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Solar Operated Liquid Vending Machine

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ABSTRACT Water has the most marketable products of the century. The stress on the multiple water coffers is a result of numerous factors. On the one hand, the fleetly rising population and changing cultures have increased the need for freshwater. However, it would be clear that in utmost pastoral areas, homes are paying far more for water force than the frequently-normal rates charged in civic areas. Also, if this cost of costing water which is nearly original. In India, there's problem of safe drinking water thus we're going to give mineral water. Water has come the most marketable products of the century. To avoid these problems, this design named “ Solar operated portable water vending machine” is proposed to deliver the purified water to the public by using the detectors and microcontrollers grounded on the mechatronics principles. It'll be cheaper and further profitable for the bulk product.

KEYWORDS: Arduino Microcontroller, Solar panel, LCD, battery, IR Sensor, relay, buck-boost converter, sprayer motor.

I.INTRODUCTION

Water has the most marketable products of the century. The stress on the multiple water coffers is a result of numerous factors. On the one hand, the fleetly rising population and changing cultures have increased the need for freshwater. However, it would be clear that in utmost pastoral areas, homes are paying far more for water force than the frequently-normal rates charged in civic areas, if occasion costs were taken into account. Also, if this cost of costing water which is nearly original. With the enhancement in the technology there are numerous advanced bias and machines that are useful to the humanity. One of them is coin operated telephone. As we know the function of it and how it works. With the same technology used we're going to design a design which is grounded on liquid (water). Coin Operated Water Dispensing System as the name indicates it's grounded on COIN operation. It has been especially designed for use on Road station, Bus deposes, public places etc. This system is grounded on microcontroller. The inputs to the microcontroller are coin and affair in the form of water. Looking at the specifications needed for Water Dispensing System and for simplicity of our operation, microcontroller was plant to be stylish suited. Now-a-days, automated dealing machines are most in use as they make colorful conditioning not only easier but also more effective.

The machine has multitudinous input and labors to give service to the client. This machine is analogous to dealing machine. It is coin operated machine. It accepts only coins as input like Rs. 1 in any sequence



and delivers drinking water. The main aphorism of this system is to avoid the environmental pollution and also to avoid the destruction of water with the help of water control stopcock. We know that the available water coffers have initiated towards the end.

II.METHODOLOGY

Solar energy is a kind of blue renewable energy sources and can be used by the light-heat exchange and light-electrical exchange. With solar photovoltaic panel component, the vending machines can change the single electric power to intelligent lighting control system; meanwhile, the humanized services can be achieved with the software programming. With the embedded technology, the intelligent control devices can be applied to the vending machine.

