Water Weed Harvest Robo

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Abstract*: Aquatic weeds, the intense plants finishing life cycle in water, square measure a significant menace to the atmosphere. Dense colonies of aquatic weeds square measure determined within the southern regions of Kerala that in the main includes Ernakulum, Kottayam, Idukki and Alappuzha districts. The pestilent aquatic weeds invade landlocked water plenty, estuaries inshore regions of seas and square measure currently abandoned. The fast and excessive growth of aquatic weeds in varied and wide condition limits the sustained performance of the many drain and irrigation system, reducing the productivity of agricultural land. Aquatic weeds square measure classified into emerging, floating and submerged weeds per the assorted habitats. several species square measure found in Kerala that were originally introduced into biology gardens. the main aquatic weeds found in Kerala embody Salvinia spp., Eichhornia spesiosa, water lettuce, genus Alternanthera spp., Azolla, duckweed, and hydrophyte. Reduction or elimination of aquatic weeds is feasible through purposeful management methods which incorporates preventive and management (biological, physical, chemical, eco-physiological) measures. A prosperous weed management program depends on the resources on the market, the weeds gift and therefore the ability to hold out effective management ways. Operational analysis and /or pilot comes got to be initiated within the problematic areas on long run basis, victimization technical recommendations derived from analysis experiments*

Keywords: D.C. Motor, RX-TX Modules, AT89C2051 Microcontroller

1. INTODUCTION

Aquatic weeds, the unabated plants completing life cycle in water, are a serious menace to the environment. Dense colonies of aquatic weeds are observed in the southern regions of Kerala which mainly includes Ernakulam, Kottayam, Idukki and Alappuzha districts. The noxious aquatic weeds invade inland water masses, estuaries inshore regions of seas and are now abandoned. The rapid and excessive growth of aquatic weeds in varied and wide environmental condition limits the sustained performance of many drainage and irrigation system, reducing the productivity of agricultural land. Aquatic weeds are classified into emergent, floating and submerged weeds according to the various habitats. Many species are found in Kerala which were originally introduced into botanical gardens.

Expansion of irrigation facilities, along with consolidation of the existing systems, has been the main part of the core strategy for increasing production of food with sustain and systematic development of irrigation grains. The irrigation potential in India has increased from 22.6 million hectares in 1951 when the process of planning began to about 102.77 at the end of the tenth plan. There is need for the greater development of irrigation resources to increase food-crop production to meet the rapidly growing needs of the people. The average annual water availability of the country is assessed as 1869 billion cubic metres. As we exploit ever increasing quantities of water, there is a collision course with rapidly spreading infestations of water weeds. As the irrigation facilities are expanded, the infestations of weeds multiply rapidly and today they are often the greatest cause of inefficient use and loss of water. Today, a large part of the one million hectares of inland water-area in this country is threatened by the invasion of noxious aquatic weeds. In many areas of Kerala, inland water masses, estuaries and also inshore regions of the sea are infested on a large scale by weeds. This grows very fast and it affects apiculturists, as well as paddy cultivators.

2. METHODOLOGY:

Methodology used for whole process of machine manufacturing is given below; this methodology gives way about how work will be carried out in systematic way. It is standard process of describing process, how it is done in simplest manner.

There are some steps include in methodology which are as follows,

1. Need or aim
2. Analysis of problem
3. Material selection
4. Design of element
5. Modification
6. Detailed drawing
7. Manufacturing
8. Result & conclusion

3. PROBLEM STATEMENT

- More human effort is required to operate the machine.
- Cost of machine is high of present used machine.
- Water Weed removing manually is difficult as well as time consuming.

4. OBJECTIVE:

- Planning to make automation
- Reduce human effort.
- Reduce cost of machine.
- Reduce operation time.

5. ROBOT COMPONENTS & IT'S SPECIFICATIONS

5.1 AT89C2051 Microcontroller:

The AT89C2051 is a low-voltage, high-performance CMOS 8-bit microcomputer with 2K bytes of Flash programmable and erasable read-only memory (PEROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard MCS-51 instruction set. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C2051 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89C2051 provides the following standard features: 2K bytes of Flash, 128 bytes of RAM, 15 I/O lines, two 16-bit timer/counters, a five vector two-level interrupt architecture, a full duplex serial port, a precision analog comparator, on-chip oscillator and clock circuitry. In addition, the AT89C2051 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes.

