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Development of Automated Solar Food Drying Machine

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Abstract— automated solar food drying is a small scale machine for drying different types of food items. Food items can be dried and preserved for a longer period. Drying of food items for preserving them is a technique used from very early period. Nowadays infrared radiations can be used for drying purpose. This process is more efficient and unique compared to natural drying systems. Cost, more area and infrastructural drawbacks of the conventional methods can be overcome by this method by providing the modern, automatic and low cost food drying unit. The food items to be dried are captured by the camera. Then it detects food in the web whose data is already stored in the web. The time and temperature is automatically set. Relay is used to control on and off process. Microcontroller is used for controlling the heating and maintaining time constant throughout the chamber.

Keywords— Food drying, solar panel, microcontroller based, Sensor, relay.

I. INTRODUCTION

Solar food drying is a technique for nourishment conservation where nourishment is dried. Drying represses the development of microbes, yeasts and shape through the evacuation of water. Lack of hydration has been utilized for this reason since antiquated occasions. Water is evacuated through dissipation, electronic nourishment dehydrators or solidify drying can be utilized to speed drying procedure and guarantee predictable outcomes. In India, various sorts of nourishments are accessible in different districts of country. The agrarian food items require the transportation of sustenance from production regions to nourishment purchaser zone. This needs a legitimate protection during transportation and to maintain strategic distance from nourishment harm and long utilization, crisp sustenance is changed over dry nourishments. Drying is used to bring down the expense, putting away and it decreases weight and volume of last items. This strategy has numerous hindrances like spoilt food items by wind, dust etc reduces growth. Thus this innovation will turn into elective technique which can process the items in protected, sterile and produce better quality and nutritious sustenance. This dryer has spared vitality, work concentrated, time, less territory for spreading items to dry. A microcontroller based framework that empowers to synchronous observing was used. There is a DHT11 sensor as the contributions of framework which is temperature. The yield is checked with principle processor and given capabilities dependent on sustenance types are executed. Nourishments were placed in a dryer. This will guarantee drying even in poor climatic conditions. The quality and shade of the dried item rely on the systems utilised for drying process. Another parameter utilized in dissecting the drying procedure is drying rate which is alluded to as time taken to dry the sustenance. The drying rate influences the shading and nature of the dried item.

II. RELATED WORKS

Authors of [1] have proposed the shading and the kind of nourishment stuffs dried with this sun powered chimney dryer are similar to that of a high calibre dried in business sectors. They are free from bacteria and other microbial pollutions. The paper [2] reviews drying in agricultural food items and marine items as one of the attractive application of renewable solar source. It suggests different sun dryers based on the items to be dried, technical, economical and other aspects. Paper [3] suggests that testing of dryers should be done to evaluate their actual and measured performance with different dryers and results give required information for designer and consumer. The deficiencies of parameters for most part announced are featured and extra parameters have been recommended. The [4] literature paper suggests that crop drying can be done either by fossil fuels in mechanical dryer or by simply placing them in sun. The previous mechanical system is not cost friendly and has no positive effect to surrounding. The latter method is purely based on weather conditions. Using sun dryer is very cheap and efficient when compared to other conventional methods, since they can be operated without electrical grids or fossil fuels. This survey paper suggests state of different dryers used today. Besides finding modes of dryers environmental influence on solar source that is important in sun drying is highlighted. Paper [5] exhibits the suitability of sun based dryer for farming maintainability and sustenance security. Before research work performed on sun oriented dryers and sun based air radiators, as the imperative component for the backhanded and blended methods of sun based dryers, were exhibited in the present audit paper. For maintainability and environmental change, it is critical to utilize sustainable wellsprings of vitality.

