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RIVER CLEANING ROBOT

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ABSTRACT

River bodies have been polluted indiscriminately by being subjected towaste generated by industries as well as human being and apart from the soluble waste thereis a lot of insoluble waste which creates a layer on the river body which not only affects the quality of water but also prevents the sunrays to move down the bed of the river seriously affecting the aquatic life within the river. This huge amount of sewage loaded with pollutants,toxic material and debris has also lead to shortage of potable water to be used by humans andposes health hazard to the flora and fauna as well as humans. Considering the above factor we have designed and fabricated a machine which is able to flush out the floating waste fromthe river bodies. The machine is automated with the help of an NRF module This NRF module controls the dc motors fabricated on the machine and helps the machine to move ahead and make various movements on the river to collect the floating garbage. The machine is supplemented by a garbage bin which accumulates the garbage collected. The machine is able to collect floating garbage and thus can be supplemented to be used to cleanvarious small water bodies which otherwise may not be cleaned due to want of funds.

Keywords: Robot, Water, Toxic Materials.

1. INTRODUCTION

The “River cleanup machine” has been utilized in that places where there's waste debris within the water body which are to be removed. This machine is consists of waterwheel driven conveyer mechanism which collect & remove the wastage, garbage & plastic wastages from waterbodies. This also reduce the difficulties which we face when collection of debris is done . A machine will lift the waste surface debris from the water bodies, this may ultimately end in reduction of pollution and lastly the aquatic animal's death to those problems will be reduced. It consists of Belt drive mechanism which lifts the debris from the water.

The use of this project are going to be made in rivers, ponds, lakes and other water bodies for to wash the surface water debris from bodies. Similarly they are lots of problems of water pollution under Godavari River, Nasik which affect the acoustic, human life &beauty of Godavari River. The some photo graphs are shows the pollution near Godavari River Nasik. Waste water is defined because the flow of used water from homes, business industries, commercial activities and institutions which are subjected to the treatmentplants by a carefully designed and engineered network of pipes.

The biggest impact of cleaning the chemical wastes can cause respiratory diseases and it plays a challenging issue for the municipality officers water damage is classified as three types of contaminated water. They are cleanwater, gray water and black water. Clean water isfrom a broken water system line or leaking faucet. Ifnot treated quickly, this water can become blackwater or gray water, counting on length of yourtime , temperature, and get in touch with withsurrounding contaminants. A ditch may be a narrowchannel that's dug at the side of a road or field tohold away the water. Nowadays, albeit automationplays important role altogether industrial applications within the proper disposal of sewages from industries and sewage cleaning remains achallenging task.

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Drainage pipes are used for thedisposal of sewage and unfortunately sometimesthere could also be loss of human life while cleaning the blockages within the drainage pipes. Themunicipality workers are only responsible to ensurethat the sewage is clean or not. Though they cleanthe ditches at the side of buildings, they can't cleanin very wide sewages. The municipality workersneed to get down into the sewage sludge to cleanthe wide sewage. It affects their health badly andalso causes skin allergy

