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TELEMETERING OF SHIP LOAD WITH SMARTPHONE BASED ON NODEMCU ESP8266

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ABSTRACT---*At the Dockyard there is no device that can measure ship loads. The purpose of this study is to determine and measure ship loads. This study uses protoype of shipbuilding with ultrasonic sensors to determine the rise in water when there is a ship to be measured.*

The load sensor readings will be processed using NodeMcu which is displayed on the Blynk application which can be accessed on a smartphone in the form of water level.

Keywords---*ship load, NodeMcu, Ultrasonic.*

I. INTRODUCTION

The rate of ship accidents is currently increasing. The number of shipping accidents in 2010 to 2016 tripled by 15 events (KNKT Media Release, 2016). One of the factors causing ship accident is overloading of ships and the absence of devices that can indicate the actual number of cargo loads.

Current load measuring devices only measure the amount of load that will be loaded on board. The measurement uses a scale that is placed at the port door, so it does not show the actual weight of the cargo on the ship. Water boundaries on the hull are also often not noticed because there is no direct warning when overloaded.

II. LITERATURE REVIEW

Related to the title of the Report, here are some studies as a reference for making the Report.

Research related to the measurement of ship weight has been investigated by Fajar et al in 2011. The research was carried out by designing gauges and detecting ship weight balance using Loadcell to determine the amount of each load.

Research related to reading of rising water levels was conducted by Andika and Rozeff in 2015, research was conducted by designing a tidal monitoring system and displaying it in a visual form via mobile phones. The research device was made using an ultrasonic sensor to measure water level which was then processed by a Ruspberry pi single-board computer and sent via SMS using the GSM Serial wvecom 1306b modem.

In completing the Report "Prototype Telemetering Ship Load via smartphone based on NodeMcu ESP8266", the reference will be used as a basis or reference in making the system, as well as the basic theory underlying the settlement which includes: NodeMcu ESP8266, ultrasonic sensor HCSR 04

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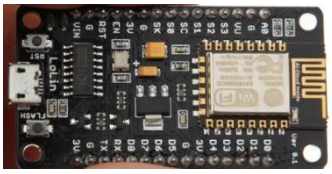
NodeMcu ESP8266

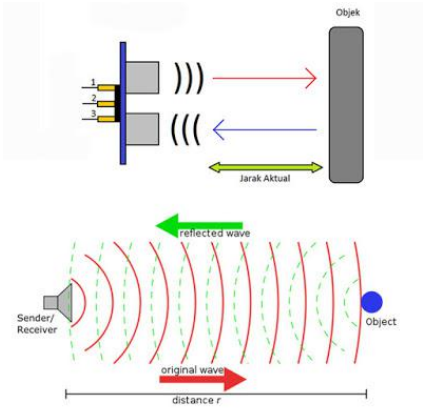
NodeMCU is an IoT platform that is open source. Consists of hardware in the form of System On Chip ESP8266 from ESP8266 made by Espressive System, as well as the firmware used, which uses the Lua scripting programming language. The term NodeMCU by default actually refers to the firmware used rather than the hardware development kit. NodeMCU can be analogous to the ESP8266 arduino board.



Picture 1. NodeMcu

Ultrasonik Sensor HC-SR04

Ultrasonic sensor is a sensor that functions to convert physical quantities (sounds) into electrical quantities and vice versa. How this sensor works is based on the principle of reflection of a sound wave so that it can be used to interpret the existence (distance) of an object with a certain frequency. Referred to as ultrasonic sensors because these sensors use ultrasonic waves (ultrasonic sounds).



Picture 2. How the ultrasonic sensor works

III. IMPLEMENTATION OF ACTIVITIES

Tahap Perancangan Sistem

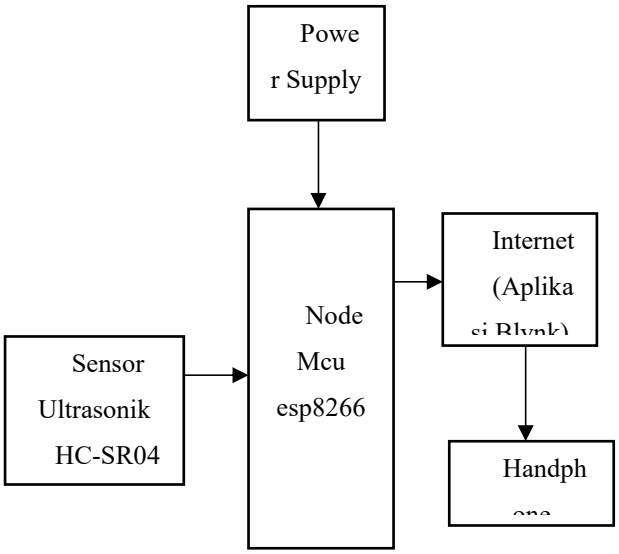
Prototype Telemetering Ship loads via smartphone based on NodeMcu ESP8266. Devices needed are HC-SR04 Ultrasonic Sensor, Node Mcu Esp 8266 and Mobile. The Working Principles are:

1. The HC-SR04 Ultrasonic Sensor functions as a water level detector by using the ultrasonic working principle.

2. NodeMcu functions as a processor of input data from sensors that will be sent via the internet with intermediaries Blynk application.

