

AUTOMATIC SOLAR TRACKING AND CLEANING SYSTEM WITH CRACK DETECTION

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Abstract – Solar energy is that the thickest supply of energy for all the sorts of life on the earth. It's conjointly the fundamental supply for all the source of energy except atomic energy. However the star technology has not matured to the extent of the standard sources of energy. It faces millions of challenges like high value, erratic and unpredictable in nature, would like for storage and low potency. This project aims at increasing the potency of solar energy plants by finding the matter of accumulation of dirt on the surface of solar battery that result in reduction in plant output and overall plant potency. It proposes to develop a solar battery cleansing system that might take away the accumulated dirt on surface on an everyday basis and maintain the solar energy plant output. The system may be a system that might move autonomously on the surface of star panels by exploitation gas suction cups and use dry ways for cleansing like rotation cylindrical brush and vacuum cleansing system keeping in mind the restricted convenience of water in area unit as wherever such plants are in the main placed. This project conjointly aims to cut back the human involvement within the method of solar battery cleansing because it may be a terribly dangerous surrounding for them in hot sun. It is conjointly in forced for police work cracks on solar battery exploitation image process techniques. Its advantageous to keep up potency of system. Exploitation GSM message is send to user when crack detection.

Key Words: solar panel, LDR, microcontroller, servomotor, battery.

1. INTRODUCTION

PV system operates at the best efficiencies if {they area unit |they're} directly facing the sun with minimal /no obstruction and are maintained at a lower temperature (250c). Dirt once settle on a glass of the PV panel, usually hinders lightweight from reaching the sell, thereby lowering overall potency. Because PV panels convert

solely the color spectrum into electricity remainder of contribution to system heat. If the layer of dirt will increase the panel needs maintenance and frequent cleansing. Dirt accumulation depends on completely different parameters. Those area unit the inclination of the PV panel, quit installation (standalone or on the trackers), wind direction, humidity, etc. The sun is that the primary supply of energy. This can be directly or indirectly, fuel for many renewable systems. Among all renewable systems, the electrical phenomenon system is that on that includes a nice likelihood to interchange typical energy resources. The solar battery is especially made up of semi conductive materials. Si used because the live part of star panels. The sole thanks to increase the potency of solar battery is to extend the intensity of sunshine falling on that. Star trackers area unit the foremost applicable technology to extent the potency of star panels by keeping the panel aligned with the suns position. These days to harness alternative energy within the best manner star trackers get popularized round the world. So as to maximize potency, frequent cleansing if powerfully suggested. Above all, each weather and style factors influence the dirt accumulation method and connected effect. Necessity thanks to the growing prices of electricity and concern the environmental impact of fossil fuels, eco-friendly energy sources area unit necessary to implement. The methodology for utilizing solar energy largely depends on the star panels by engrossing sun rays. Accumulation of dirt on even one panel reduces their potency in energy generation. That's why we want to stay the panel's surface as clean as doable. Thus we have got to develop AN automatic cleansing machine which might clean and simply travel the glass surface of panels that helps in improvement of potency. The most common faults in star panel's area unit involved with crackers that area unit found on the surface of star cells which might prompt to loss of yield. During this case, throughout the assembly and generation processes, it's necessary to ensure the getting of an honest upshot. Generally cracks can happen on cell panels at any circumstance. They all specifically influence potency and will decrease the performance. It's

necessary to tell a part cracks on electric cell panels and therefore dismiss imperfect merchandise. Various techniques are made to review the electric cell panels, and these have distinctive strengths and shortcomings. Some assessment frameworks

Area unit acoustic research and impact testing, radiometric

Pulse and thermal imaging, hyper- spectral imaging, defect surface brightness, resonance ultrasound vibration and image process approach to alter the electric cell panels. Still it's essential to find a productive approach, which can be a non-contact, nondestructive and low-priced review framework the performance. It's necessary to differentiate cracks on cell panel and so dismiss blemished product varied techniques are made to review the cell panels, and these have distinctive strengths and shortcomings. Some assessment frameworks square measure acoustic research and impact testing, radiometric pulse thermal imaging, hyper-spectral imaging, defect surface opalescence, resonance ultrasound vibration and image process approach to traumatize the cell that was displayed for crack detection in cell panels. Still it's essential to find productive

approach, which can be a non-contact, non-destructive and

low-priced review framework In observe, there square measure numerous shapes and sizes of cracks during a cell counting on however they're shaped, As an example a line-shaped micro-crack is caused by scratches, and it usually happens throughout cell fabrication. This sort of defect can even flow from to wafer sawing or optical device cutting that propagates and causes the detachment or internal breakage of the granulose materials inside the star cells.

