

# OIL SKIMMER BOAT WITH OCEAN MONITORING SYSTEM

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## ABSTRACT

A gadget called a "oil skimming robot" can be utilized to clean the ocean by removing oil from the surface of the water. Marine life has been negatively impacted by oil spills that have polluted the ocean. To that end, we've been working on a little boat that can skimmer oil from water. Our oil skimming robot is equipped with a control circuit, a 12v battery, two motors, an L293D driver, an ESP32 controller, a relay, and a pump. The L293D motor driver ic can convert a low-current signal into a high-current one, and it can operate two DC motors in opposite directions at the same time. The basic setup consists of hooking up the motors to the driver and the power supply circuit; we utilised a battery to provide 12v power; the Esp32 is responsible for guiding and controlling the robot; and the relay allows for hands-free on/off operations. Among its many potential uses is the extraction of oil from

water, whether it is a river, lake, ocean, or marine layer.

## 1. INTRODUCTION

The worst unintentional oil leak ever occurred on March 14, 1910, when a wellhead burst in the Midway-Sunset oilfield in California. The apparatus encircling the drilling location was obliterated as a pillar of sand and oil surged over fifty meters into the air. Compared to the 2010 Deepwater Horizon oil leak, the Lakeview Gusher Number One's 1.4 million cubic meters of crude oil spill was more than double that quantity. By October, the gusher had been contained thanks to the sand bags that workmen had used. The remaining oil was either allowed to evaporate or sank into the earth; just half of it was collected. According to the San Joaquin Geological Society (2013)... A great shift in consciousness about the need of protecting the environment has taken place in the time since. According to

Eurobarometer(2005),water contamination is the number one environmental issue for the European population today. Many attribute this in large part to the Deepwater Horizon disaster, which released a plethora of oil into the Gulf of Mexico. Oil skimming is a mechanical technique that may be used to remove oil from water and is one way to deal with oil spills. The only practical way to extract the oil on a big scale is via skimming, which may be done using a number of different processes. (The year, 2013) Oil skimming in particular saw a spike in interest in oil spill cleanup and technology due to the thorough media coverage of the Deepwater Horizon disaster. Nevertheless, skimmers are also employed in industrial settings to collect lubricants and tramp oils; for example, skimmers are utilized in steel mills and food processing facilities. Violent rivalry between established, multinational firms and new, inventive upstarts defines the complicated competitive environment of the modern era. Businesses in this sector are always on the lookout for new ways to grow and put their strengths to use. Companies are increasingly targeting environmental and social sustainability as a means to attract new customers, thanks to the growing political and social consciousness around these issues. at 1901, Sandvik Process Systems made their first steel belt at Sandviken. Ever since then, they have been a leading force in several processing technologies that utilize steel belts. In the 1960s, an oil skimmer was created using steel belt technology as a way to separate and expand. Skimming saw a brief uptick in activity before fading away as competitors sprung up offering more lucrative alternatives.

## 2. LITERATURE SURVEY

The oil skimming industry is rife with startups and promising technology, but it has yet to reach maturity. We discovered that the skimming business is not structured like other industries when we started reviewing the literature. We organized conversations with experts to help us avoid common mistakes and find the right books fast. Oil skimming and related applications were the focus of four interviews with specialists from several domains.

- Lecturer in Industrial Ecology at the Royal Institute of Technology, Per-Olof Persson: The topic of oil skimming has come up several times in Mr. Persson's lectures on technical environmental protection. Mr. Persson is also well-versed in the several oil varieties and processing techniques.
- Orjan Nilsson is the person in charge of the oil skimmer at Sandvik Process Systems and has tested it. He works in application technology and is responsible for purchasing. The data on the oil skimmer's present uses is likewise kept by Mr. Nilsson.
- Those in charge of rescue operations at the Swedish Coast Guard's regional control center, Tommy Carlsson and Lars Mattson: It was Mr. Carlsson and Mr. Mattson's responsibility as rescue coordinators for the Swedish Coast Guard to organize rescue efforts in response to oil spills. They are also well-versed in the available technological solutions

since they have been actively buying new equipment to deal with oil spills.