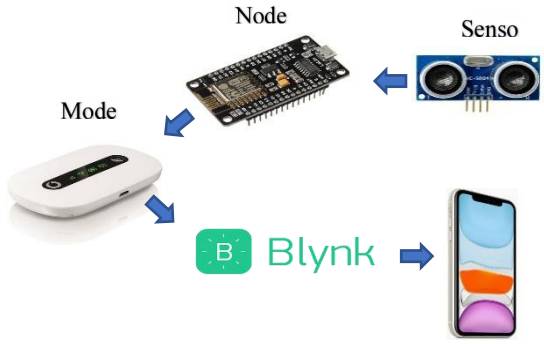
3. Wifi Modem router functions as an intermediary for data communication from NodeMcu to Mobile

4. Smartphone functions as the output level reading display from the Blynk application.

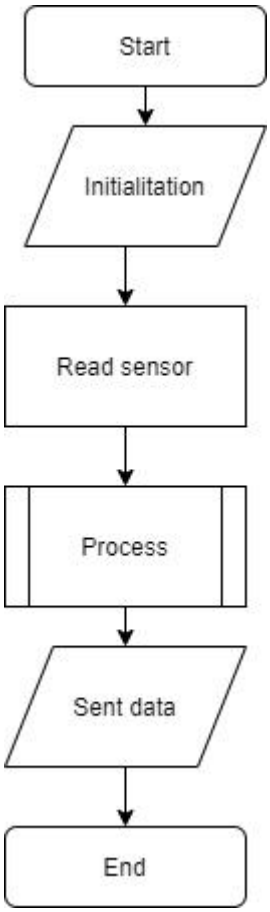


Picture 3. Diagram Block

How the system works



Picture 4. System

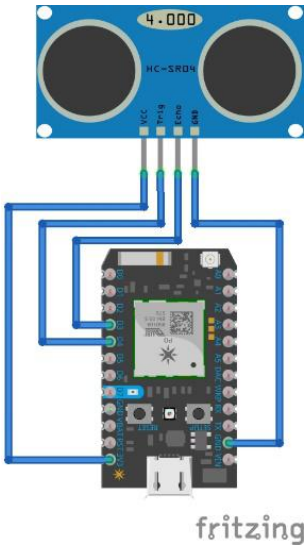


Picture 5. Flowchart

Workpiece Making

The physical layer used is the wifi router as data communication from Node Mcu to Smartphone. Wifi that will be used later is a modem or Thetering using a mobile phone.

Wiring Diagram



Picture 6. Wiring Diagram

Instalation

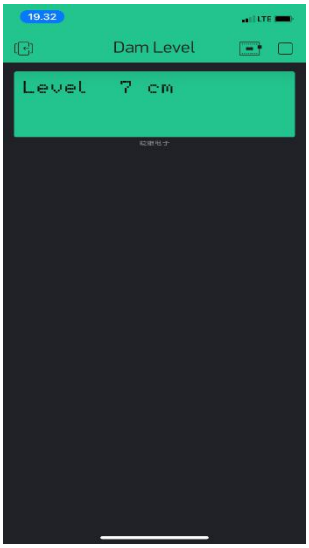
Picture 7.Instalation

Spesification

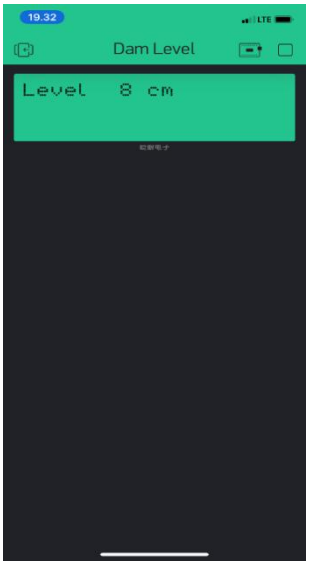
- Supply 5 Vdc
- Minimum distance sensor is 0 cm
- Maximum distance sensor is 10 cm
- Max load 5 Kg

IV Analysis

Experiment Tool



Picture 8. View in Bynk Application



Picture 9. View in Bynk Application

Analysis

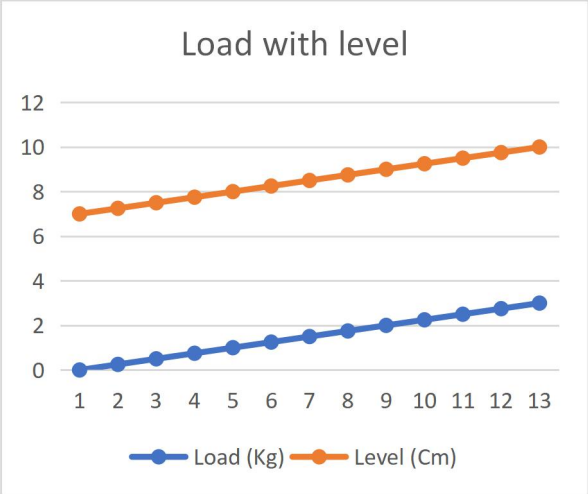
Measurements were made with an initial water level of 7 cm without load.

Tabel 1. Load with level

Load (Kg)	Level (Cm)
0	7

0,25	7,25
0,5	7,5
0,75	7,75
1	8
1,25	8,25
1,5	8,5
1,75	8,75
2	9
2,25	9,25
2,5	9,5
2,75	9,75
3	10

Grafik 1. Load with level



From the measurement results, it can be concluded that if the object load is 3 kg, the water level will be 10 cm, so this shows that every increase in object load is 0.25 kg, the water level rises to 0.25 cm. Or if it's more detailed then every 100 grams the water level rises 1 dm.

IV. CONCLUSION

1. From the measurement results, it can be concluded that if the weight of the object is 3 kg, the water level will be 10 cm, so this shows that every increase in the object load is 0.25 kg, then the water level rises to 0.25 cm. Or if it's more detailed then every 100 grams the water level rises 1 dm.
2. This tool can be applied to the shipyard at the port to determine the load of the ship.

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