2. HISTORY OF CELL CRACK DETECTION

Due to the growing demand of economical renewable power supply star panels become very hip because it works by permitting photons, or particles of sunshine(from the sun),to knock electrons free from atoms, generating a flow of electricity. These star panels don't seem to be economical perpetually as when an extended use the potency of star panels could cut back bit by bit. To spot the cause the reduction in potency several researches were conducted. Finally, it absolutely was all over that the cracks or micro cracks developed within the electrical is that the main cause for the reduction of potency electrical device. In image process technique, we tend to 1st take the image of the electrical device and convert it into a gray scale image, because the gray scale image returns most of the knowledge and doesn't have an effect on the crack review. Because of the spread gray values of pixels and therefore the ambiguous characteristic of crack, inverse option on bar chart exploit ought to be taken to change the distribution of gray price, and so reworking the image to black-white one, which might stand up to the cracks.

3. NEED FOR CELL CRACK DETECTION

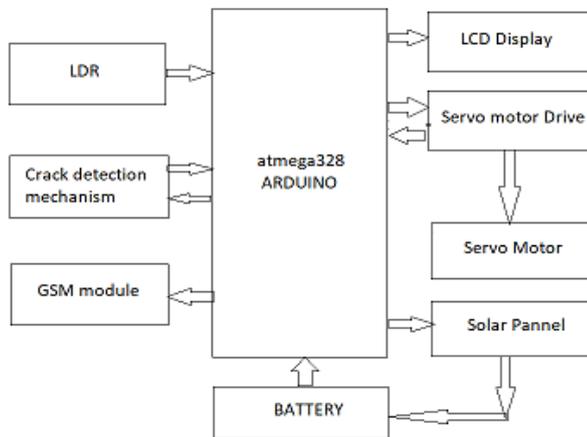
The increasing demand for alternative energy has increased the necessity for electrical phenomenon (PV) arrays as a significant element of the PV array, the demand for star cells has conjointly increased. Cell micro-cracks will occur in numerous stages of the cell lifespan, ringing from the producing method, to transportation and installation of the electrical phenomenon (PV) modulus. Because of these cracks the user is forced to switch the complete electrical device that is uneconomical. Thus we want associate in nursing makeshift techniques to discover the crack within the specific cell and replace that cell which can provide US longer lifespan of the electrical device and can be economical. The crack detection should be conjointly facilitated in increasing the potency of the electrical device by replacement the cracked cell alone. This can enhance the general output and provides constant performance as of a replacement electrical device. As there's associate in nursing abrupt increase within the usage of star panel all told industrial sectors like cars, electronic gadget etc., the makeshift detection technique should be ready to analyze the injury or crack to the electrical device that helps simply because of external conditions.

4. OBJECTIVES

There square measure numerous effects on the electrical device that affects, we tend to get less output and so the most objective of this project is

- A. To increase the potency of the electrical device by pursuit the utmost strength of sun.
- B. To keep the electrical device clean by cleanup the dirt when fastened interval of your time to keep up the potency of electrical device.
- C. To avoid decreasing in potency due cracks on electrical device by victimization crack detection technique.
- D. To send message to the user mechanically when crack is detected victimization GSM technology.