III. METHODOLOGY

A. Block diagram

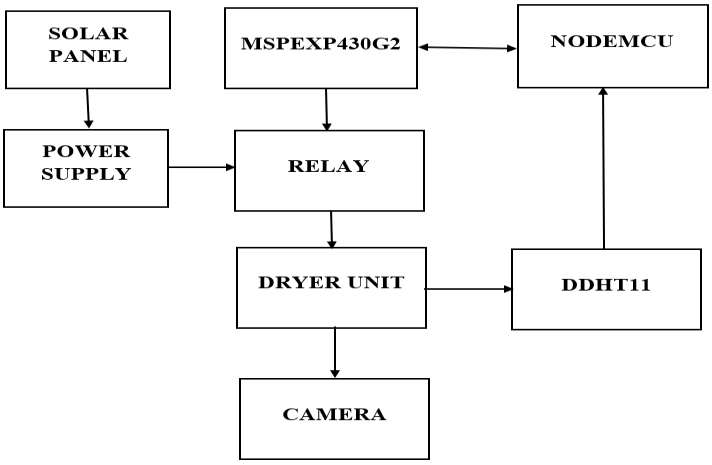

Fig. 1 Functional block diagram

B. Working

In this model we have to put the food sample which has to be dried into dryer machine. In this framework a DHT11 sensor is utilized. Sensor is utilized to measure the temperature and humidity in the unit. Sensor is associated with microcontroller. A controlled situation which is appropriate for little scale food product drying process inside a shut chamber. Over drying causes staining because of caramelization and decrease in healthy benefit. Then again, under drying or moderate drying results in decay of the nourishment quality because of parasitic and bacterial activity. The solar panel is utilized to control the microcontroller. The microcontroller is utilized and customized to control and deal with the general procedure of the unit. Various organic products will have various temperatures to dry.

C. Pin diagram

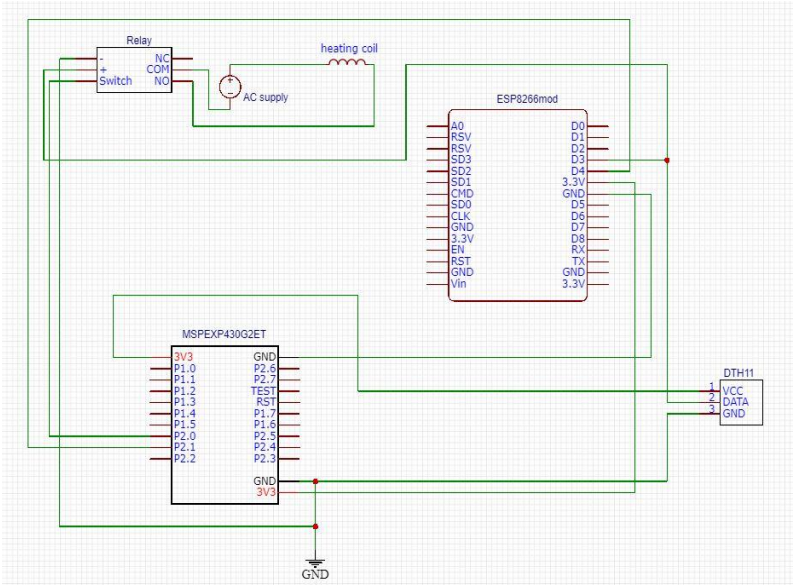

Fig2: pin diagram

C. Image detection

The food sample image will be captured with the help of webcam and sent to the matlab for picture recognition. In matlab utilizes SVM there will be testing and training of testing of samples. The identified picture, comparing drying temperature and drying term will then be sent to notebook. From the scratch pad the items and temperature for drying is sent to the web with the goal that the gadget can be controlled utilizing IOT

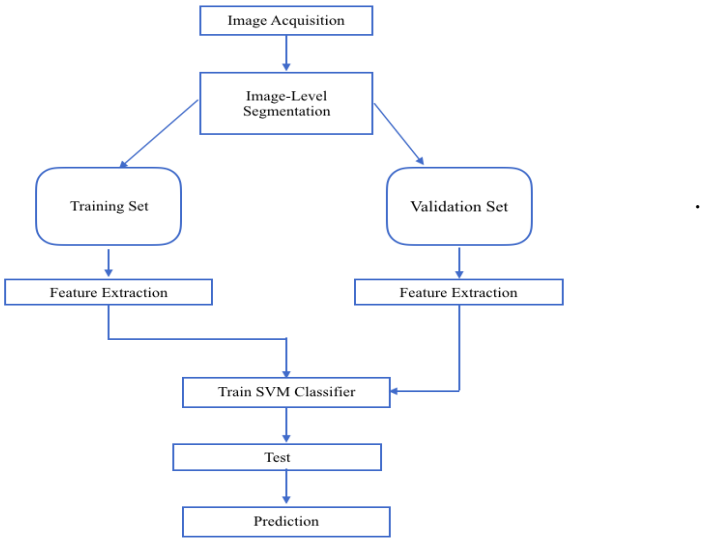

Fig 3: Flow diagram for image detection

D. Internet of Things:

The device can be monitored and controlled through web using IoT. The detected image details from the notepad is collected i.e. the temperature and duration of the drying process. The device can be operated in both automatic and manual mode. In auto mode, the duration of the drying is set automatically by the controller according to the food sample detected from the matlab. In manual mode of operation the can be switched on or switched off as desired by the user manually.