- Surf-Cleaner's CEO, Jonas Johnson: Mr. Johnson has first-hand knowledge of the oil skimming market's evolution and dynamics as CEO of an organization that makes oil skimming equipment. Mr. Johnson's knowledge of the oil skimming industry and its latest innovations complements Surf-Cleaner's cutting-edge offering. 15 A semi-structured format was used for the interviews. While we did have some questions prepared, we really pushed our interviewees to think deeply about the topics we covered and provide thoughtful responses. In order to go on with the literature study, these interviews served as a springboard for further exploration.
- Few books and articles have covered oil skimming because it is still a relatively new industry. Rather, the majority of the data came from in-depth interviews with market participants. We traveled to Houston, Texas, USA, to attend the 2013 Offshore Technology Conference as a way to contact a large number of firms simultaneously. While at the conference, we had meetings with many firms involved in oil spill response and oil skimming equipment manufacturing. Several unstructured interviews took place on the exhibition floor as a consequence of the conference, which provided valuable market information; these interviews were

then supplemented with follow-up email correspondence.

### 3.Block diagram

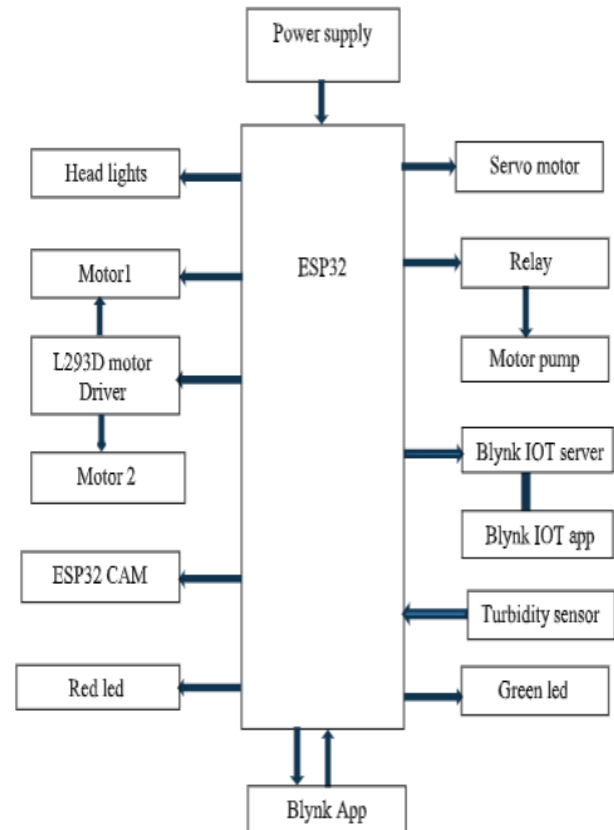


Fig.3.1 Block diagram

#### 3.1 ESP8266

Typically, an Arduino comes to mind when we consider incorporating a microcontroller into a project. It's cheap, user-friendly, and packed with digital I/O ports plus a few of analog inputs. Despite its many advantages, the Arduino is deficient in certain respects. If we're talking about speed, the most well-known Arduino AVR boards operate at 16MHz. While that may be quick enough to construct hundreds of apps, it becomes a stumbling block for others. The Arduino's digital inputs and outputs are more than enough to meet most needs, and the analog

inputs are handy as well. However, third-party components are needed to add capabilities such as Wi-Fi and Bluetooth. The Arduino, come on! It's been around since 2005. In technological terms, that's one hundred and fifty years. Espressif Systems of Shanghai makes a line of microcontroller chips that go by the name ESP32. It comes in a variety of affordable packages.



Fig.3.2 ESP-Wroom-32 module

### 3.2 L293D Motor Driver

An easy-to-use and user-friendly interface for embedded applications is provided by the L293D motor driver. The L293D motor driver is attached to a high-quality, one-sided, non-PTH printed circuit board. To facilitate access to the pin functionalities of the L293D motor driver IC, the IC's pins are attached to connectors. With a supply voltage of up to 24V, the L293D, a dual full bridge driver, can drive up to 1Amp per bridge. One or more DC motors, relays, solenoids, etc., can be driven by it. You may use it with any TTL sensor. If you want to make its current capacity 2 Amp, you may connect two L293D H bridges in parallel.

