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COIN BASED WATER DISPENSER AND MOBILE CHARGER OPERATED ON SOLAR ENERGY

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ABSTRACT

Here we put forward a fully automated coin based water dispenser system using Arduino and sensor. The system is capable of fully automated water dispensing using Pump and sensors. The system also senses if glass is placed at the counter to avoid water spoilage if there is no glass placed at the counter panel. The system uses IR sensors to detect presence of glass and then the sensors send a signal to the Arduino. The aim of this project is to provide a solution for charging of mobile at public places. The person who wants to charge his/her mobile has to insert a coin and connect his/her mobile with the charger. Mobile will be charged a particular amount of time depending on the number of coins inserted by him/her. As soon Coin Sensor detects the coin it sends a pulse to the Arduino. The Arduino turns ON the relay(Electromechanical Switch) to provide 230V,50Hz signal to the charging socket and the user can charge his/her mobile phone from the socket. The LCD (16×2) is used to display the time duration for which the user can charge his/her mobile phone. As the total time gets lapsed, the charging will be stopped. All system is powered with Solar Panel and Battery with charge controller. It can be further explained with the help of following block diagram.

Index Terms: *Coin Accepter, Solar panel, Charge controller, Water pump, Arduino, Infrared sensor, Battery, Relay.*

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INTRODUCTION

A vending machine is a machine that dispenses items such as snacks, beverages, alcohol, cigarettes, lottery tickets to customers automatically, after the customer inserts currency or credit into the machine. There is need of water dispenser in various public places also with mobile charging terminals availability which is fulfilled by this project. Vending machines are not very common in India and are usually found only in major cities or along some national highways. Plastic pollution involves the accumulation of plastic products in the environment that adversely affects wildlife, wildlife habitat, or humans. It takes 500-1,000 years for plastic to degrade. Mobile charging stations at various public places are required by modem generation.

LITERATURE SURVEY

1. Water dispensing system using arm. Prof. D.A.Mhaske published on April 2015.
With the improvement in the technology there are many advanced devices and machines that are useful to the mankind. One of them is coin operated telephone. As we know the function of it and how it works. With the same technology used we are going to design a project which is based on liquid. Coin Operated Water Dispensing System as the name indicates it is based on COIN operation. When we put the coin in coin box camera catch the coin image camper to database using mat lab and give signal to ARM7. Microcontroller switched on relay and motor is on, when put the glass under the valve IR sensor is activate gives output in the form of water.

2. Coin Based Mobile Charger Using Solar Panel.Prof. Raju R. Khawse published on March2015.
Mobile phones play's an important role in present communication world as well as day to day life. This paper describes mobile charger using solar panel system based on coin and RFID module. The mobile phone business is currently worth billions of Dollars supports of most no. of features in your mobile phone with several OS. There are increasing large numbers of Android user which requires more battery supply. So to operate these mobile phones public charging needed & it should be useful to public.

3. Coin Based Universal Mobile Battery Charger. Prof. M.S.Varadarajan Published on Jun2012.
This paper describes coin based mobile charger using solar tracking system. Mobile phone's become a major source of

business/personal communication; the mobile phone business is currently worth billions of dollars, and supports millions of phones. The need to provide a public charging service is essential. Coin operated mobile phone charger is new business milestone because many are attending business conventions and forgetting their charger at home or in hotel rooms. Students and many people use the public transportation that don't know that their level of their battery is low are prospective customers for coin operated mobile phone charger service. Recommended locations include: Hotels, Conference centers, Exhibition halls, Serviced offices, Exchange halls, Motels, Leisure centers, Health clubs, Training centers, Golf clubs, Retail outlets, Shopping malls, Internet cafes, Universities, Colleges, Train terminals, etc., so that the mobile phone users can reactivate a low or dead battery by simply plugging in and charging for one rupee.

