Wireless Boat for Rescue Operation

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***Abstract*-Day by day, we9 are facing the some unwanted changes in environment, like irregularity in seasons, irregularity in rain. This is again resulting in cyclones, tsunami, and etc. Sometimes due to some environmental conditions irregular rainy season occurs & sometimes it rains cats and dogs but sometimes it rains very less. When over raining occurs, it again results in heavy flooding. Many people get trapped in flooding and government arrange some protecting programs to save the trapped people. This boat has to go where people have caught and save them. Using DTMF technology we derived the boat, give direction to the boat, the boat is controlled by user mobile phone that makes a call to a mobile placed in the boat.**

***Keywords*- DTMF,Boat, Microcontroller,IR**

I. INTRODUCTION

This paper demonstrates the flooding situation to provide the protection to many people to get escaped. This boat is going to travel in flood completely wirelessly which will be human less boat. By using this boat it will be possible to go anywhere in flood affected area and to keep a watch over the people trapped in the flooding. In this boat some traditional technologies used, with the help of GSM technology. Dual Tone Multiple Frequency (DTMF) [2][3][5]which play important role in the GSM. GSM technology plays vital role in this boat. This boat will be in controlled by administrative person with the help of mobile phone to use 3G technology is used. So use of 3G mobile enables the administrative person to be known with visual view of the boat wherever it will be. With the help of video calling, person can have visual of surrounding of boat. This will help to locate the trapped people by using camera.

This boat carried life jackets, inners, food etc. to the people who are trapped, and save their life. In this paper, the boat is controlled by user mobile phone that makes a call to a mobile placed in the boat. According to user's requirement, the codes have given to a microcontroller[1]. And user can move the boat in requires direction. During a call, if any key is pressed, the tone corresponding to that key generates the code. This received tone is processed by the microcontroller with the help of the DTMF circuit interfaced with the microcontroller. This DTMF decoder decodes the DTMF tone into its equivalent binary digit this binary number is send to the microcontroller. After receiving this binary number processor takes the decision for any given input in order to drive the boat in right or left. Thus the mobile at user side acts as remote. DTMF signalling is used for telephonic signalling over the line in the voice frequency to the call switching centre. IR system,

which measures the distance between boat and object 10 times per second, limited to between 1 and 10 m due to the limitations of the sensor.

II. DESIGN AND DRAWING

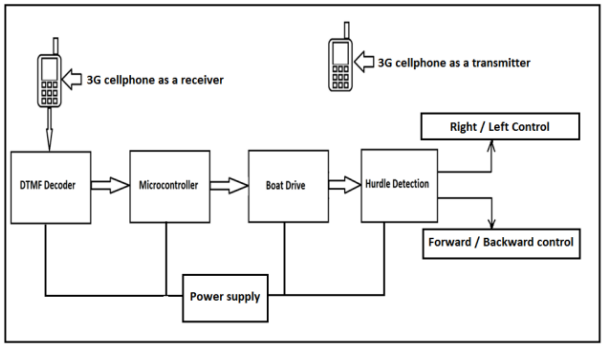

Figure2.1: Block diagram of the system

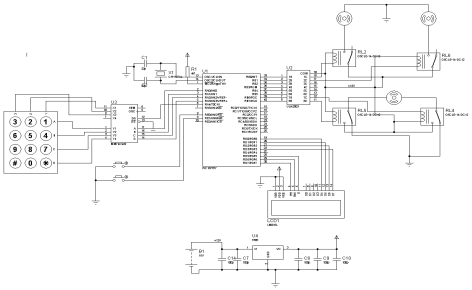

Figure2.2: Interfacing Diagram of the system

In this paper, we have used MT8870 series decoder. All type of the MT8870 series uses digital counting technique to detect and decode all the DTMF code into 4bit code output. The built in dial tone rejection circuit eliminates the need of pre-filtering. When the input signal is given to input pin2 (IN-) of decoder.

