Available online at www.elixirpublishers.com (Elixir International Journal)

Computer Science and Engineering

Elixir Comp. Sci. & Engg. 49 (2012) 9731-9733

ISSN: 2229-712X

Vending machine design based on solar energy and LED screen

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ARTICLE INFO

Article history:

Received: 6 June 2012;

Received in revised form:

22 July 2012;

Accepted: 30 July 2012;

Keywords

Solar energy;

LED screen;

Database programming.

ABSTRACT

In order to save the energy and provide the humanized hint and operation of vending machine, we design the function and application combing with solar energy and light emitting diode (LED) screen, the vending machine updated the intelligent device system to data query and the alarm hints to sound. The theoretical analysis and practical results implies that it is feasible to provide better service for client by the intelligent device system.

Introduction

When we travel in the tourist cities or abroad, the vending machines act an important role on our self-services, but it is lack of humanized hints and managements. Many of them had no intelligent hints with voice message or digital screen display. Especially the onefold power supply management of light energy, there are little energy saving selections [1-6].

Solar energy is a kind of blue renewable energy sources and can be used by the light-heat exchange and light-electrical exchange [7-10]. 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 LED screen and computer software programming [11,12].

With the embedded technology, the intelligent control devices can be applied to the vending machine.

Methods

Solar Energy: the solar energy battery can be a substitute for power energy. Solar battery can absorb the sun radiation to change into the power energy. By the solar photovoltaic panel component or solar circuit, the DC electricity can be applied to regular power circuit [13-15].

The photovoltaic battery can provide the energy of the machine, such as the watch, computer, vending machine and so on. The photovoltaic component can be made into different shapes and connections [16-20].

LED Screen: LED screen provides the visual display of the characters, graphs, images, animations, markets and videos by semiconductor lighting diode. The LED screen is made up of LED matrix block; it can display the digital signal synchronous with the computer [14-19].

LED screen system includes computer special hardware, display screen, video input port and system software. The computer hardware decides directly system functions; the display screen receives the display information of external port and drives the LED lighting to form image, moreover, output sound by adding power amplifier and sound box; video input port provides all kinds of data format coming from video recorder, vidicon, computer and so on; the system software provides the video display software [21-23].

Results

Intelligent Light Based on Solar Energy: in the light design of the vending machine, we put forward a hybrid solution in order to save the power energy. In the light control circuit of the vending machine, there are two lighting circuit and an intelligent control switch. A regular circuit of wine provides the assistance of the solar energy circuit in the bad weather or in the dark. The solar energy circuit provides the lighting in daytime with good sunshine and storage the energy by a storage battery [24-29].

Discussion

Solar Energy: in the vending machine, solar energy switch circuit has been designed by electronic circuit wafer. The solar energy and regular electricity power are the power methods to light. In the circuit, it is necessary to add an electronic element with the function of switch and quantity of electricity measurement. We can select the lighting method by the electricity quantity.

The function of solar energy switch circuit includes two parts, so we need to simply change or update the solar device system. In the embedding, the electricity quantity measurement and switch circuit design need to add to the vending machine.

LED Screen: in the design of LED screen, we accomplish the intelligent information control based on the regular function. In the embedding of the vending machine, the hardware circuit designs accomplish LED driver, control and display based on single chip microcomputer system. The computer system accomplishes control function; the clock control model demonstrates the system time and we select the suitable screen for the LED screen driver model. The software design concentrates on embedding and database programming.

By the LED screen, the simple and complex information can be displayed and interactive operated. If there is no sale, we can advertise our city or some tourist information. If the sale exists, we can display the detailed information and demonstrate

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the introduction of the sales. The sales have been stored in the database.

Intelligent Sound and Language Functions: with this function we can provide more humanized operation and hint. In vending machine, the language display in LED screen and sound hint of the operation give people convenience. In the programming, it mainly realizes the intelligent query of the sales; when clients select the confirm operation of the purchase, the query operations will be triggered before the goods out of the vending machine and the language or sound hints will be given to the client on the overdue goods or error sale actions. When the operators query or add and update goods, the function operates batch operations by the stored procedure to check the overdue of the goods and give hint by the language or sound. For the sound hints, we apply the text changing sound technology based on former record of the display contents.

The same function implements can be applied in the car alarm system, overflow protection system and intelligent switch system.

Database Programming: Database programming focuses on the data management, such as the data collection and storage. By the data definition language, data manipulation language and data control language, the basic data operations can be realized easily. For the smart hint and pitch query, we use the trigger and stored procedure to achieve the data safety check and automatic operation with the batch data. For the data consistency, we adopt the snapshot technology to keep the logic uniform of the data in different servers.

Conclusions

Quality of service of our lives is a focus in our modern society. How to improve the quantity is a society and individual question.

In our paper, we put forward the method to improve the quantity of the vending machine in operation. The results implies it is feasible to apply the smart control system to the machine with some new technologies. Such as LED screen and solar energy.

Intelligent assistance device system with smart sound hint, LED screen and data query acts important role on improving vending machine self-service and humanized operations

Acknowledgements

This work was financially supported in part by Institutes of Higher Education Science and Technique Foundation of Shandong Province (J10LC59), Scientific Research Tasks of Tainshan Medical University General Program (2010ZR100) and College Student Science and Technique Innovation Action Program of Taian (2010D2033, 2010D2034, 2011D1035, 2011D2035).

The authors thank the Institute of Neuroinformatics in Dalian University of Technology staff for assistance with data collection and the College of Information and Engineering Taishan Medical University colleagues for manuscript comments. Special thanks to professor Yiyuan Tang for his assistance of the paper and Polly and Xiaochen Xu for suggestions and modifications on writing.

The authors are grateful to the anonymous referees for their valuable comments and suggestions.

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