METHODOLOGY

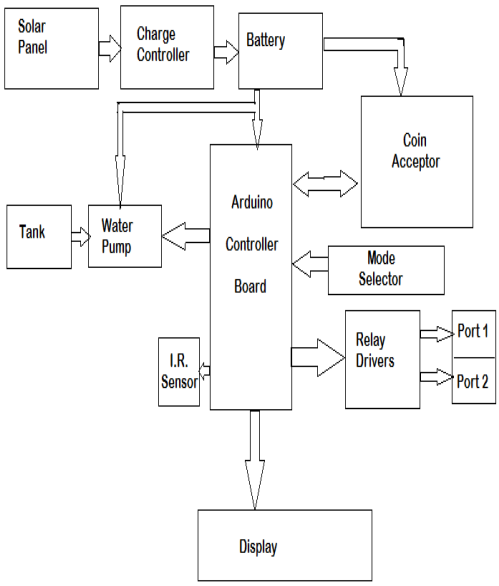

Fig-1: Block Diagram

A. Coin Accepter :

Fig-2: Coin Accepter

The total equipment of this project is placed inside the box are not visible to others. A currency detector or coin acceptor is a device that determines whether banknotes or coins are genuine or counterfeit. These devices are used in many automated machines found in retail kiosks, self-checkout machines, gaming machines, transportation parking machines, automatic fare collection machines, and vending machines. The process involves examining the currency that has been inserted, and by using various tests, determining if the currency is counterfeit. Since the parameters are different for each coin or banknote, these detectors must be programmed for each item that they are to accept.

B. Solar Panel :

Fig-3: Solar Panel

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (PV) module is a packaged, connect assembly of typically 6×10 solar cells. Solar Photovoltaic panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions, and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. There are a few commercially available solar panels available that exceed 22% efficiency and reportedly also exceeding 24%. A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes a panel or an array of solar modules, a solar inverter, and sometimes a battery and/or solar tracker and interconnection wiring.

C. Charge Controller :

Fig-4: Charge Controller

A charge controller, charge regulator or battery regulator limits the rate at which electric current is added to or drawn from electric batteries. It prevents overcharging and may protect against overvoltage, which can reduce battery performance or lifespan, and may pose a safety risk. It may also prevent completely draining ("deep discharging") a battery, or perform controlled discharges, depending on the battery technology, to protect battery life. The terms "charge controller" or "charge regulator" may refer to either a stand-alone device, or to control circuitry integrated within a battery pack, battery-powered device, or battery charger.

D. Water Pump :

Fig-5: Water Pump

A pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action. Pumps can be classified into three major groups according to the method they use to move the fluid: direct lift, displacement, and gravity pumps. Pumps operate by some mechanism (typically reciprocating or rotary), and consume energy to perform mechanical work by moving the fluid. Pumps operate via many energy sources, including manual operation, electricity, engines, or wind power, come in many sizes, from microscopic for use in medical applications to large industrial pumps.

E. Arduino :

Fig-6: Arduino

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices.

An Arduino board consists of an Atmel 8-, 16- or 32-bit AVR microcontroller (although since 2015 other makers' microcontrollers have been used) with complementary components that facilitate programming and incorporation into other circuits. An important aspect of the Arduino is its standard connectors, which let users connect the CPU board to a variety of interchangeable add-on modules termed shields. Some shields communicate with the Arduino board directly over various pins, but many shields are individually addressable via an I²C serial bus—so many shields can be stacked and used in parallel. Before 2015, Official Arduino had used the Atmel mega AVR series of chips, specifically the ATmega8, ATmega168, ATmega328, ATmega1280, and ATmega2560. In 2015, units by other producers were added. A handful of other processors have also been used by Arduino compatible devices. Most boards include a 5 V linear regulator and a 16 MHz crystal oscillator (or ceramic resonator in some variants), although some designs such as the Lily Pad run at 8 MHz and dispense with the onboard voltage regulator due to specific form-factor restrictions. An Arduino microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external chip programmer. This makes using an Arduino more straightforward by allowing the use of an ordinary computer as the programmer.