The decoded 4-bit signal of DTMF [2][3][5]tone is transferred to 4 output pins that are pin No.11,12,13,&14.and according to this the operation of boat is controlled.

The two DC motors i.e. motor1 & motor2 are used for drive the boat rotated in clock wise and anticlockwise direction respectively. This direction can be controlled by giving a command through microcontroller.[1]

The ultrasonic's sensors provide excellent results even with difficult-to-detect objects, e.g. small or thin hurdles.

The ultrasonic's sensor connected to microcontroller, it senses the hurdles in the path & gives signal to the microcontroller. Then the microcontroller generates the signals for DC motor, to change the direction of a boat.

Ultrasonic system, which measures the distance between vehicles 10 times per second, limited to between 1 and 10 m due to the limitations of the sensor.

The distance between boat & object is obtained by comparing the resulting signal with a preset threshold level. The first time the signal exceeds this threshold is the well-known time of flight. The distance is calculated by multiplying the time of flight by the speed of sound in air, and halving to take into account that the ultrasonic pulse goes back and forth between the sensor and the object ahead.

Ultrasonic sensors operate by emitting and receiving high-frequency sound waves. The frequency is usually in the order of 200 kHz, which is too high for the human ear to hear. Certain characteristic of targets must be considered when using ultrasonic sensors. These include target shape, material, temperature, size and positioning.

DTMF technology: Dual-Tone-Multi-Frequency is also known as touch tone & are the audible sounds we hear when we press key on mobile handset. We have used DTMF here for optimal performance with each tone being distinct. This makes the decoding of tone very easily even in surrounding noise.

The Signal generated by DTMF circuit is a direct algebraic sum of, the amplitudes of two sine waves of two different frequencies. Pressing 5 will generate, 5= 1336Hz + 770Hz = 2106Hz When you press a button in the telephone set keypad, a connection is made that generates a resultant signal of two tones at the same time. These two tones are taken from a row frequency and a column frequency. The resultant frequency signal is called "*Dual Tone Multiple Frequency*". These tones are identical and unique.A *DTMF* signal is the algebraic sum of two different audio frequencies, and can be expressed as follows:

$f(t) = A_0\sin(2*\Pi*f_a*t) + B_0\sin(2*\Pi*f_b*t) + ...$

Where f_a and f_b are two different audio frequencies with A and B as their peak amplitudes and f as the resultant DTMF signal.$f_a$belongs to the low frequency group and f_b belongs to the high frequency group. Each of the low and high frequency groups comprise four frequencies from the various keys present on the telephone keypad; two different frequencies, one from the high frequency group and another from the low frequency group are used to produce a DTMF signal to represent the pressed key. The amplitudes of the two sine waves should be such that $(0.7 < (A/B) < 0.9)V$

The frequencies are chosen such that they are not the harmonics of each other. The frequencies associated with various keys on the keypad.

Along with these DTMF generator in our telephone set provides a set of special purpose groups of tones, which is normally not used in our keypad. These tones are identified as 'A', 'B', 'C', 'D'. These frequencies have the same column frequency but uses row frequencies given in the table in figure (A). These tones are used for communication signalling.

Table 1.1:
Shows signal event with their frequency range

Event	Low frequency	High frequency
Busy signal	480 Hz	620 Hz
Ring back tone	440 Hz	480 Hz
Dial tone	350 Hz	440 Hz

Busy Signal: A busy signal (or busy tone or engaged tone) in telephony is an audible or visual signal to the calling party that indicates failure to complete the requested connection of that particular telephone call.

Ringback Tone: A ring back tone is an audible indication that is heard on the telephone line by the calling party after dialing and prior to the call being answered at the receiving end. It is normally a repeated tone, designed to assure the calling party that the called party's line is ringing, although the ring-back tone may be out of sync with the ringing signal.

