Modern Academy **for** *Computer Science* **&** **Management** *Technology*

Smart Mini-Boat

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Abstract:

To begin, a Mini-boat is a new way to save cases of drowning in public beaches, tourist facilities, ships and floating oil companies, The fun part is that people can use it for swimming and free diving. And we can control it by a remote control, website and a bracelet that is attached with a life jacket. The bracelet has a big role in rescuing the people in the public beaches and the tourist facilities as a solo role.

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Chapter1: Introduction

Drowning is fast and silent. It can happen in as little as 20-60 seconds. Drowning doesn’t always look like we would expect. that is making drowning a major public health problem, so to So to reduce this death limit, We’ve came with an idea that will help a lot.

Why smart mini-boat, and who will use it?

Drowning is the 3rd leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths. The world health organization estimated 320,000 annual drowning deaths worldwide.

What is a Mini-Boat?

Our smart mini-boat have 3 ways of rescuing people
-First way is an Wide range remote control: So, instead of delays that is caused by beach guards, they will take control of the remote control to reach the drowning people much earlier that a human can.

-Second way is a mobile application: By the mobile application beach guards and people who care about people who go beaches or snorkeling will be able to take control of the smart mini-boat to help them

-Third way is a wearing a bracelet: The bracelet will be made specially for hotels and people who go snorkeling, They will wear the bracelet which will have sensors and tracking options that will help find these people easily and track their health condition, if something unusual happened the bracelet will send signals or messages to nearby people to help saving the drowning person.

Difference between Mini-boat And regular Lifeguard?

A lifeguard

Is a rescuer who supervises the safety and rescue of swimmers, surfers, and other water sports participants such as in a swimming pool, water park, beach, spa, river and lake. Lifeguards are trained in swimming and CPR/AED first aid, certified in water rescue using a variety of aids and equipment depending on requirements of their particular venue. In some areas, lifeguards are part of the emergency services system to incidents and in some communities, lifeguards may function as the primary EMS provider.

Mini-Boat

It will replace the lifeguard to rescue the people, it will be faster than the lifeguard which is required in saving cases of drowning because the time in cases of drowning is limited. He needs to be rescued quickly, Thus, the chance of survival will be better because there is no human intervention here. This is because the drowning person can cause the savior to drown, and this is because he is in an unconscious state.

There is another attachment, the bracelet and the rescue jacket, and they are used to track the condition of the person wearing them through the sensors in the bracelet. Through the data that

the bracelet will collect on the basis of it, it will send an alarm, and then it will open a small oxygen tube inside the rescue jacket. And here the person will float on the face of the water, and from here he will be rescued with our mini-boat

Features of Mini-boat

- Faster
- Safer
- Track person status.

Advantages of Mini-boat

- Decreased the number of drowning cases.
- Time-saving in case of rescue.
- Ease of control.
- Self save by bracelet.

Disadvantages of Mini-boat

- Prone to Hacking.
- Fewer job opportunities for others.
- Less battery life.

Chapter2: Design

Hardware requirements:

- Maquette
- Water jets
- Batteries
- DC-Motors
- Arduino Nano
- NRF24L01
- ESP32 Camera module
- ESP8266
- Electronic boards
- Life Jacket
- Air Flow
- Oxygen Tube
- Heart-rate sensor

Software requirements:

- Website

Languages used:

- C / HTML / CSS / PHP

Maquette

Fiberglass is a common type of fiber-reinforced plastic using glass fiber. The fibers may be randomly arranged, flattened into a sheet called a chopped strand mat, or woven into glass cloth.
The plastic matrix may be a thermoset polymer matrix most often based on thermosetting polymers such as epoxy, polyester resin, or vinyl ester resin or a thermoplastic.

Cheaper and more flexible than carbon fiber, it is stronger than many metals by weight, non-magnetic, non-conductive, transparent to electromagnetic radiation, can be molded into complex shapes, and is chemically inert under many circumstances. Applications include aircraft, boats, automobiles, bath tubs and enclosures, swimming pools, hot tubs, septic tanks, water tanks, roofing, pipes, cladding, orthopedic casts, surfboards, and external door skins.

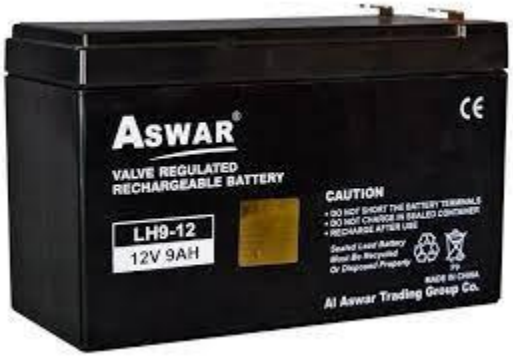
Carbon-fiber-reinforced polymer is a similar composite material in which the reinforcement fiber is carbon fibers.

Polyester resins are synthetic resins formed by the reaction of dibasic organic acids and polyhydric alcohols. Maleic anhydride is a commonly used raw material with diacid functionality in unsaturated polyester resins.
Unsaturated polyester resins are used in sheet moulding compound, bulk moulding compound and the toner of laser printers. Wall panels fabricated from polyester resins reinforced with fiberglass—so-called fiberglass reinforced plastic (FRP)—are typically used in restaurants, kitchens, restrooms and other areas that require washable low-maintenance walls. They are also used extensively in cured-in-place pipe applications. Departments of Transportation in the USA also specify them for use as overlays on roads and bridges. In this application they are known as PCO Polyester Concrete Overlays. These are usually based on isophthalic acid and cut with styrene at high levels—usually up to 50%. Polyesters are also used in anchor bolt adhesives though epoxy based materials are also used. Many companies have and continue to introduce styrene free systems mainly due to odor issues, but also over concerns that styrene is a potential carcinogen. Potable water applications also prefer styrene free.
Most polyester resins are viscous, pale coloured liquids consisting of a solution of a polyester in a reactive diluent which is usually styrene, but can also include vinyl toluene and various acrylates. □