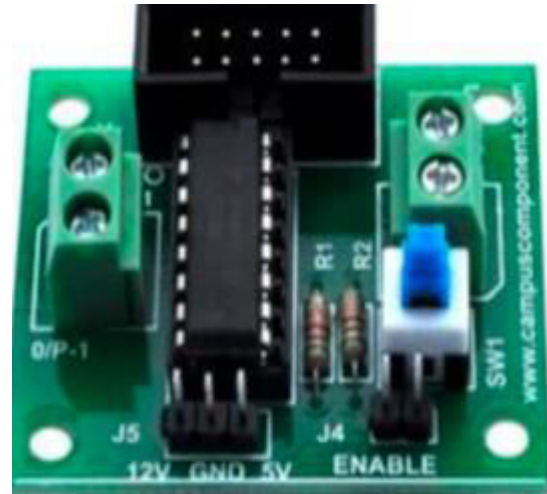


Fig 3.3 L293D Motor driver.

### 3.3 Relay

In electronics, relays are the most prevalent switching devices. Unlike transistors, which have a maximum current flow limit and can't switch AC loads, it can readily switch high current loads. Whether your load is AC or DC, this 5V 1A Relay Module can switch it. Electromagnetic switches are able to turn high-current circuits on and off by applying a tiny current to an internal coil. It may be immediately connected via the PCB screw connections. Electronic circuits can use them to turn appliances on and off, safety circuits can use them to connect or disconnect heavy loads in case of danger, and they have many automotive uses, such as powering the windshield wipers, fuel pump, cooling fan, and power windows.

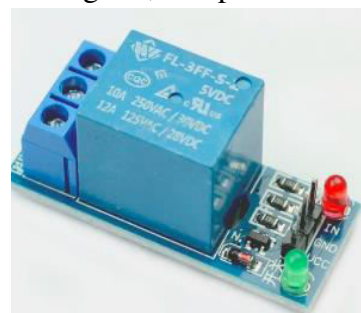


Fig.3.4 Relay

### 3.4 PUMP

Pump Mini submersible DC 3-6v micro pump for garden fountains and other small water circulation systems, ideal for do-it-yourself projects underwater pump that operates from 3 to 6 volts tiny submersible water pump-micro DC water pump for do-it-yourself projects, adjustable from 3 to 6 volts motor for small submersible pump This is a compact submersible pump motor that operates from a power source ranging from 2.5 to 6V and is inexpensive. It uses just 220 milliamperes of power and can handle up to 120 liters per hour. All you have to do is plug in the engine, attach the tube, and then submerge it in water. Keep the water level above the motor at all times. Not only will the dry run be noisy, but it might heat up the engine to the point where it damages it.



Fig 3.5 Pump

### 3.5 Turbidity Sensor

The water quality may be determined using the Arduino turbidity sensor by tracking the turbidity level. In order to detect particles in suspension, it compensates for fluctuations in the concentration of total suspended solids (TSS) in water by tracking changes in light transmittance and scattering rate. Turbidity of liquids increases as a function of TTS. Tomson Electronics, located in Kochi, Kerala, India, sells Turbidity Sensor Modules of the best quality. This arduino

turbidity sensor gives you the option to output digital or analogue signals. Pick the mode that goes with the MCU since you can change the threshold in digital signal mode. Turbidity sensors may measure the clarity of water in a variety of settings, including streams and rivers, wastewater and effluent, sediment movement, and laboratory experiments. Tomson Electronics of Kochi, Kerala, India makes turbidity sensors that are used to monitor the turbidity of water in washing machines and dishwashers. The 165D6042P003 is capable of measuring both turbidity and temperature. By just cleaning for the amount of filth that the level indicates, appliances can conserve electricity. You may use it with a variety of microcontrollers, including the Arduino Uno and the Raspberry Pi Zero W.



Fig 3.6 Turbidity Sensor

### 3.6 ESP32 CAM

The OV2640 camera module with the original ESP32 CAM WiFi+Bluetooth module board make up the ESP32-CAM. Built on top of the ESP32 platform, this device also has the option to use a camera. That implies you may use the OV2640 camera module as an add-on and still take advantage of the ESP32's features, such as WiFi and Bluetooth connection. Numerous Internet of Things (IoT) applications may now take use of this. It is a strong camera despite its diminutive size, and it requires very little in the way of system assistance to function. It comes in a ribbon cable arrangement. A 2.0 megapixel UXGA



sensor powers the camera. The sensor's native resolution is 1600 by 1200. It works well with the majority of camera-based Internet of Things applications.