At a conceptual level, when using the Arduino integrated development environment, all boards are programmed over a serial connection. Its implementation varies with the hardware version. Some serial Arduino boards contain a level shifter circuit to convert between RS-232 logic levels and transistor–transistor logic (TTL) level signals. Current Arduino boards are programmed via Universal Serial Bus (USB), implemented using USB-to-serial adapter chips such as the FTDI FT232. Some boards, such as later-model Uno boards, substitute the FTDI chip with a separate AVR chip containing USB-to-serial firmware, which is reprogrammable via its own ICSP header. Other variants, such as the Arduino Mini and the unofficial Boarduino, use a detachable USB-to-serial adapter board or cable, Bluetooth or other methods, when used with traditional microcontroller tools instead of the Arduino IDE, standard AVR in-system programming (ISP) programming is used.

The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The Diecimila Duemilanove, and current Uno provide 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. These pins are on the top of the board, via female 0.1-inch (2.54 mm) headers. Several plug-in application shields are also commercially available. The Arduino Nano, and Arduino-compatible Bare Bones Board and Boarduino boards may provide male header pins on the underside of the board that can plug into solder less breadboards.

F. Infrared Sensor :

Fig-7: Infrared Sensor

An infrared detector is a detector that reacts to infrared (IR) radiation. The two main types of detectors are thermal and photonic (photo detectors). The thermal effects of the incident IR radiation can be followed through many temperature dependent phenomena. Bolometers and micro bolometers are based on changes in resistance. Thermocouples and thermopiles use the thermoelectric effect. Golay cells follow thermal expansion. In IR spectrometers the pyro electric detectors are the most widespread. The response time and sensitivity of photonic detectors can be much higher, but usually these have to be cooled to cut thermal noise. The materials in these are semiconductors with narrow band gaps. Incident IR photons can cause electronic excitations. In photoconductive detectors, the resistivity of the detector element is monitored. Photovoltaic detectors contain a p-n junction on which photoelectric current appears upon illumination.

G. Battery :

Fig-8 : Battery

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smartphones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that when connected to an external circuit will flow and deliver energy to an external device. When a battery is connected to an external circuit, electrolytes are able to move as ions within, allowing the chemical reactions to be completed at the separate terminals and so deliver energy to the external circuit. It is the movement of those ions within the battery which allows current to flow out of the battery to perform work. Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved to additionally include devices composed of a single cell.

H. Relay :

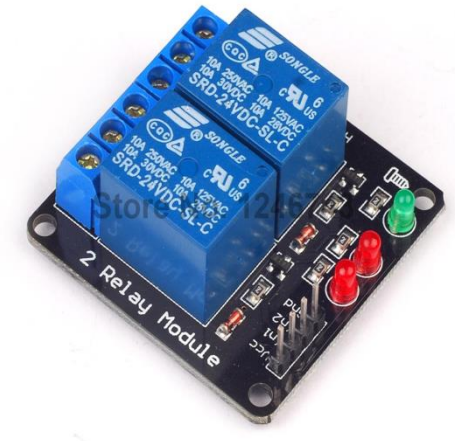

Fig-9: Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers: they repeated the signal coming in from one circuit and re-transmitted it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

RESULT

We are insert the coin in coin accepter. When inserted coin is true then system provide the water as well as charging for mobile at a time and it is depends on the selected mode (mode1 for water & mode2 for charging). The inserted coin is false or duplicate then coin accepter rejects the coin. IR sensor check the glass for water if glass is absent then water pump is stop otherwise pump is turn ON.

CONCLUSION

An innovative system using Arduino controller board and solar panel system has been developed for water dispensing and mobile charging. This coin based water dispenser and mobile charger systems provide crucial service to emergency travelers in the earliest possible time. By implementing this system problem of wastage plastic bottles also with emergency phone charging is solved. This system also comprises of renewable solar energy that will ensure power saving.

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