Water jets

Water jet units are used by many types of industries and by contractors who provide specialty-cleaning services to those industries. They are also widely used by the surface prep industry to remove all sorts of paints and coatings

Batteries



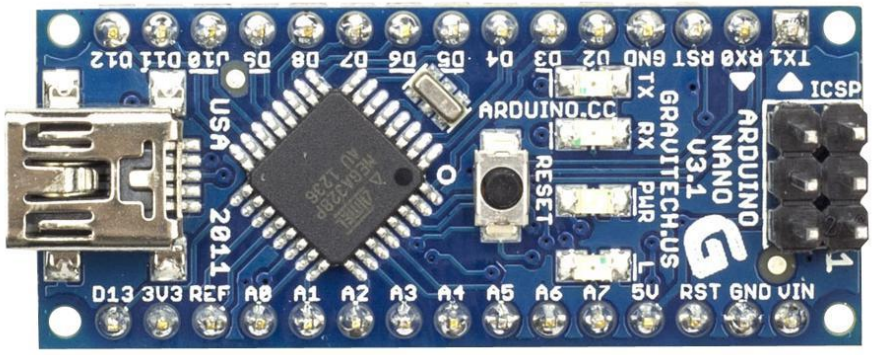
- Genuine ExpertPower Battery - The Most Trusted And Highest Reviewed Sealed Lead Acid Batteries
- Battery Type - 12 Volt 9 Amp 20 Hour Sealed Lead Acid Battery With "F2" Style Terminals
- Ease Of Mind -All Of Our Batteries Are MAINTENANCE FREE and VALVE REGULATED
- AGM Tech - Utilizes Absorbed Glass Mat (AGM) Technology And Has A Wide Temperature Range
- User Friendly - Easy Installation With a Very Durable And Rugged Construction

We've used four batteries to produce 48V, which is required to turn on the DC Motors.

DC-Motors

Working voltage: 12-48VDC
Power: 400W
ROV: 3000-12000r/min 12V-3000r/min,24V-6000r/min,36V-9000r/min,48V-12000r/min
Torque: 500mN.m
Isolating resistance: >2 tera ohm
Insulating dielectric strength: 400v
Diameter: 52mm
Length of collet: 35mm,including screw 43mm
Diameter of the collet: 16mm
Total length: 185mm
Wind cooling system, duty cycle: 8hr
Spindle runout of about 0.01-0.03.
Can be used for engraving metal or non-metal materials.
The spindle comes with forced air cooling, can work long hours.

Arduino Nano



The **Arduino Nano** is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor.

The Arduino Nano is equipped with 30 male I/O headers, in a DIP-30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline. The board can be powered through a type-B mini-USB cable or from a 9 V battery.

Technical specifications

- Microcontroller: Microchip ATmega328P
- Operating voltage: 5 volts
- Input voltage: 6 to 20 volts
- Digital I/O pins: 14 (6 optional PWM outputs)
- Analog input pins: 8
- DC per I/O pin: 40 mA
- DC for 3.3 V pin: 50 mA
- Flash memory: 32 KB, of which 0.5 KB is used by bootloader
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock speed: 16 MHz
- Length: 45 mm
- Width: 18 mm
- Mass: 7 g
- USB: Mini-USB Type-B
- ICSP Header: Yes
- DC Power Jack: No

NRF24L01

NRF24L01 is a single chip radio transceiver for the world wide 2.4 - 2.5 GHz ISM band. The transceiver consists of a fully integrated frequency synthesizer, a power amplifier, a crystal oscillator, a demodulator, modulator and Enhanced ShockBurst™ protocol engine. Output power, frequency channels, and protocol setup are easily programmable through a SPI interface. Current consumption is very low, only 9.0mA at an output power of -6dBm and 12.3mA in RX mode. Built-in Power Down and Standby modes makes power saving easily realizable.

ESP32 Camera module

ESP32-CAM WiFi – WiFi Module ESP32 serial to WiFi ESP32 CAMERA Development Board – 5V Bluetooth with OV2640 Camera Module

Product Features

- Onboard ESP32-S module, supports WiFi + Bluetooth + OV2640 Camera
- Low-power dual-core 32-bit CPU for application processors
- Main frequency up to 240MHz, computing power up to 600 DMIPS
- Built-in 520 KB SRAM, external 4M PSRAM
- Supports interfaces such as UART/SPI/I2C/PWM/ADC/DAC

- Include Camera OV2640 and can support OV7670 camera (not included) , built-in flash
- Support image WiFi upload
- Support TF card
- Support multiple sleep modes
- Embedded Lwip and FreeRTOS
- Support STA/AP/STA+AP working mode
- Support Smart Config/AirKiss one-click distribution network
- Support secondary development