Dial Tone: A dial tone (known in the British Isles as a dialling tone) is a telephony signal used to indicate that the telephone exchange is working, has recognized an off-hook, and is ready to accept a call. The tone stops when the first numeral is dialled.The MT-8870 is a full DTMF Receiver that integrates both band split filter and decoder functions into a single 18-pin DIP. Its filter section uses switched capacitor technology for both the high and low group filters and for dial tone rejection. Its decoder uses digital counting techniques to detect and decode all 16 DTMF tone pairs into a 4-bit code. External component count is minimized by provision of an on-chip differential input amplifier, clock generator, and latched tri-state interface bus. Minimal external components required include a low-cost 3.579545 MHz crystal, a timing resistor, and a timing capacitor. MT-8870 operating functions include a band split filter that separates the high and low tones of the received pair, and a digital decoder that verifies both the frequency and duration of the received tones

before passing the resulting 4-bit code to the output bus. The low and high group tones are separated by applying the dual-tone signal to the inputs of two 6th order switched capacitor band pass filters with bandwidths that correspond to the bands enclosing the low and high group tones.

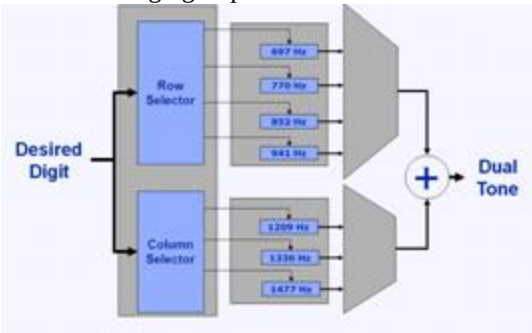

Figure2.3 DTMF generation

A. *Microcontroller*

Infrared sensor-The ultrasonic's sensors provide excellent results even with difficult-to-detect objects, e.g. small or thin hurdles.

The ultrasonic's sensor connected to microcontroller, [2]it senses the hurdles in the path & gives signal to the microcontroller. Then the microcontroller generates the signals for DC motor, to change the direction of a boat.Ultrasonic system, which measures the distance between vehicles 10 times per second, limited to between 1 and 10 m due to the limitations of the sensor.Ultrasonic system, which measures the distance between boat and object 10 times per second, limited to between 1 and 10 m due to the limitations of the sensor.

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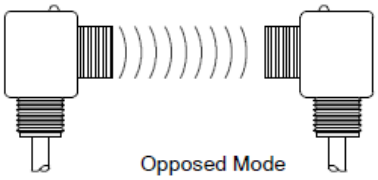
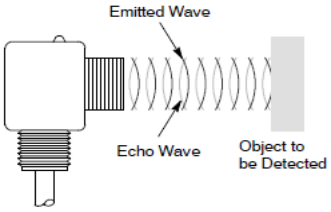
Ultrasonic sensors operate by emitting and receiving high-frequency sound waves. The frequency is usually in the order of 200 kHz, which is too high for the human ear to hear.

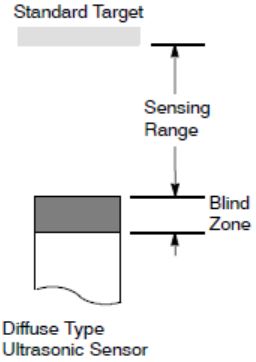
There are two basic modes of operation: opposed mode and diffuse (echo) mode. In opposed mode, one sensor emits the sound wave and another, mounted opposite the emitter, receives the sound wave.



In diffuse mode, the same sensor emits the sound wave and then listens for the echo that bounces off an object.



*Sensing Range:*The sensing range is the distance within which the ultrasonic sensor will detect target under fluctuations of temperature and voltage.



B *Blind Zone:*

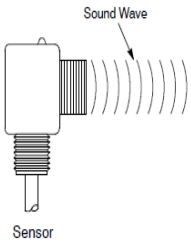
Ultrasonic sensors have an inherent blind zone located at the sensing face. The size of the blind zone depends on the frequency of the transducer. Objects located within the blind spot cannot be reliably detected.