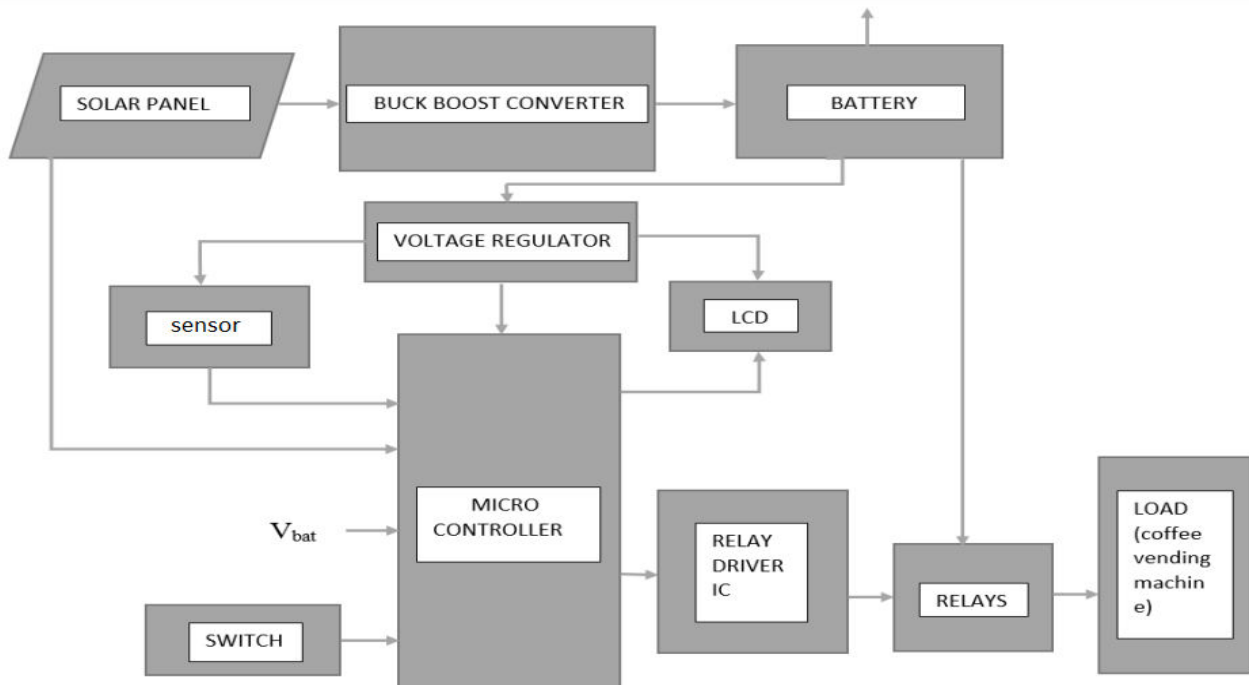


Fig.1 Block Diagram

III.OVERVIEW OF MAXIMUM POWER POINT TRACKING

A typical wind and solar panel converts only 30 to 40 percent of the incident wind and solar irradiation into electrical energy. Maximum power point tracking fashion is used to ameliorate the effectiveness of the wind and solar panel. According to Maximum Power Transfer theorem, the power affair of a circuit is maximum when the venin impedance of the circuit (source impedance) matches with the cargo impedance. Hence our problem of tracking the maximum power point reduces to an impedance matching problem. In the source side we're using a boost convertor connected to a wind and solar visage el in order to enhance the affair voltage so that it can be used



for different operations like motor cargo. By changing the duty cycle of the boost motor meetly we can match the source impedance with that of the cargo impedance.

SOFTWARE SIMULATOR

MATLAB:

MATLAB is used for technical computing because of its high performance. Programming, visualization and computation are integrated with the MATLAB. So it is easy to use. In mathematical notation the problems and solution are expressed. The basic elements in the MATLAB do not require dimensioning so MATLAB is an interactive system. Technical computing problems are solved by this interactive system, mainly matrix and vector formulations within a fraction of time. C or FORTRAN are mainly used scalar non-interactive languages to write programs. This is a high-level matrix/array language with control flow statements, functions, data structures, input/output, and object-oriented programming features. It allows both “programming in the small” to rapidly create quick and dirty throw-away programs, and “programming in the large” to create complete large and complex application programs.

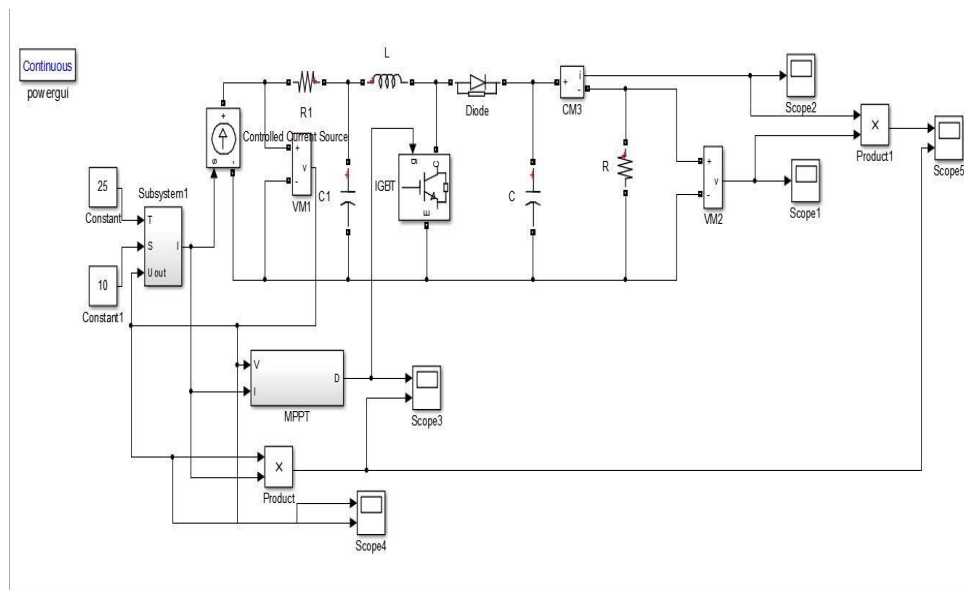


Fig.2 MATLAB Simulation

Proteus ISIS:

Proteus PCB design electronic circuits can computer- backed design and circuit boards are designed. The ISIS Intelligent Schematic Input System (Intelligent Switching input system), is the terrain for the design and simulation of electronic circuits. The element library includes claims further than circuit factors with 6000 Prospect Simulations models. Own factors can be created and added to the library.