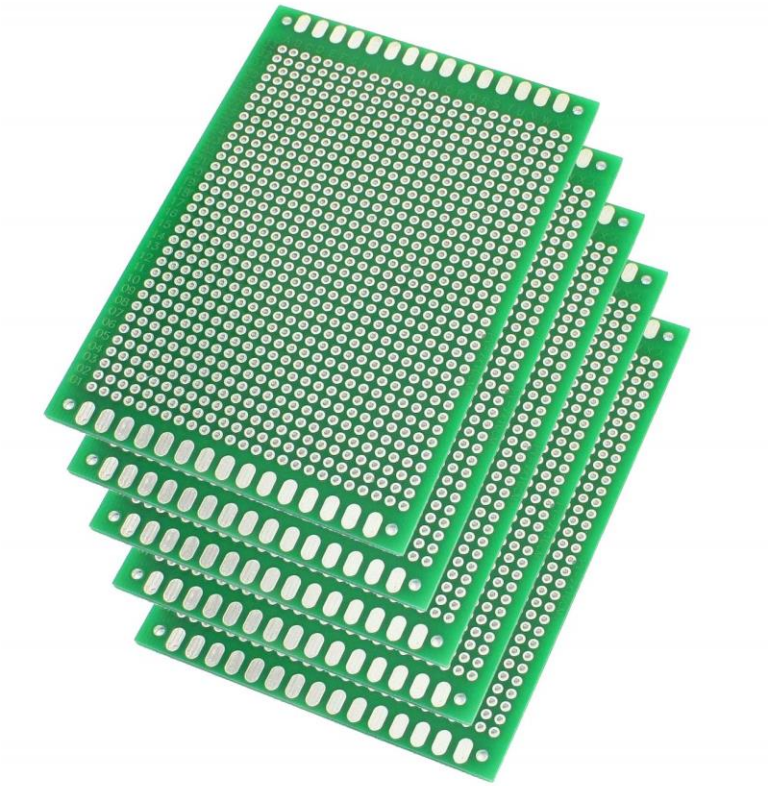
ESP8266

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

Technical Specifications

- Processor: L106 32-bit RISC microprocessor core based on the Tensilica Xtensa Diamond Standard 106Micro running at 80 MHz[5]
- Memory:
  - 32 KiB instruction RAM
  - 32 KiB instruction cache RAM
  - 80 KiB user-data RAM
  - 16 KiB ETS system-data RAM
- External QSPI flash: up to 16 MiB is supported (512 KiB to 4 MiB typically included)
- IEEE 802.11 b/g/n Wi-Fi
  - Integrated TR switch, balun, LNA, power amplifier and matching network
  - WEP or WPA/WPA2 authentication, or open networks
- 16 GPIO pins
- SPI
- I²C (software implementation)[6]
- I²S interfaces with DMA (sharing pins with GPIO)
- UART on dedicated pins, plus a transmit-only UART can be enabled on GPIO2
- 10-bit ADC (successive approximation ADC)

Electronic boards



DESCRIPTION

This universal double-sided prototyping board is 4 x 6 cm (1.6 x 2.4″) in size with standard hole pattern on 2.54mm (0.1″) centers.

PACKAGE INCLUDES:

- PCB, 4 x 6 cm Universal Prototype Board

KEY FEATURES OF PCB 4 X 6 CM UNIVERSAL PROTOTYPE BOARD:

- 4 x 6 cm (1.6 x 2.4″) outside dimensions
- 1.6mm (0.64″) thickness
- FR-4 double-sided construction with green solder mask
- Holes on 2.54mm (0.1″) centers in grid pattern with alphanumeric grid marked along edges of the board.
- Holes are plated through with same pad pattern on both sides of the board.
- Edge solder pads are on 2.54mm (0.1″) centers
- HASL (SnPb) plating over copper for best solderability

These boards are useful for permanently mounting components and wires via soldering when a project is put into permanent use.

Some circuits with high energy or high frequency such as DC-DC converters or high power MOSFETs need to be prototyped on boards of this type rather than using solderless breadboards since the components need to be placed closely together with robust connections that can handle heavy current transients.

Life Jacket

LifeJackets work on the principle of buoyancy, i.e. the amount of water displaced by an object is equal to its weight. This implies that when a person is in the water, the buoyancy force created is equal to the weight of the person. A LifeJacket, however, is made of lightweight form that weighs much less than the average weight density of human beings. As a result, when a person is wearing a LifeJacket, the total weight to be displaced by the water is much less as compared to the weight of the person alone, and so the person floats.

It is important to wear a jacket that fits well, protects the person from injuries due to impact, and ensures maximum safety till further help arrives, even in rough sea conditions.

