info/

https://www.migatron.com/distance-measurement-sensors/

Ultrasonic sensors are used around the world, indoors and outdoors in the harshest conditions, for a variety of applications. An object passing within the pre-set range will be detected and generate an output signal. The detect point is independent of target size, material or reflectivity. Precise distance(s) of an object moving to and from the sensor are measured via time intervals between transmitted and reflected bursts of ultrasonic sound. Distance change is continuously calculated and outputted.

Swot Analysis: -

STRENGHTS: The ultimate strength is calculation of distance between target and the object.

WEAKNESS: If the sensor reflects wrong signals, then calculation will give back erroneous distance.

OPPORTUNITIES: The newer technologies can provide accurate distance measurements.

THREAT: Exploitation of time intervals and speed range are one of the threats in this field.

HIGH LEVEL REQUIREMENTS: -

ID	DESCRIPTION	CATEGORY
HLR01	User should be able to calculate accurate distance.	Mathematical
HLR02	Distance calculation should be contactless.	Technical
HLR03	The range of sensor should be minimum of 400cms.	Mathematical

LOW LEVEL REQUIREMENTS: -

ID	DESCRIPTION	CATFORY
LLR01	The system should be cost effective.	Technical
LLR02	Sensor should use sonar waves for reflection.	Technical
LLR03	Distance should be displayed on LCD	Technical

Architecture

Tools: -

- draw.io (https://app.diagrams.net/)
- Microsoft Word
- or any other free tool