3G technology-Third Generation (3G) mobile devices and services will transform wireless communications into on-line, real-time connectivity. 3G wireless technology will allow an individual to have immediate access to location-specific services that offer information on demand.

3G wireless technology represents the convergence of various 2G wireless telecommunications systems into a single global system that includes both terrestrial and satellite components. One of the most important aspects of 3G wireless technologies is its ability to unify existing cellular standards, such as CDMA, GSM, and TDMA, under one umbrella. The following three air interface modes accomplish this result: wideband CDMA, CDMA2000 and the Universal Wireless Communication (UWC-136) interfaces.

characteristic of targets must be considered when using ultrasonic sensors. These include target shape, material, temperature, size and positioning.

Principle of operation: Ultrasonic sensors operate by emitting and receiving high-frequency sound waves. The frequency is usually in the order of 200 kHz, which is too high for the human ear to hear. Certain known time of flight. The distance is calculated by multiplying the time of flight by the speed of sound in air, and halving to take into



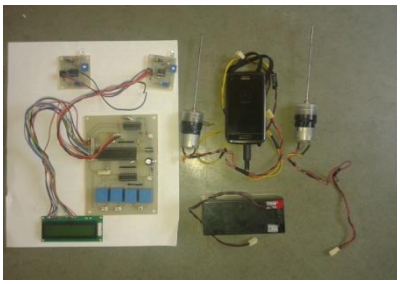
III. ALGORITHM:

1. Start
2. Hardware initialization &LCD initialization
3. (Connection Establishment)Make 3G Video call from Tx to Rx
4. Press key 5 on Mobile phone at Tx.(For forward movement of boat)
5. Press key 6 on Mobile phone at Tx.(For right direction of boat)
6. If hurdle detected at right side?
7. Press key 4 on Mobile phone at Tx.(For left direction of boat)
8. Is hurdle detected at left side?
9. Press key 7 on Mobile phone at Tx.To move camera left.
10. Press key 9 on Mobile phone at Tx.To move camera right.
11. Stop

IV. EXPERIMENTATION RESULT

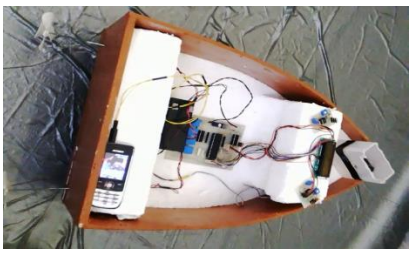
In this Paper, the boat is controlled by user mobile phone that makes a call to a mobile placed in the boat. User can move the boat in required direction. During a call, if any key is pressed, the tone corresponding to that key generates the code. This received tone is processed by the microcontroller with the help of the DTMF circuit interfaced with the microcontroller. This DTMF decoder decodes the DTMF tone into its equivalent binary digit this binary number is send to the microcontroller.

After receiving this binary number processor takes the decision for any given input in order to drive the boat in right or left. Thus the mobile at user side acts as remote. DTMF signaling is used for telephonic signaling over the line in the voice frequency to the call switching centre. The IR sensor connected to microcontroller, it senses the hurdles in the path & gives signal to the microcontroller. Microcontroller then generates the signals for DC motor, to change the direction of a boat. IR system, which measures the distance between vehicles 10 times per second, limited between 1 and 10 m due to the limitations of the sensor.



a) Assembly of project

b) Boat Stop Camera Right



c) Top view of "Wireless Boat"

d) Actual Demo in Lake

V. CONCLUSION

As natural calamities can never be predicted, the administration is supposed to be ready for all sorts of problems. Considering limitations of human being many times administration fails to perform rescue operations as it consists of human to operate all the operations. Considering all the probabilities environmental irregularities in rainy season, this boat

may definitely be useful for getting rid from all problems. Using such wireless boats we send food, life jackets, etc to the person caught in the flood and save lives of many people.

VI. REFERENCES

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