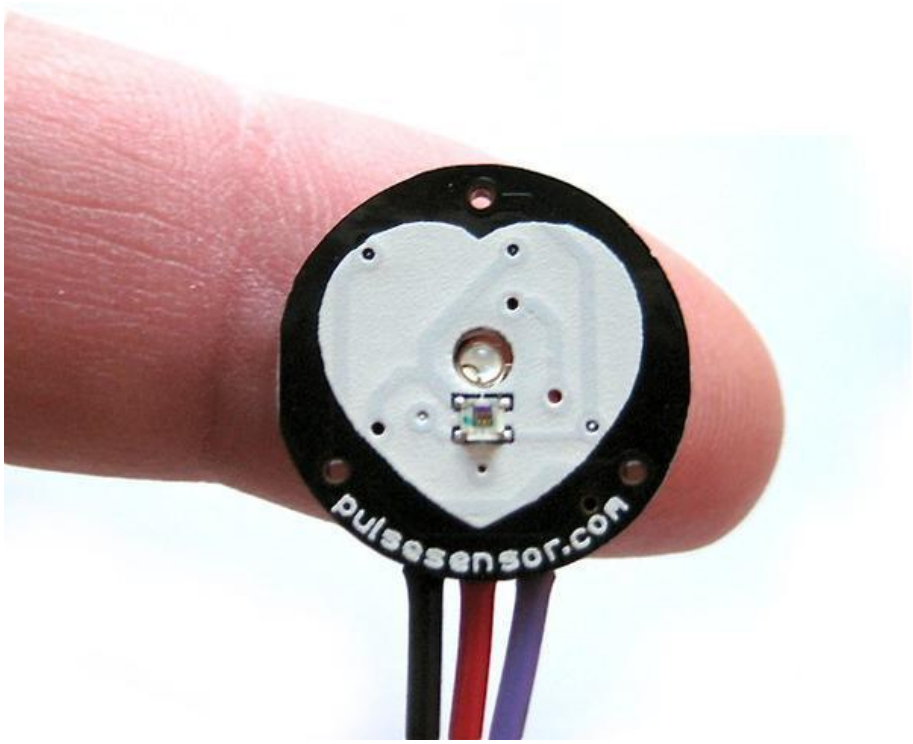
Air Flow

- **Body material:** Die- cast aluminum
- **Operating pressure:** 2 bar - 8 bar
- **Working pressure:** 10 bar
- **Response time:** 30 ms - 40 ms
- **Weight:** 210g ~ 340g
- **Voltage:** 110V AC, 220 AC, 24V DC, 12V DC
- **Power:** AC=4.8/4.4VA, 6/4.9VA, DC=2W
- **Available voltage range:** ±10%
- **Insulation Grade:** F
- **Pipe connection:** Thread
- **Working temperature:** - 5°C ~ 80°C
- **Working medium:** Compressed air

Oxygen Tube

A small cylinder with a high capacity to absorb oxygen due to its rigidity and light weight.

Heart-rate sensor



Heart rate data can be really useful whether you're designing an exercise routine, studying your activity or anxiety levels or just want your shirt to blink with your heart beat. The problem is that heart rate can be difficult to measure. Luckily, the Pulse Sensor Amped can solve that problem!

The Pulse Sensor Amped is a plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their projects.

It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings.

Simply clip the Pulse Sensor to your earlobe or fingertip and plug it into your 3 or 5 Volt Arduino and you're ready to read heart rate! The 24" cable on the Pulse Sensor is terminated with standard male headers so there's no soldering required.

```
int PulseSensorPurplePin = 0; //--> Pulse Sensor PURPLE WIRE connected to ANALOG PIN 0.
int LED_3 = 3; //--> LED to detect when the heart is beating. The LED is connected to PIN 3 on the Arduino UNO.

int Signal; //--> holds the incoming raw data. Signal value can range from 0-1024
int Threshold = 600; //--> Determine which Signal to "count as a beat", and which to ingore.
//----------------------------------------

//--------------------------------------------------------------------------------void setup
void setup() {
  pinMode(LED_3,OUTPUT); //--> Set LED_3 PIN as Output.
  Serial.begin(9600); //--> Set's up Serial Communication at certain speed.
}
//--------------------------------------------------------------------------------

//--------------------------------------------------------------------------------void loop
void loop() {
  Signal = analogRead(PulseSensorPurplePin); //--> Read the PulseSensor's value. Assign this value to the "Signal" variable.

  Serial.println(Signal); //--> Send the Signal value to Serial Plotter.

  if(Signal > Threshold){ //--> If the signal is above "550"(Threshold), then "turn-on" Arduino's on-Board LED.
    digitalWrite(LED_3,HIGH);
  } else {
    digitalWrite(LED_3,LOW); //--> Else, the sigal must be below "550", so "turn-off" this LED.
  }

  delay(10);
}
```

Website

We've created an initial website for our mini-boat, The main goal for the website is to control the mini-boat and to track it by the help of the camera

```php
<?php

session_start();

if (!isset($_SESSION['username'])) {
    header("Location: index.php");
}

?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/font-awesome/4.7.0/css/font-awesome.min.css">

  <link rel="stylesheet" type="text/css" href="style.css">
    <title>Welcome</title>
</head>
<body>
  <div class="container">
    <form action="" method="POST" class="login-email">

      <div class="input-group">
        <button name="submit" class="btn">Forward</button>
      </div>

    </form>
        <form action="" method="POST" class="login-email">

      <div class="input-group">
        <button name="submit" class="btn">Left</button>
      </div>
    </form>
    <form action="" method="POST" class="login-email">

      <div class="input-group">
        <button name="submit" class="btn">Right</button>
          <p class="login-register-text">Link Camera? <a href="http://192.168.173.225/">Camera ip</a></p>
          <p class="login-register-text">Microcontroller? <a href="http://192.168.123.183/">Motor controller</a></p>
      </div>
    </form>
  </div>
```

The website also has a login and registration page that is connected to a database and works correctly.

```php
<?php

$server = "localhost";
$user = "root";
$pass = "";
$database = "miniboat";

$conn = mysqli_connect($server, $user, $pass, $database);

if (!$conn) {
    die("<script>alert('Connection Failed.')</script>");
}

?>
```