IV. RESULTS

The project is mainly based on IOT and image processing. Many simulation steps have to be followed to obtain the results of drying. First open wamp server for hosting host PHP pages. It is used to store the root directory folder. Then click on the folder and open it. Login to the admin page created using MySQL which will direct us to the registration page. In registration page modification can be done where we can also adjust temperature and temperature is also measured. When the user doesn't submit proper values it directs us back to registration page. Then enter username and password. Open matlab and run the code. Then create a database in matlab through ip- webcam where the training of different food items are done which is done through real time capturing of images. Solar panel will open up where we can switch ON /OFF the drier and we can also monitor temperature, duration of time and fruits placed can also be detected. The Fig shows the result of the experimentation.

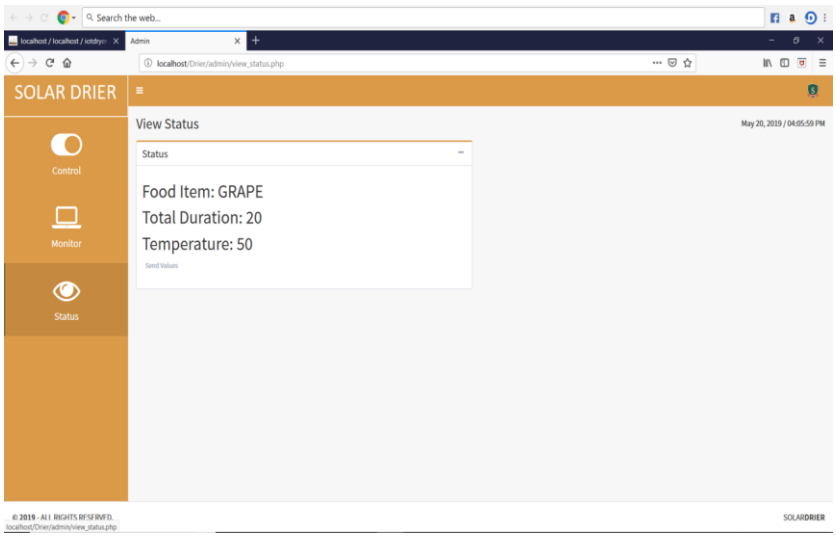

Fig 4: Experimentation result

V. CONCLUSION

The project suggests drying as the best method for preserving the food items for a longer time. By using this automated sun dryer we get faster, hygienic, effective and better quality items compared to open and other conventional drying methods. This dryer has solar and also battery supply where food items are dried and simultaneously controlled and monitored in the remote areas using IOT technology. The battery power supply gives an advantage of using this dryer even in the cloudy environment and can also be used during night. This machine also contain image processor unit by which loaded items are automatically detected and corresponding time duration and temperature is set for drying purpose. This is also used in drying agricultural food items like seeds, crops, fruits, vegetables etc

REFERENCES

[1].Medugu, D. W, "Performance study of two designs of solar dryers", Archives of Applied Science Research, 2010, 2 (2):136-148(http://scholarsresearchlibrary.com/archive.html)
[2].Fudholi , K. Sopian, M.H. Ruslan, M.A. Alghoul, M.Y. Sulaiman, "Review of solar dryers for agricultural and marine products", Renewable and Sustainable Energy Reviews 14 (2010) 1–30
[3].M. Augustus Leon, S. Kumar, S.C. Bhattacharya, "A comprehensive procedure for performance evaluation of solar food dryers", Renewable and Sustainable Energy Reviews 6 (2002) 367–393
[4].A.G.M.B. Mustayen, S. Mekhilef, R. Saidur, "Performance study of different solar dryers: A review", Renewable and Sustainable Energy Reviews 34 (2014) 463–470
[5].J.T Liberty, W.I Okonkwo, S.A Ngabea, "Solar Crop Drying-A Viable Tool for Agricultural Sustainability and Food Security", IJMER | ISSN: 2249–6645 | Vol. 4 | Iss. 6| June. 2014 | 8|