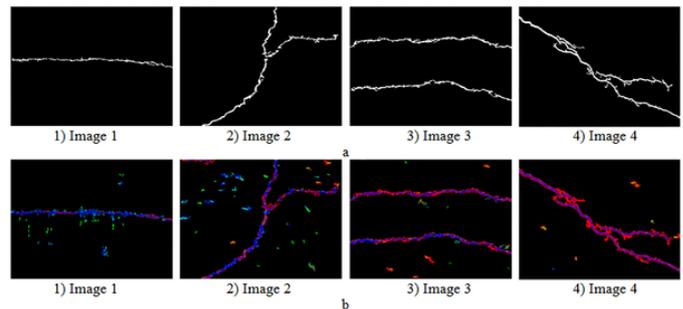
5. DESIGN DEVELOPMENT



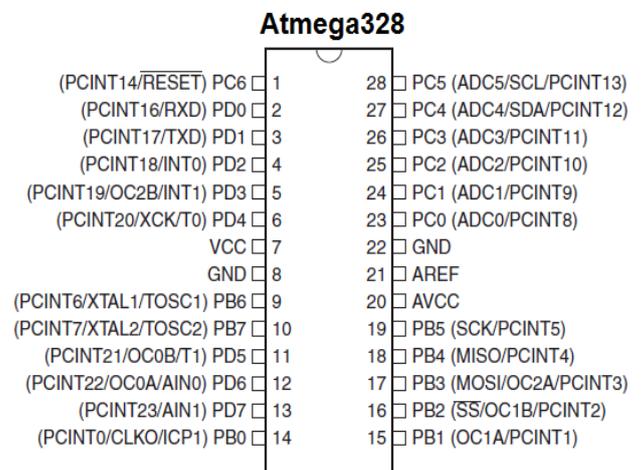
Block diagram of star pursuit whit cleanup system and crack detection system is as shown in fig. it continuous LDR, microcontroller driver circuit, dc motor, battery etc. once the sunshine incident on the electrical device, the LDR device generates electrically different voltages this analog signal reborn into digital signals and send to microcontroller and it permits motor driver to rotate the dc motor and crack the movement of sun .The main challenge is that to maximize the chapter of rays of the sun upon the electrical device, thence we tend o use cleanup system to maximize the output of electricity. By victimization the microcontroller the total mechanism is controlled. During this system we tend to essentially use slippery wiper to get rid of the dirt saturated on surface of electrical device. This mix is mounted on the surface of panel and for movement of mechanism; we tend to use servo motor assembly that is controlled by microcontroller.

6. CRACK DETECTION MECHANISM

The presence of the broken fingers and non-uniform background luminescence directly affects the micro-crack analysis, particularly if a straightforward image segmentation technique is employed. The solution to those issues square measure to get rid of the periodic interruption of fingers and minimize the result on background irregularity on image processes. This may be done by filtering within the frequency domain.