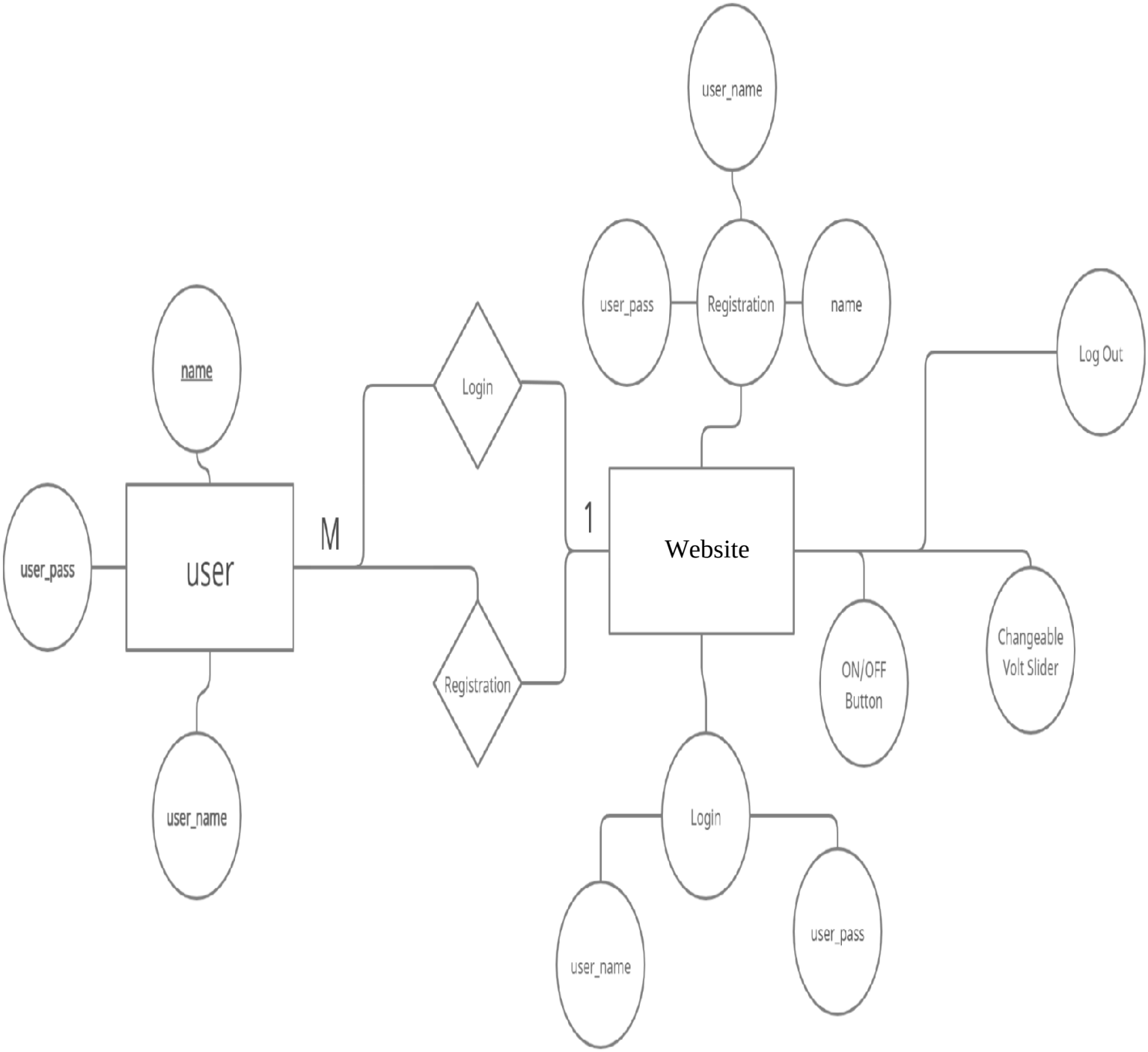
```php
<?php

include 'config.php';

session_start();

error_reporting(0);

if (isset($_SESSION['username'])) {
    header("Location: welcome.php");
}

if (isset($_POST['submit'])) {
  $email = $_POST['email'];
  $password = md5($_POST['password']);

  $sql = "SELECT * FROM users WHERE email='$email' AND password='$password'";
  $result = mysqli_query($conn, $sql);
  if ($result->num_rows > 0) {
    $row = mysqli_fetch_assoc($result);
    $_SESSION['username'] = $row['username'];
    header("Location: welcome.php");
  } else {
    echo "<script>alert('Woops! Email or Password is Wrong.')</script>";
  }
}

?>

<!DOCTYPE html>
<html>
<head>
  <meta charset="utf-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <link rel="stylesheet" href="https://stackpath.bootstrapcdn.com/font-awesome/4.7.0/css/font-awesome.min.css">

  <link rel="stylesheet" type="text/css" href="style.css">

  <title>Login Form - Pure Coding</title>
```

```php
<?php

include 'config.php';

error_reporting(0);

session_start();

if (isset($_SESSION['username'])) {
    header("Location: index.php");
}

if (isset($_POST['submit'])) {
  $username = $_POST['username'];
  $email = $_POST['email'];
  $password = md5($_POST['password']);
  $cpassword = md5($_POST['cpassword']);

  if ($password == $cpassword) {
    $sql = "SELECT * FROM users WHERE email='$email'";
    $result = mysqli_query($conn, $sql);
    if (!$result->num_rows > 0) {
      $sql = "INSERT INTO users (username, email, password)
          VALUES ('$username', '$email', '$password')";
      $result = mysqli_query($conn, $sql);
      if ($result) {
        echo "<script>alert('Wow! User Registration Completed.')</script>";
        $username = "";
        $email = "";
        $_POST['password'] = "";
        $_POST['cpassword'] = "";

      } else {
        echo "<script>alert('Woops! Something Wrong Went.')</script>";
      }
    } else {
      echo "<script>alert('Woops! Email Already Exists.')</script>";
    }
```