ISIS includes a base VSM machine with support for the following functions

1. DC/ AC voltmeter and ammeter, oscilloscopes, sense analyzers
2. Analog signal creators, digital pattern creator
3. Timekeeper functions, protocol analyzers (including RS232, I2C, SPI)

VIRTUAL SYSTEM MODELLING

The VSM Virtual System Modelling provides a graphical SPICE circuit simulation and animation directly in the ISIS environment. The SPICE simulator is based on the Berkeley SPICE3F5 model. It can microprocessor-based systems can be simulated. With the VSM engine can interact during the simulation directly with the circuit. Changes of buttons, switches or potentiometers are queried in real-time and LED indicators, LCD displays, "Hot / Cold" Wires displayed.

IV.HARDWARE IMPLEMENTATION

The solar operated liquid vending machine is very useful. It saves our electricity. It is very effective. It is very easy to handle. In this project simple programs are used. It is easy to understand. They connect all the hardware equipments to complete it. We use Arduino UNO Microcontroller, Solar Panel, Buck-Boost converter, Battery, IR Sensor, Switch, Relay, Button, Sprayer motor, Liquid Crystal Display (LCD) in this project. In this project, we use IR Sensor to detect the object or container to fill the liquid in that. We connect buck-boost converter, battery, relay, button, microcontroller, IR Sensor, switch, LCD, sprayer motor and the solar panel into it.



Fig.3 Hardware implementation



This is the hardware setup. When we switch ON the kit, the LCD displays “WELCOME” and “SOLAR OPERATED LIQUID VENDING MACHINE”. Then we press the button it displays “PLEASE PLACE THE CONTAINER” until we place any cup near to the IR Sensor. When the IR Sensor detects the object the water is pour into the cup from the container using the sprayer motor. The motor pumps the water from the container and pour into the cup. After filling the cup we don’t press the button. Then the LCD displays ”THANK YOU”

V.RESULT AND CONCLUSION

Solar energy is obtained by using the solar panel of 12V, 10 Watt, which gets converted into electrical energy. Battery has been charged at its annual rating of 7.4Volts. Low battery indication is shown on the LCD screen and red LED glows. The machine is operated manually with help of switches. The machine is operated automatically with the help of mobile (Arduino). 6. Heating of water is upto 100K. Liquid is being prepared with addition of different types of ingredients. The task performed by the machine is displayed on LCD Screen.