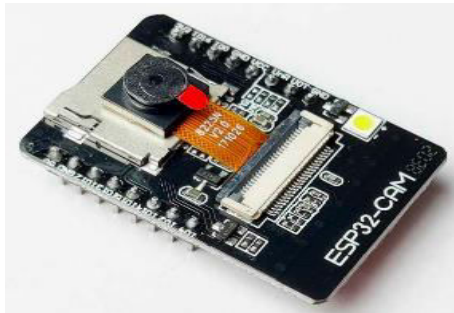


Fig.3.7 ESP32 CAM

**3.7 SERVO MOTOR**

Mini servo motors like the Tower Pro SG90 9g are RC enthusiasts' go-to choice. Positioning robot arms and tools in machining equipment are two examples of control applications that rely on servo motors for precise control. Typically, servo motors offer control across a whole circle. Because the PWM approach is used to regulate the motor's angular position, the duty cycle may be varied to control the angular position. This servo motor has a maximum lifting capacity of 1.6 kg when hanging 1 cm from the shaft. In addition to RC car steering systems, robotic arms, CNC machines, and other automation and robotic applications, it has a wide range of potential uses.



Fig.3.8 Servo motor.

**4. Schematic Diagram**

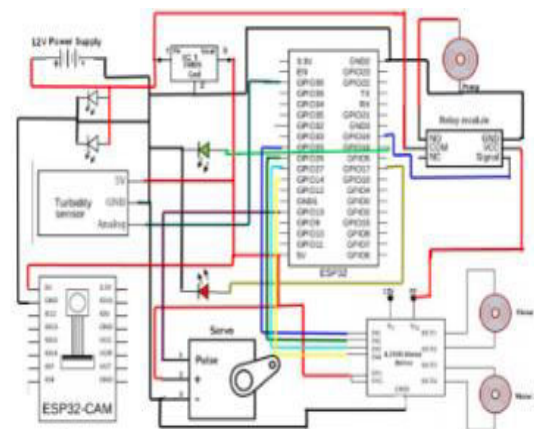


Fig 4.1 Schematic Diagram

**5. Flow Chart**

Fig 5.1 Flow Chart of this Project

**6. RESULT AND CONCLUSION**

When used properly, this oil skimmer may remove oil from water's surface with relative ease. Also, any industry that disposes of waste oil, such as oil refineries located near the water, uses it. The sea swarm can be utilized by the deep-water horizon rig locations in the event of a mishap.



Fig 6.1 Pump is on

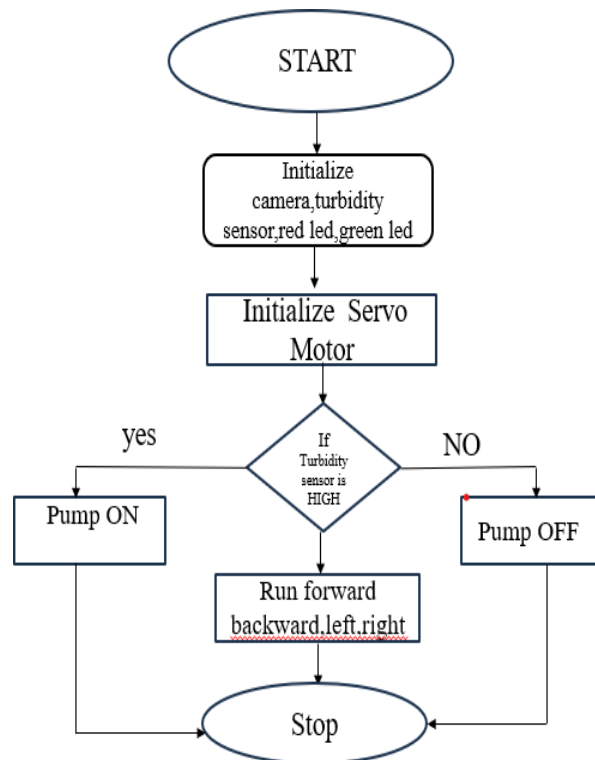


Fig 6.2 Oil is detected

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