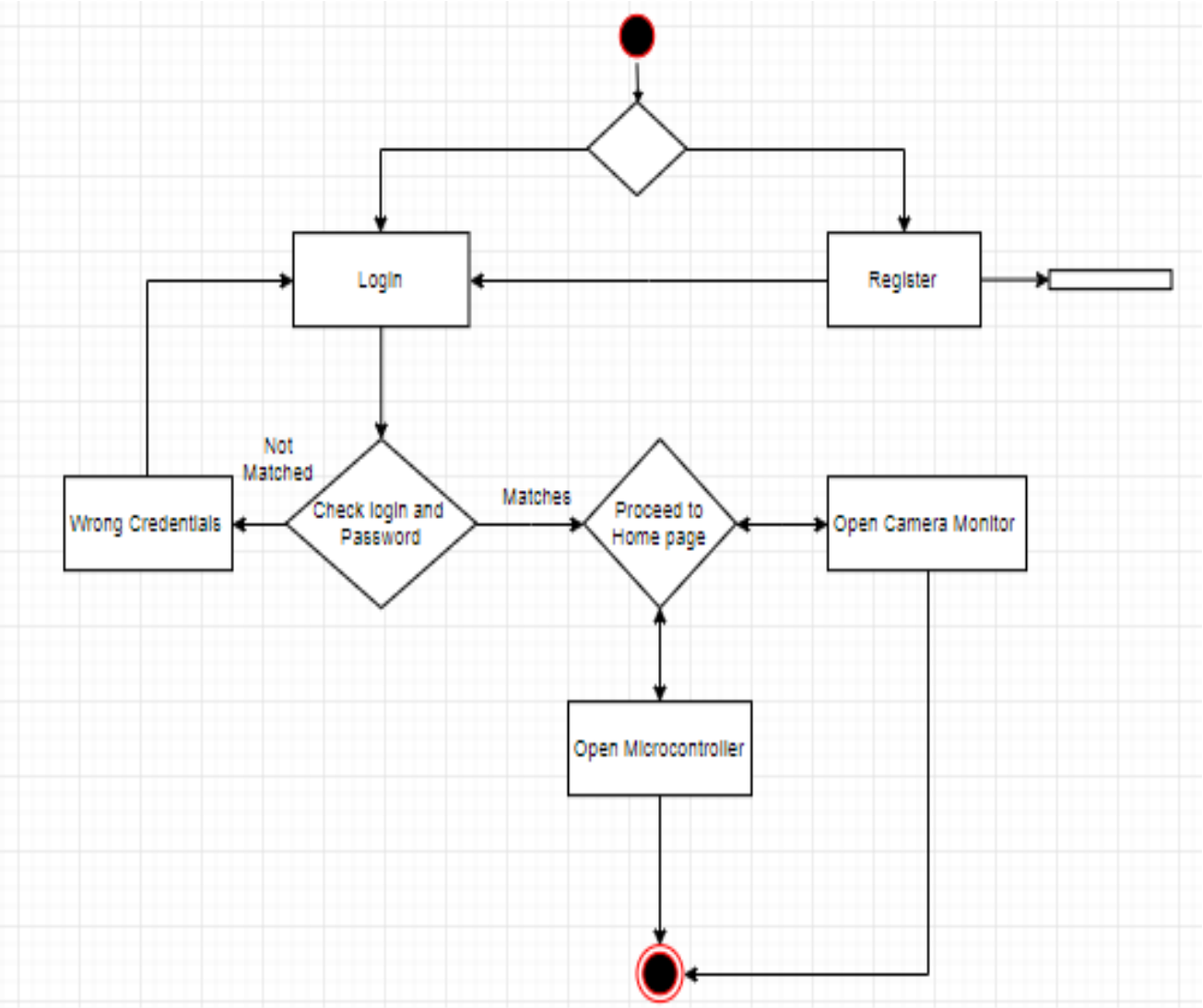
```css
@import url('https://fonts.googleapis.com/css2?family=Poppins:ital,wght@0,1
400;1,500;1,600;1,700;1,800;1,900&display=swap');

* {
    margin: 0;
    padding: 0;
    box-sizing: border-box;
    font-family: 'Poppins', sans-serif;
}

body {
    width: 100%;
    min-height: 100vh;
    background-image: linear-gradient(rgba(0,0,0,.5), rgba(0,0,0,.5)), url(bg.jpg);
    background-position: center;
    background-size: cover;
    display: flex;
    justify-content: center;
    align-items: center;
}

.container {
    width: 400px;
    min-height: 400px;
    background: #FFF;
    border-radius: 5px;
    box-shadow: 0 0 5px rgba(0,0,0,.3);
    padding: 40px 30px;
}

.container .login-text {
    color: #111;
    font-weight: 500;
    font-size: 1.1rem;
    text-align: center;
    margin-bottom: 20px;
    display: block;
    text-transform: capitalize;
}
```