Fig.: Microcontroller AT89C2051

5.1.2. Features of AT89C2051 Microcontroller:

• Compatible with MCS®-51 Products
• 8K Bytes of In-System Programmable (ISP) Flash Memory – Endurance: 10,000 Write/Erase Cycles
• 4.0V to 5.5V Operating Range
• Fully Static Operation: 0 Hz to 33 MHz
• Three-level Program Memory Lock
• 256 x 8-bit Internal RAM
• 32 Programmable I/O Lines
• Three 16-bit Timer/Counters
• Eight Interrupt Sources
• Full Duplex UART Serial Channel
• Low-power Idle and Power-down Modes
• Interrupt Recovery from Power-down Mode
• Watchdog Timer
• Dual Data Pointer
• Power-off Flag
• Fast Programming Time
• Flexible ISP Programming (Byte and Page Mode)
• Green (Pb/Halide-free) Packaging Option

5.2 D.C. Motor:

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

Fig.: D.C. Motor

3.3.1 Construction of D.C. Motor:

DC electric motor, as shown above (here red (right side) represents a magnet or winding with a "North" In a simple 2-pole polarization, while green (left side) represents a magnet or winding with a "South" polarization.

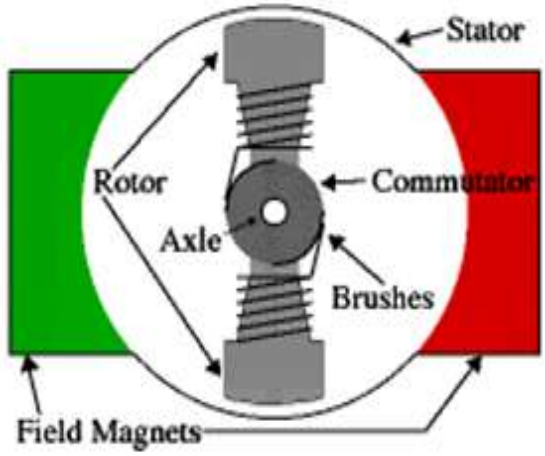


Fig.: Construction of D.C. Motor

Every DC motor has six basic parts axle, rotor (armature), stator, commutator, field magnet(s), and brushes. In most common DC motors (and all that Beamers will see), the external magnetic field is produced by high-strength permanent magnets.

The stator is the stationary part of the motor this includes the motor casing, as well as two or more permanent magnet pole pieces. The rotor (together with the axle and attached

commutator) rotates with respect to the stator. The rotor consists of windings (generally on a core), the windings being electrically connected to the commutator. The above diagram shows a common motor layout with the rotor inside the stator (field) magnets.

3.3.2. Working of D.C. Motor:

The geometry of the brushes, commutator contacts, and rotor windings are such that when power is applied, the polarities of the energized winding and the stator magnet(s) are misaligned, and the rotor will rotate until it is almost aligned with the stator's field magnets. As the rotor reaches alignment, the brushes move to the next commutator contacts, and energize the next winding. Given our example two-pole motor, the rotation reverses the direction of current through the rotor winding, leading to a "flip" of the rotor's magnetic field, driving it to continue rotating.

Fig.: Working of D.C. Motor

In real life, though, DC motors will always have more than two poles (three is a very common number). In particular, this avoids "dead spots" in the commutator. You can imagine how with our example two-pole motor, if the rotor is exactly at the middle of its rotation (perfectly aligned with the field magnets); it will get "stuck" there. Meanwhile, with a two-pole motor, there is a moment where the commutator shorts out the power supply (i.e., both brushes touch both commutator contacts simultaneously). This would be bad for the power supply, waste energy, and damage motor components as well. Yet another disadvantage of such a simple motor is that it would exhibit a high amount of torque "ripple."

5.3. RF Based Wireless Remote Using RX-TX Modules (434mhz.):

Description:-

This circuit utilizes the RF module (Tx/Rx) for making a wireless remote, which could be used to drive an output from a distant place. RF module, as the name suggests, uses radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate. A receiver can receive these signals only if it is configured for that frequency.

A four channel encoder/decoder pair has also been used in this system. The input signals, at the transmitter side, are taken through four switches while the outputs are monitored on a set of four LEDs corresponding to each input switch. The circuit can be used for designing Remote Appliance Control system. The outputs from the receiver can drive corresponding relays connected to any household appliance.