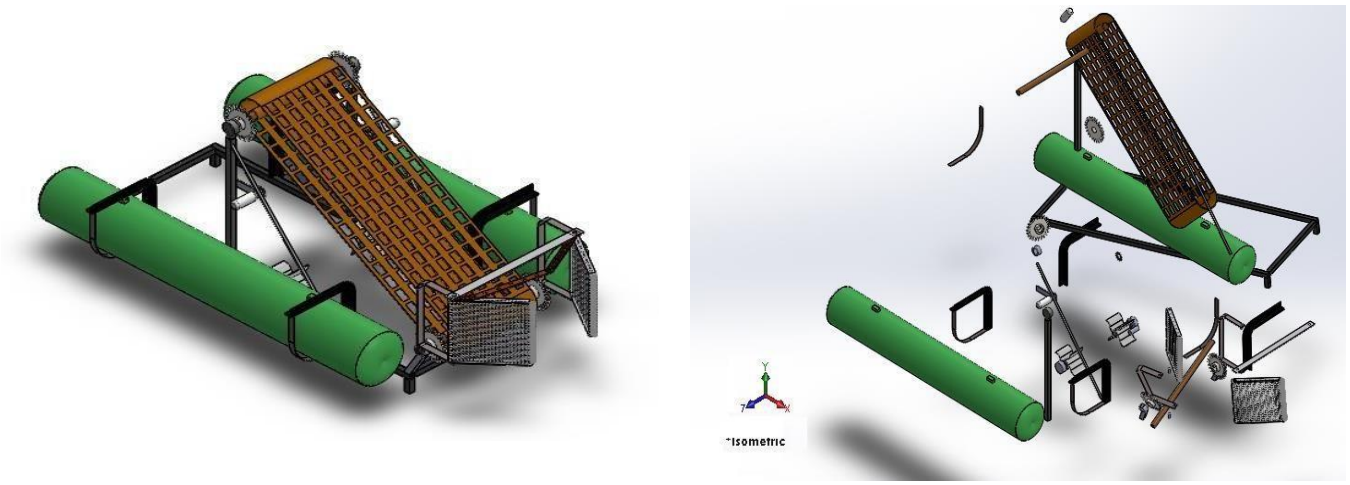

Figure.1: Structure of drive mechanism

Chain drive may be a way of transmitting mechanical power from one place to a different . It is often wont to convey power to the wheels of a vehicle, particularly bicycles and Motorcycles. It is also utilizedin a good sort of machines besides vehicles. The power is conveyed by a roller chain, referred toas the drive chain, passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force.

2. EXISTING METHDOLOGY

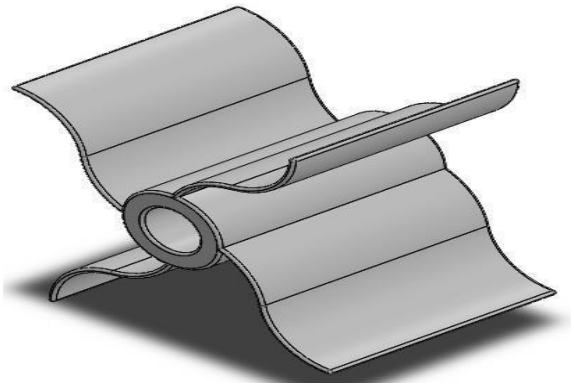

Figure. 2: Propeller

In this project the most aim of this machine is to lift the waste debris from the water surface and dispose them within the tray. Here we are fabricating theremote operated river cleaning machine. The collecting plate and chain drives are rotating continuously by the motor. The collecting plate iscoupled

between the 2 chain drives for collect the waste materials from river. The collected wastages arethrown on the collecting tray with the assistance of conveyer. Our project has propeller which is employed to drive the machine on the river. The propeller is run with the help of two PMDC motor. The total device is controlled by RF transmitter and receiver which use to regulate the machine remotely.

Propeller may be a sort of fan that transmits power byconverting rotational motion into thrust. A pressuredifference is produced between the forward and rear surfaces of the airfoil-shaped blade, and a fluid (such as air or water) is accelerated behind the blade. Propeller dynamics, like those of aircraft wings, areoften modelled by either or both Bernoulli's principle and Newton's third law

3. PROPOSED METHDOLOGY

In modern communication, wireless transmission of received serial data is provided by the RF transmitterat the rate of 1Kbps to 10Kbps. While the transmitted data is received by the RF receiver. The operating frequency range of the RF transmitter and RF receiver is the same. The NRF24L01 is one of the wireless transceiver RF modules used for SPI communication with a 2Mbps transmission speed.It is a single-chip 2.4GHz transceiver module used in data transmission. The HC12, NRF905, 433MHz RF module, Bluetooth, ESP8266, GSM, Xbee, and Lora are the alternatives to the NRF24L01 module. This article gives a brief description of pin configuration, circuit diagram, specifications, features, and applications of the NRF24L01 module.