Chapter3: Analysis problem and requirements

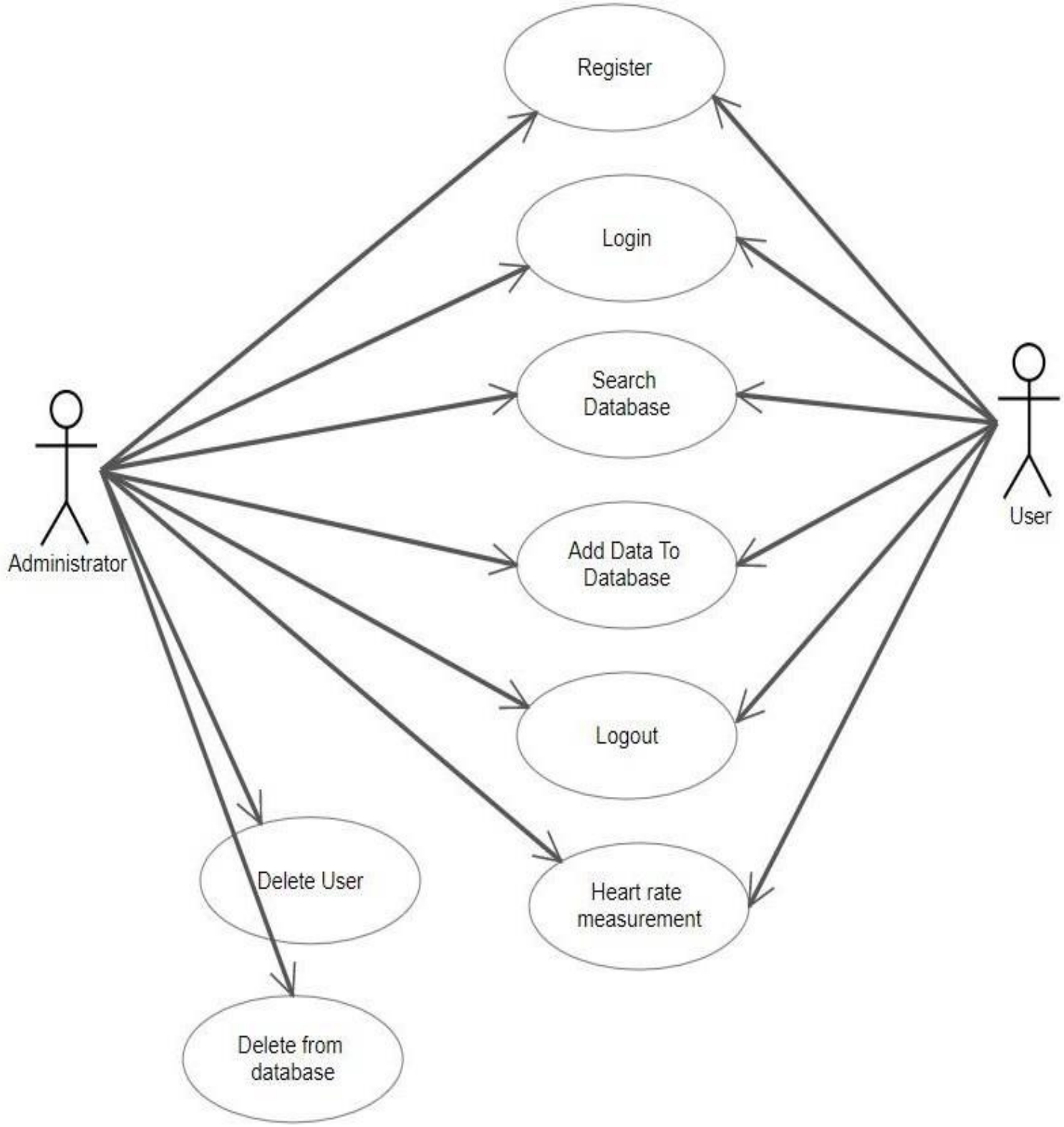
Entity Relationship Diagram



Activity Diagram



Use-case Diagram



Sequence Diagram

Design:

We needed something suitable for working in water that could withstand external factors on the one hand, beautify weight, bear pressure, be resistant to rust and light weight.
We have solved this problem using fiberglass materials, and this is because of its light weight, high durability, resistance to rust and unexpected external factors.

Motors:

And here comes the second row, the problem of motors. We needed lightweight motors with high performance, through the number of motor revolutions per minute and horsepower for it to be able to maneuver in the water under any working pressure to meet the required needs of it, due to the presence of speed in performance for the ability to pull the largest weight In the water, by weighing the people that the mini-boat will save.
Here we have solved the problem by using DC Spindle motors which gives 12000RPM and 400W

Batteries:

And here we come to the problem of the power source, we needed the highest amount of electricity in the lowest weight of batteries, and here we solved this problem by using four batteries each one has 12V and 9A And here we got them in a row to give us 48V, Which is required to let the DC-Motors work efficiently.

Control unit:

And here comes the problem of the control unit through the remote control. We needed a long-range remote control that is easy to use with available materials, and we were able to solve this problem by using Arduino Nano and NRF24L01 which uses radio signals
This is due to its long range, which is a thousand meters in the best conditions.

```
//Include Libraries
#include <SPI.h>
#include <nRF24L01.h>
#include <RF24.h>


//create an RF24 object
RF24 radio(9, 8);  // CE, CSN

//address through which two modules communicate.
const byte address[6] = "00001";
int motor1 = 4;
int PWM1 = 0;
int motor2 = 3;
int PWM2 = 0;
char input[32] = "";
char input1[32] = "";
const char var1[32] = "motor1";
const char var2[32] = "motor2";

void setup()
{
  pinMode(motor1,OUTPUT);
  pinMode(motor2,OUTPUT);
  while (!Serial);
    Serial.begin(9600);

  radio.begin();

  //set the address
  radio.openReadingPipe(0, address);
  radio.setChannel(100);
radio.setDataRate(RF24_250KBPS);
radio.setPALevel(RF24_PA_MAX);
  //Set module as receiver
  radio.startListening();
}

void loop()
```

```
//Include Libraries
#include <SPI.h>
#include <nRF24L01.h>
#include <RF24.h>

//create an RF24 object
RF24 radio(9, 8);  // CE, CSN

//address through which two modules communicate.
const byte address[6] = "00001";
#define pot1 A0
#define pot2 A1
const int threshold = 20;
int potValue1 = 0;
int pwmValue1 = 0;
int check1 = 0;
int potValue2 = 0;
int pwmValue2 = 0;
int check2 = 0;
const char var1[32] = "motor1";
const char var2[32] = "motor2";
void setup()
{

  Serial.begin(9600);
  radio.begin();

  //set the address
  radio.openWritingPipe(address);
  radio.setChannel(100);
radio.setDataRate(RF24_250KBPS);
radio.setPALevel(RF24_PA_MAX);
  //Set module as transmitter
  radio.stopListening();
}
void loop()
{
 potValue1 = analogRead(pot1);{
if(potValue1 > check1 + threshold || potValue1 < check1 - threshold)
```

Other Control unit:

We needed to control through modern electronic devices such as laptops and cellular phones, and here we solved the problem by designing a special website for control, with the help of ESP8266 module which uses Wi-Fi signal

```
#include <ESP8266WiFi.h>

// Enter your wifi network name and Wifi Password
const char* ssid = "xFadiZ";
const char* password = "12345678910Fady";

// Set web server port number to 80
WiFiServer server(80);

// Variable to store the HTTP request
String header;

// These variables store current output state of LED
String outputRedState = "off";
String outputGreenState = "off";
String outputYellowState = "off";

// Assign output variables to GPIO pins
const int redLED = 2;
const int greenLED = 4;
const int yellowLED = 5;

// Current time
unsigned long currentTime = millis();
// Previous time
unsigned long previousTime = 0;
// Define timeout time in milliseconds (example: 2000ms = 2s)
const long timeoutTime = 2000;

void setup() {
Serial.begin(115200);
// Initialize the output variables as outputs
pinMode(redLED, OUTPUT);
pinMode(greenLED, OUTPUT);
pinMode(yellowLED,OUTPUT);
// Set outputs to LOW
digitalWrite(redLED, LOW);
digitalWrite(greenLED, LOW);
digitalWrite(yellowLED, LOW);
```

Camera module:

We needed to use a camera to monitor the conditions inside the water, and here we solved the problem using the ESP32 Camera module by Wi-Fi Signal that can be displayed in a Website.

```
#include "esp_camera.h"
#include <WiFi.h>

//
// WARNING!!! PSRAM IC required for UXGA resolution and high JPEG quality
//            Ensure ESP32 Wrover Module or other board with PSRAM is selected
//            Partial images will be transmitted if image exceeds buffer size
//

// Select camera model
//#define CAMERA_MODEL_WROVER_KIT // Has PSRAM
//#define CAMERA_MODEL_ESP_EYE // Has PSRAM
//#define CAMERA_MODEL_M5STACK_PSRAM // Has PSRAM
//#define CAMERA_MODEL_M5STACK_V2_PSRAM // M5Camera version B Has PSRAM
//#define CAMERA_MODEL_M5STACK_WIDE // Has PSRAM
//#define CAMERA_MODEL_M5STACK_ESP32CAM // No PSRAM
//#define CAMERA_MODEL_M5STACK_UNITCAM // No PSRAM
#define CAMERA_MODEL_AI_THINKER // Has PSRAM
//#define CAMERA_MODEL_TTGO_T_JOURNAL // No PSRAM

#include "camera_pins.h"

const char* ssid = "xFadiZ";
const char* password = "12345678910Fady";

// Set your Static IP address
IPAddress local_IP(192, 168, 89, 227);
// Set your Gateway IP address
IPAddress gateway(192, 168, 1, 1);

IPAddress subnet(255, 255, 0, 0);
IPAddress primaryDNS(8, 8, 8, 8);   //optional
IPAddress secondaryDNS(8, 8, 4, 4); //optional

void startCameraServer();

void setup() {
  Serial.begin(115200);
  Serial.setDebugOutput(true);
```

Chapter4: Implementation

Here, we designed the shape by designing its template initially to accommodate the tools used inside it by distributing weights and taking the measurements of everything in an orderly manner. And that was using a plaster mold that we designed manually. After the gypsum molding dried, it was isolated with an insulating wax for the fiber from the gypsum, and then we prepared the fiberglass materials and put it on the outer shape of the gypsum to give us the same shape of the gypsum after unloading the gypsum from it, by sculpting the gypsum inside it manually to empty it of all the gypsum. After unloading it was cleaned, polished and sanded. And then we color it? Here we started by placing the water jet, motors and batteries in an orderly manner that suits each other through sizes and weights, and after installing them, we isolate them from the water so as not to harm them in the future. After that, we connected the electrical circuit and connected the controllers, through the remote control receiver and the web site receiver, and then we tested the electrical circuit to ensure efficiency, and from here we closed it and left exits and entrances for energy and maintenance, and we put a switch to turn on and off the controller in the operation of the electrical circuit.

We have designed a remote control to control our Mini-Boat using NRF, Arduino Nano, Potentiometer, ON/OFF Buttons and Batteries, and all this was designed on the PCB board, and we designed the electrical circuit to connect everything in its proper place.

Also we have designed a website to control the mini-boat and turn it ON and OFF by the help of ESP8266 module which uses Wi-Fi signal, this website can take control of the motors as individuals, from the website we can turn ON/OFF one motor by one.

We have also designed another rescue unit, which consists of a bracelet and a life jacket connected to each other and on the other side also connected to the Mini-Boat and the website to track the condition of the person and rescue him if he is exposed to any danger, through the bracelet that tracks his heartbeat and vital sensors, when there is a change in any of the values The vital sensors sends an alarm to the Mini-Boat and the website, and fills the life jacket with air through the control unit located in the bracelet by the presence of a small oxygen tube and an air coil. Here the person floats on the surface of the water.

Chapter5: Future work and Conclusion

Conclusion:

To summarize this paper, Our mini-boat reduce the number of deaths due to drowning, and that is through two tools, namely the Mini-Boat, which can be used by beach guards to rescue those in distress in the water, as we explained previously. The second method is by wearing a bracelet and a life jacket. When any malfunction occurs in the bio-sensors that monitor its vital data, then the life jacket will be filled with air and the wearer will float and thus We will have increased the chance of survival in the water for anyone who uses our project, even by a small percentage, because the World Health Organization counted the number of deaths by drowning in the last statistics of the organization. The number of drowning deaths was 372,000, and if we could save 10% of these cases, that would be the case. We have saved 37,200 people, and that is not a small number, but rather it is subject to increase, and it is by spreading the project's ideas and circulating them in all places where people are in the water of various forms, and in the different use of the project.

Future Work:

We're not stopping here for sure, we will always improve our project, in the future we will work hard on making it more useful and self-dependent.

1. We will make our Mini-boat track the bracelet automatically in the snorkeling cases, for more protection.
2. Auto-pilot to the bracelet if something undesirable happens like if the person is drowning.
3. Performance and user experience optimizations.
4. Bug fixes and stability improvements.
5. Some UI enhancements on the website.
6. Optimize the overall performance.
7. Optimize and improve the final project appearance.

Chapter6: References

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Thank
you