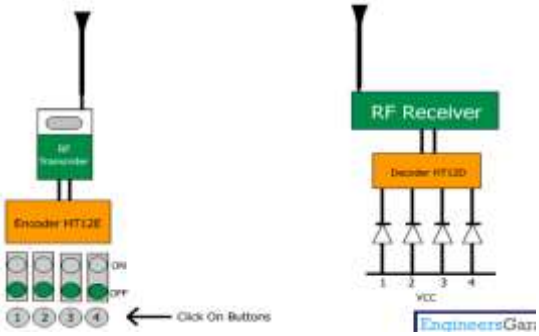


Fig.: RF Transmitter & RF Receiver

This radio frequency (RF) transmission system employs Amplitude Shift Keying (ASK) with transmitter/receiver (Tx/Rx) pair operating at 434 MHz. The transmitter module takes serial input and transmits these signals through RF. The transmitted signals are received by the receiver module placed away from the source of transmission.

The system allows one way communication between two nodes, namely, transmission and reception. The RF module has been used in conjunction with a set of four channel encoder/decoder ICs. Here HT12E & HT12D have been used as encoder and decoder respectively. The encoder converts the parallel inputs (from the remote switches) into serial set of signals. These signals are serially transferred through RF to the reception point. The decoder is used after the RF receiver to decode the serial format and retrieve the original signals as outputs. These outputs can be observed on corresponding LEDs.

Encoder

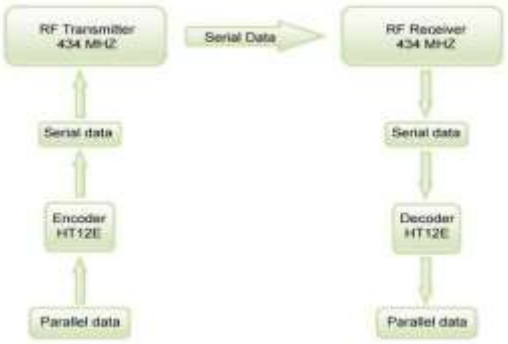
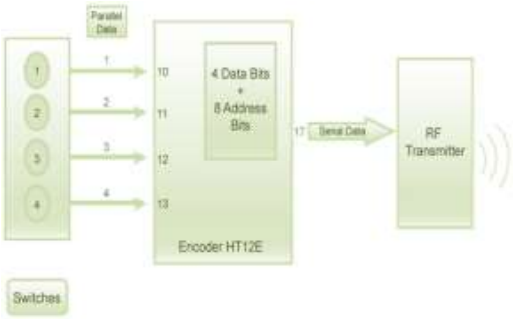


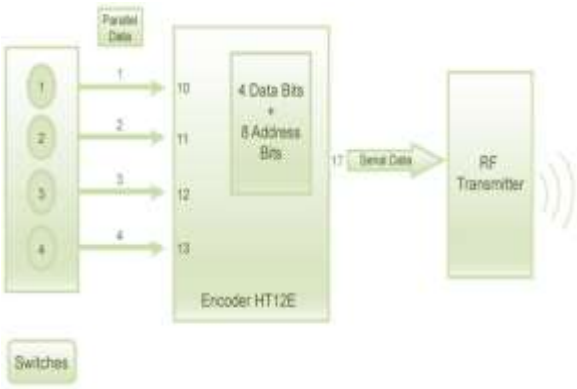
Fig.:Signal transmission

Encoder IC (HT12E) receives parallel data in the form of address bits and control bits. The control signals from remote switches along with 8 address bits constitute a set of 12 parallel signals. The encoder HT12E encodes these parallel signals into serial bits. Transmission is enabled by providing ground to pin14 which is active low.



Transmitter, upon receiving serial data from encoder IC (HT12E), transmits it wirelessly to the RF receiver. The receiver, upon receiving these signals, sends them to the decoder IC (HT12D) through pin2. The serial data is received at the data pin (DIN, pin14) of HT12D. The decoder then retrieves the original parallel format from the received serial data.

When no signal is received at data pin of HT12D, it remains in standby mode and consumes very less current (less than 1μA) for a voltage of 5V. When signal is received by receiver, it is given to DIN pin (pin14) of HT12D. On reception of signal, oscillator of HT12D gets activated. IC HT12D then decodes the serial data and checks the address bits three times. If these bits match with the local address pins (pins 1-8) of HT12D, then it puts the data bits on its data pins (pins 10-13) and makes the VT pin high. An LED is connected to VT pin (pin17) of the decoder.



When no signal is received at data pin of HT12D, it remains in standby mode and consumes very less current (less than 1μA) for a voltage of 5V. When signal is received by receiver, it is given to DIN pin (pin14) of HT12D. On reception of signal, oscillator of HT12D gets activated. IC HT12D then decodes the serial data and checks the address bits three times. If these bits match with the local address pins (pins 1-8) of HT12D, then it puts the data bits on its data pins (pins 10-13) and makes the VT pin high. An LED is connected to VT pin (pin17) of the decoder. This LED works as an indicator to indicate a valid transmission.