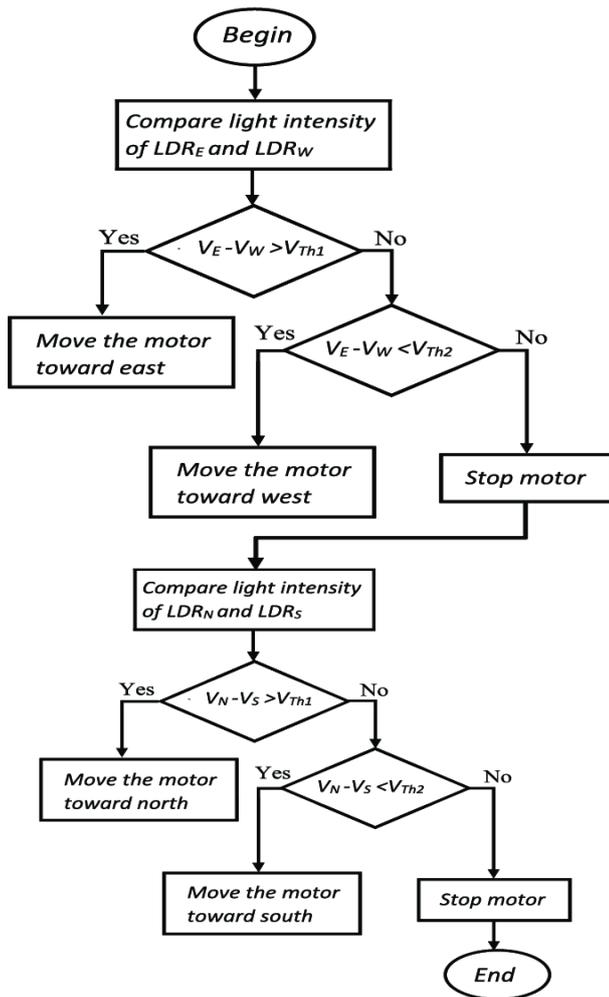


7. ATMEGA 328 PIN DAIGRAM



8. FLOW CHART FOR PURSUIT THE PANEL

The LDR sensors square measure won't to track the utmost intensity of daylight. The logic that works for decide the direction of motor to maneuver by victimization the microcontroller. The logic is that the microcontroller discover the daylight on each LDR's and compares it supported resistance of LDR's, if there square measure unequal daylight than motor can move towards direction of LDR that has less daylight i.e. clockwise direction and anticlockwise direction severally. Fig.2 shows flow chart for pursuit system.



9. CONCLUSIONS

This paper explains the study for electrical device trailing and cleanup system and electrical device crack direction. This technique is enforced for one electrical device however the array system consist of verity of star panels on a very row. Therefore this technique may also be enforced for array system and it's very advantageous to extend potency. The enforced model is removable therefore it will simply mount on another array. Higher than system are often unbroken include within the all four direction to attend higher energy for the electrical device the designed system is twin axis trailing by rotating axis mechanically as a motor direction modification. We can clean the panel mechanically for verity of time by setting timer for higher potency. It is conjointly enforced for police investigation crackers on electrical device victimization image process technique. It's advantageous to make care of potency for system victimization GPM message are often send to user once crack direction. The early direction of micro-cracks in star cells is very

important within the production of PV modules. During this study, a picture process theme composed of segmentation procedures supported eolotropic diffusion and form classification is bestowed. The result shows that the segmentation procedures will notice and establish micro crack pixels with efficiency within the presence of assorted types of noise.

REFERENCES

- [1] Akshay Jadhav, abhijit godse, vijaykumar bhosale, sanjay bhavar, prof. A. S. Jaibhai, "implementation of automatic solar tracking and cleaning system", International Engineering Research Journal (IERJ), Volume 2 Issue 12 Page 4389-4392, 2018 ISSN 2395-1621
- [2] Nagalakshmi¹, K.S. Abdul Karimullah Ansari², Gowtham.N³, Janagi Raman.P⁴ Assistant Professor, "Solar Cell Crack Identification using Internet of Things", International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 6, Issue 3, March 2017
- [3] Aayush Sharma, Varun Vaidya, K.Jamuna "Design of an Automatic Solar tracking controller" (978-1-5090-46799/17/\$31.00_c 2017 IEEE) 2017 International Conference on Power and Embedded Drive Control (ICPEDC)
- [4] Md. Tanvir Arafat Khan, S.M. Shahrear Tanzil, Rifat Rahman, S M Shafiul Alam "Design and Construction of an Automatic Solar Tracking System" 6th International Conference on Electrical and Computer Engineering ICECE 2010, 18-20 December 2010, Dhaka, Bangladesh
- [5] Betha Karthik Sri Vastav, Dr.Savita Nema, Dr. Pankaj Swarnkar, Dopplapudi Rajesh "Automatic Solar Tracking System using DELTA PLC" 2016 International Conference on Electrical Power and Energy Systems (ICEPES) Maulana Azad National Institute of Technology, Bhopal, India. Dec 14-16, 2016
- [6] M.D. Dafny Lydia^{1,*}, K. Sri Sindhu², K. Gagan³ "Analysis on Solar Panel Crack Detection Using Optimization Techniques" JOURNAL OF NANO- AND ELECTRONIC PHYSICS ЖУРНАЛ НАНО- ТА ЕЛЕКТРОННОЇ ФІЗИКИ Vol. 9 No 2, 02004(6pp) (2017) Том 9 № 2, 02004(6cc) (2017)