REFERENCES

1. Guthi Prakash, Dr. S. Pradeepa, “Design and Modeling for Solar Based Power Source”, 4th International Conference on Electrical Energy Systems (ICEES), 978-1-5386-3695-4\$31.00©2018 IEEE
2. Nistor Daniel Trip, Adrian Schiop, Marin Tomse, “Increase of the Efficiency for a Solar Renewable Source Using a Soft Switched DC-DC Boost Converter”, Department of Electronics, University of Oradea, Romania, 1-4244-0969-1/07/\$25.00©2007 IEEE
3. Medilla Kusriyanto, Beny Setiawan, “Android Smart Home System Based on Atmega16”, 2015 4th International Conference on Instrumentation, Communication, Information Technology, and Biomedical Engineering (ICICI-BME) Bandung , 978-1-4673-7800-0/15/\$31.00©2015 IEEE
4. NavdeepJakhar, NileshBaheti, Mahesh Chand Gurjar, Parag Sharma, “Model Development of Refrigerator and Heater Based Poltler Module and Fresnel lens”, International Conference on Recent Advance and Innovation in Engineering (ICRAIE-2016), December – 23 – 25, 2016, Jaipur, 978-1-5090-2807-8/16/\$31.00©2016 IEEE
5. Kwangsoo Kim, Dong-hwan Park, Hyochan Bang, Geonsoo Hong, Seong-ilJin, “Smart Coffee Vending Machine Using Sensor and Actuator Networks”, 2014 IEEE International Conference on Consumer Electronics (ICCE), 978-1-4799-1291-9/14/\$31.00©2014 IEEE
6. Shiqiang Wang, Mingshum Wang, Yue Ma and Hansheng Hong, “Series Connected Buck Boost Type Solar Power Converter Based on Microcontroller” ,2009 IEEE International Conference on Mechatronics and Automation , August 9-12, Changehum , China
7. Fabio A, Faria, Jefresson A. dos Santos, Ricardo da S. Torres, Anderson Rocha, “Automatic fusion of Region Based Classifiers for Coffee crop Recognition”,978-1-4673-5/12\$31.00©2012 IEEE
8. P.Manikandan, S.Karthick, S.Saravanan and T.Divya,” Role of Solar Powered Automatic Traffic Light Controller for Energy Conservation” International Research Journal of Engineering and Technology (IRJET), Vol.5, Issue 12, pp.989-992, 2018.
9. R.Satheesh Kumar, D. Kanimozhi, S. Saravanan, “An Efficient Control Scheme for Wind Farm Using Back to Back Converter,” International Journal of Engineering Research & Technology (IJERT), Vol. 2, No.9, pp.3282-3289, 2013.
10. K.Prakashraj, G.Vijayakumar, S.Saravanan and S.Saranraj, “IoT Based Energy Monitoring and Management System for Smart Home Using Renewable Energy Resources,” International Research Journal of Engineering and Technology, Vol.7, Issue 2, pp.1790-1797, 2020
11. S.Umamaheswari, M.Thilagavathi, S.Sivaranjani, N.Mohananthini, M.Selvakumari, S.Saravanan,” A Study Of Renewable Energy In Smart Grid Technology”, International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.



12. D.Ajithkumar, J.S.Akilan, K.Dileep, R.Lokesh, E.Viswanathan S.Tamilselvan S.Saravanan," Design and Development of Electric Two Wheeler With Fast Charging", International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.
13. V.Annamalai P.S.Isaiyalagan T.Manikandan T.Premkumar N.Sathya R.Prakash S.Saravanan," Design and Implementation of Automatic Rope Robot for Supplying Poultry Feeds", International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.
14. S.Arvinthraj, M.Arun, S.Inbhakumar, R.Sagayaraj, S.Saravanan," Multipurpose Hybrid Electric Vehicle for Agricultural Applications", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7366-7371, 2021.
15. G.Boopathi raja, K.Dhinesh, S.Gobi, G.Nandakumar, G.Nagarajan, G.Vijayakumar, S.Saravanan," Cotton Harvesting Machine", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7372-7377, 2021
16. S.Anbarasu, K.Hariharan, S.Hariharan, R.Vinoth, T.Divya, N.Mohananthini, S.Saravanan," Battery Monitoring for E-Scooter Using Internet of Things", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7384-7389, 2021
17. S.Mangalraj, L.Manimaran, C.Kumaresan, R.Manikandan, G.Srinivasan, A.Gokulraj, S.Saravanan," IoT Based Smart Energy Meter", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7390-7395, 2021
18. M.Dhanarasan, T.Jothimurali, S.U.Manishkumar,, G.Dineshkumar,P.Sakthilakkia, A.Senthilkumar, S.Saravanan," Gas Booking Using IoT", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7396-7400, 2021
19. D.Manoj kumar, C.Kavinkumar, S.Kesavan, S.Saranraj, M.Selvakumari, P.Dhivyabharathi, S.Saravanan," Intelligent Water Level Management for Domestic Application Using GSM", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7401-7404, 2021
20. Jaladi Kishan Kanna, S.Muniyappan, A.Ajay, M.Swathisriranjani, N.Balaji , K.Prakasam , S.Saravanan , " IOT Based Multi Functional Robot", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7405-7413, 2021
21. G.Naveen, S.Guna, P.Praveen Kumar, P.Manikandan, S.Sandhiya, M.Dineshkumar, S.Saravanan , " Smart Agriculture Using IoT", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7414-7419, 2021
22. K.Karan, M.Nirmal Kumar, S. Pugalenth, R.Suresh V.Deepika, Dr.S.Saravanan , " Design and Development of E-Vehicle Based on Roller", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7420-7426, 2021
23. S.Priyadarshini, D.Sivaranjani, S.Sowbaranika, S.Saravanan, N.Mohananthini," Automatic Solar Panel Tracker Using Artificial Intelligence and Data Science", International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13729-13735, 2021



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