The corresponding output is thus generated at the data pins of decoder IC. A signal is sent by lowering any or all the pins 10-13 of HT12E and corresponding signal is received at receiver's end (at HT12D). Address bits are configured by using the by using the first 8 pins of both encoder and decoder ICs. To send a particular signal, address bits must be same at encoder and decoder ICs. By configuring the address bits properly, a single RF transmitter can also be used to control different RF receivers of same frequency.

To summarize, on each transmission, 12 bits of data is transmitted consisting of 8 address bits and 4 data bits. The signal is received at receiver's end which is then fed into decoder IC. If address bits get matched, decoder converts it into parallel data and the corresponding data bits get lowered which could be then used to drive the LEDs.

6. ADVANTAGES:

- Harvesting effectively rids your waterfront of certain types of vegetation that ultimately hinder your ability to traverse your lake.
- Creates a more conducive environment for swimming and irrigation.
- No possibility of an adverse reaction when using a mechanical means of treatment as opposed to using a chemical or granular approach.
- Effectively releases healthy nutrients back into the water that were previously trapped in the vegetation.

7. DISADVANTAGES

Weed removal rate is slow:-

As our robo is compact in size so it consume more time for removal of weed.

Battery Operated:-

Our robo is battery operated so it required charging the battery when battery is finished.

8. FUTURE SCOPE:

Automation could be achieved through robotics, of these sources robotics form an attractive medium for low cost automation. The main advantage of all robotics system is economy and simplicity. Automation plays an important role in reducing human effort.

9. CONCLUSIONS:

From this project the below conclusions are drawn after developing the actual model

1) Lower cost than actual weed harvester machine
2) Total project is environmental friendly.
3) Easy to handle so that operator relief from Back pain.
4) Economical and suitable for small lakes.
5) Maintenance is less.

9. ACKNOWLEDGEMENT:

There are, however, several individuals that have gone well beyond the normal call of duty and now I would like to thanks them. First of all, I would like to thanks **Prof. N. B. Surwase** , who was kind enough to encourage me in the exploration of **"Water Weed Harvest Robo"** and in the development of this Project II also wish to express thanks to

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REFERENCES:

[1] India 2009. A Reference Annual. Research, reference and training division. Publications Division. Ministry of Information and Broadcasting, Government of India. 2009. http://www.publicationsdivision.nic.in/othAccessed on [2011-07-25].

[2] Zettler F W, Freeman T E. Plant pathogens as biocontrols of aquatic weeds. Annual review of Phytopathology, 1972; 10: 455-470

[3] Joy P J. Ecology and control of Salvinia (African Payal) the molesting weed of Kerala (Technical Bulletin No. 2). Kerala Agricultural University, Trichur. 1978. pp.40.

[4] John Tinker. Waterweeds: flies in the irrigation ointment. New Scientist. Reed Business Information, 1974; 69(890): pp.64, 748.

[5] Thomas K J. The extent of Salvinia infestation in Kerala (S. India): Its impact and suggested methods of control. Environmental Conservation, 1979; 6: 63-69.

[6] Singh S P. Some success stories in classical biological control of Agricultural Pests in India. Asia- Pacific Association of Agricultural Research Institutions. 2004. http://www.apaari.org/wp-content/uploads/2009/05/ss_2004_ Accessed on [2011-7-18].

[7] Charudattan R. Regulation of microbial weed control agents. In: Biological Control of WR. Charudattan and H.L. Walke.

[8] Langeland K A. *Hydrilla verticillata* (L.f.) Royle (Hydrocharitaceae), "The perfect aquatic weed." Castanea, 1996; 61: 293-304.

[9] Spencer W, Bowes G. Ecophysiology of the world's mtroublesome aquatic weeds. 1990. In: Aquatic Weeds the Ecology and Management of Nuisance Aquatic Vegetation. Eds A H Pieterse & K J Murphy, pp. 39-73. Oxford University Press: New York.

[10] Chapalapata D.A.J.: Problems of Aquatic Weeds and Power Generation in ESCOM (A Paper presented at the 17th Africa Hydro Symposium) Oct 2005.

11] Chapalapata D.A.J &Ramundi H.F.: Kamuzu Barrage under Siege (A paper presented to a stakeholders meeting at Liwonde) Feb 2004.