NRF24L01 Definition:

The NRF24L01 is a wireless transceiver RF module, where each module can send and receive data. Since it operates on the 2.4 GHz ISM band, the technology is approved for engineering applications in almost all countries. This module can cover 100 meters (200 feet) when operated efficiently, making it suitable for wireless remote control projects.

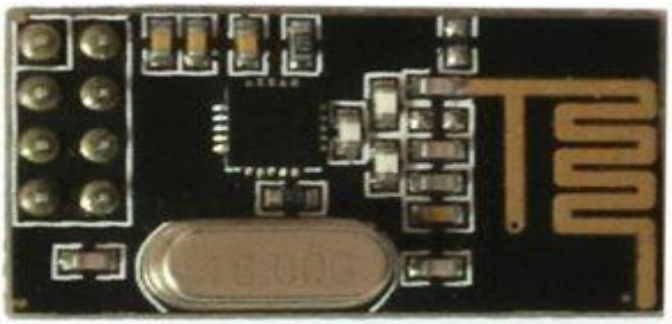

Figure. 3: .NRF24L01 RF Module

NRF24L01 is a radio transceiver module (SPI protocol) used to send and receive data at ISM operating frequency from 2.4 to 2.5 GHz. This transceiver module is composed of a frequency generator, beat controller, power amplifier, crystal oscillator modulator, and demodulator. It consumes only 11.3 mA at 0 dBmtransmit power and consumes 13.5 mA in receive mode.

The NRF24L01 module is powered by 3.3 Volts, so it can be easily used in both 3.2 Volts and 5 Volts systems.Each module has an address range of 125 to communicate with the other 6 modules and also allows several wireless units to communicate with each other in a specified location. Therefore, mesh and other types of networks use this module.

The high over-the-air data rate combined with sleep mode is highly preferred for ultra-low power applications. The internal voltage regulator controls the high power rejection ratio and power band. The module is compactand can be easily used in confined spaces.

Operating Modes

It operates in 3 modes, which are transmitter mode, receiver mode, and transceiver (transmitter and receiver) mode. So, these modes are discussed below.

- In transmitting mode, when the power is 0dBm, then the NRF24L01 uses only 11.3mA current.
- While in receiving mode, it uses only 13.5mA current.
- In the transceiver mode, the NRF24L01 module is used for long-distance and quick transmission of datausing the SPI protocol.

Pin Configuration/Pin Diagram:

The NRF24L01 is an 8-pin wireless transceiver module with special pins that enable communication in all boards and microcontrollers. This device is used for interfacing with an Arduino Or an external microcontroller through the pin functions. The **NRF24L01 pin configuration/pin diagram** is illustrated below.

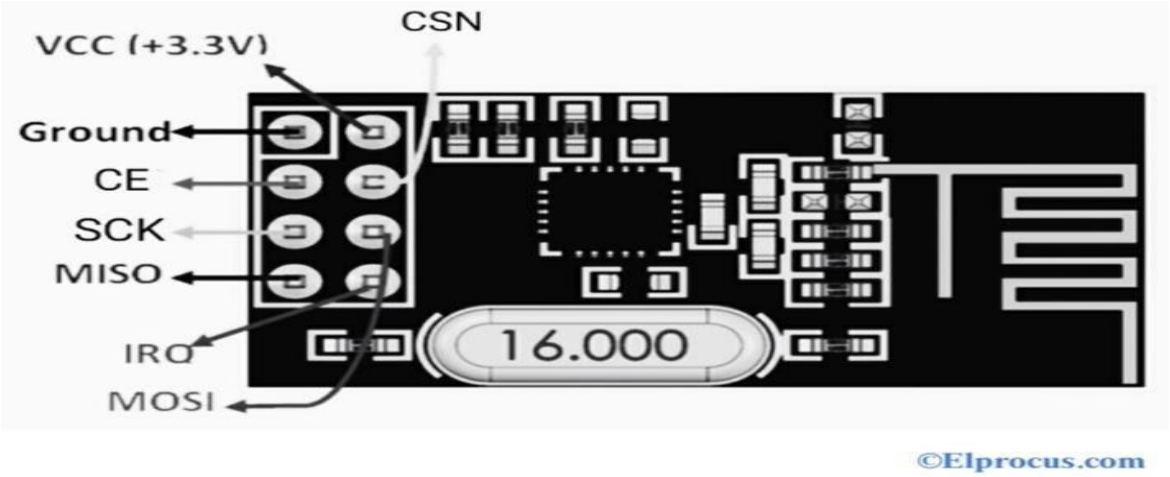

Figure. 4: Pin configuration of NRF24L01NRF24L01 Pin Diagram

- **Pin 1 (GROUND/Vss):** It is a common ground connection for the system.
- **Pin 2 (VCC):** It refers to the power supply pin of 3.3 Volts given to the module. The NRF24L01 module contains two power supply pins for operation.
- **Pin 3 (CE):** Chip Enable: It is an input pin that enables the control of data transmission and reception in transmitter and receiver modes. It activates the SPI communication.
- **Pin 4 (CSN): Chip Select Not:** It is an active-high pin, which can send the device an SPI command or canget the data from the chip on the SPI bus. It provides communication between the module and the microcontroller. When it is active low, then the SPI is disabled and the NRF24L01 starts listening to dataon the SPI port for processing.
- **Pin 5 (SCK): Serial Clock**: It refers to the clock pulse of the NRF24L01 to enable the SPI communication. It transmits the data between the microcontroller and the module according to the clock pulse.
- **Pin 6 (MOSI): Master Out Slave In** The transmitted data via SPI by the microcontroller is received by the NRF24L01 module. Here the microcontroller acts as a master and the NRF24L01 acts as a slave. Thispin refers to the MOSI pin connection on the microcontroller SPI interface. Note that the NRF24L01 module never sends the data without the first request of data by the microcontroller.

- **Pin 7 (MISO): Master In Slave Out:** It is connected to the MISO pin of the microcontroller. Data transmitted from the NRF24L01 module via the SPI bus is received by the microcontroller. Here the NRF24L01 module acts as a master and the microcontroller acts as the slave.
- **Pin 8 (IRQ): Interrupt Pin:** It is an active low pin. This module contains 3 interrupt pins and generates an interrupt whenever the new data is available on the SPI bus. It is also used for

Pin 9 (XC2): It is used for crystal analogue output pin.

Pin 10 (XC1): It refers to crystal analogue input pin. **Pin 11 (VDD_PA):** It is used as a power amplifier. **Pin 12 (ANT1):** It is used for interfacing antennas. **Pin 14 (ANT2):** It is used for interfacing antennas.

Pin 15 (VSS): It refers to the common ground connection. The module contains two common groundconnections for operation with the microcontroller.

Pin 16 (IREF): It is used for reference current.

Pin 17 (DVDD): It refers to the digital positive supply for decoupling.

4. CONCLUSION

Thus we have been able to develop a bot which is ableto move on the surface of the water. The bot are oftencontrolled using an RF remote . The remote is used to control the dc motors which are able to provide forward , reverse , left and right movement. Apart form this the bot is able to collect the garbage withthe help of the wings which continually flap over the water. Once the wings grab the garbage, the garbageis pushed on to the belt which carries the garbage anddrops it into the waste bin attached with the bot.Thus this bot is able to pick the floating garbage and isable to clear the surface of the water from such floating objects. This project has been developed after a through literature revive so as to maximize the flexibility in operation. The project has been developed with basic material and is cost effective and had been successful in removing the floating garbage on the water surface .The basic challenge has been to design a black box which houses the RF receiver. Further work can bedone on integrating the system to an IoT and AndroidApplication along with cloud. The machine can beoperated from anywhere in the world using a customized android application and the system can be integrated with cloud to store data related to the amount of garbage collected and the data can be used by the government authorities to have a tab on levelof pollution in the water bodies and can help them to focus on revising policies related to water pollution. The battery is one of the issue which need to be dealt out. Switching the system on to the solar power cando the trick thus further work can be carried in the direction of integrating the system with solar power.

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