Manipulator visual positioning photovoltaic panels

How a fixed-tilted PV system works?
The fixed-tilted PV system was aligned manually toward north - south orientationat the beginning of the field test in order to obtain optimum power generation. As the sun started to rise,solar tracker started to move the PV panel accordingly while the position of the fixed-tilted PV system remained the same as the beginning of the field test.

Does a dual axis solar tracker perform better than a fixed-tilted PV system?
The power generation performance of the dual-axis solar tracking system was compared with the fixed-tilted Photovoltaic (PV) system. It is found that the solar tracker is able to position itself automatically based on sun path trajectory algorithm with an accuracy of ±0.5°.

What is the difference between solar tracker and fixed-tilted PV system?
As the sun started to rise,solar tracker started to move the PV panel accordingly while the positionof the fixed-tilted PV system remained the same as the beginning of the field test. Both systems were tested at Serdang,Malaysia with the coordinate of 3.00 North and 101.72 East.

Does a single axis PV system collect more energy than a fixed PV system?
Even the single axis system could collect 22%higher energy than fixed PV system . The current,voltage and power with resistance variation were also examined in one of the studies where it was found that the recorded power gain for two axes was 43.87% with 37.53% for east-west,34.43% for vertical and 15.69% for north-south tracking.

How do solar panels rotate?
Typically,a chlorofluorocarbon or shape memory alloy is placed on either side of the solar panel. When the panel is perpendicular with the sun,the two sides are at equilibrium. Once the sun moves,one side is heated and causes one side to expand and the other to contract,causing the solar panel to rotate.

In this paper, the ultra-redundant manipulator visual positioning and robust tracking control method based on the image moments are advocated rst, six image moment features used to control camera motion around the x-axis and around the y-axis are proposed. And then, a novel method is proposed to use to select image features.

The position of the sun changes during the day, even during the year, which imposes a system of automatic orientation of solar panels for this purpose, several devices have been proposed ...

The proposed light weight solar panel cleaning aerial manipulator with the gravity compensation mechanism is intended to be attached beneath a drone to increase its stability during operation.

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Owing to the disturbance of the environment, the objects are hard to be located precisely by robot manipulator. Aiming at the positioning problem, binocular stereo vision system and positioning ...

A visual feedback control scheme, called image-based visual servo, is proposed for manipulators with cameras on their hands that is stable even under noisy conditions, while the conventional position-based servo tends to be unstable. A visual feedback control scheme, called image-based visual servo, is proposed for manipulators with cameras on their hands. To ...

Creating a visual system for the manipulator, so that the manipulator can be more flexible to adapt to the current environment, such as visual autonomous guide manipula-tor and manipulator for industrial field visual recognition and positioning. Visual positioning of the loading and unloading manipulator is an important part of the produc-

That is because the position of the sun in the sky changes every hour. And with that, the solar azimuth also changes continuously. ... (in degrees), and the left vertical axis shows the direction of the solar panel for a given angle. Each curve in the figure represents a region. The vertical axes are divided into shaded zones as per directions ...

Aiming at the positioning problem, binocular stereo vision system and positioning principle of the picking manipulator in virtual environment (VE) were proposed and expatiated upon; in addition, the manipulator positioning model was built in VE, and the manipulator positioning simulation system was developed by Microsoft Visual C++ 6.0; and the ...

Any implementation of a sustainable photovoltaic solar energy system implies the optimization of the resources to be used. Therefore, it is the basis for the design and assembly of solar installations to optimize renewable energy production.. To achieve optimal conversion of solar energy, it is essential to know the solar path, the profile of the needs, and the ...

The smoke generated by satellite during the process of position and attitude adjustment is easily attached to the solar panel. If the smoke is not cleaned regularly, it will lead to a decrease in the power supply capacity. Therefore, using the space manipulator to implement the task of cleaning the solar panels was studied. Firstly, the dynamic mode of the space manipulator system is ...

manipulator undergoes two levels of visual positioning, with the latter achieving a higher spatial precision than the earlier. At the first visual positioning, the manipulator poses at a

State-of-the-art object detection networks depend on region proposal algorithms to hypothesize object locations. Advances like SPPnet [7] and Fast R-CNN [5] have reduced the running time of these ...

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There is a bottleneck of mobile robots positioning technologies for uncertain goals in complex field environment. Owing to the disturbance of the environment, the objects are hard to be located precisely by robot manipulator. Aiming at the positioning problem, binocular stereo vision system and positioning principle of the picking manipulator in virtual environment ...

Find your solar panel manipulator easily amongst the 7 products from the leading brands (DALMEC, Indeva, Atis, ...) on DirectIndustry, the industry specialist for your professional purchases. ... positioning (4) for gripping (4) for lifting (3) for sheet metal (3) for lifting (3) for large glass panels (3) fiberglass (3) for windows and doors (3)

In recent years, several large-scale solar power plants, called mega solar power plants, have been built at various locations. Inspection of a faulty solar panel is important for the maintenance of solar panels. However, previous methods of determining a fault in a solar panel required removal of panels from the solar power plant.

The article proposes an approach for inspecting PV arrays with autonomous UAVs equipped with an RGB and a thermal camera, the latter being typically used to detect heat failures on the panels ...

Abstract: In this paper a Parallel Manipulator (Stewart Platform) is used to align and maintain the position of the photovoltaic panels in relation to the Sun. The system is designed on a Stewart ...

However, compared with the traditional motor manipulators, the dynamic model of hydraulic manipulator is more complex such as higher model order characteristics, which makes the design of ...

Experimental results show that the manipulators visual positioning method can position an unknown object without having to known any model information about the object prior to the positioning task execution, and it is an effective manipulator visual positioning on unknown object method. To solve the problem of robot visual servoing on unknown object, we apply ...

Solar panel inspections are now backed with revolutionary Drone Survey Technology, visual and thermal aerial inspections, aerial infrared imaging, etc. Drone surveys in large photovoltaic plants have proven to be significantly ...

The developed application in the WinCC environment provides a visualization of the positioning control process. The conclusion is devoted to the assessment of the obtained results for the proposed complex mechatronic ...

Robotic grasping systems often rely on visual observations to drive the grasping process, where the robot must be able to detect and localize an object, extract features relevant to the task, and ...

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Four situation tests have been performed: panel tilted at 0°, panel tilted at 30 one axis tracking and finally the two axes tracking cases with a robot controlling a solar PV panel.

Image moment features can describe more general target patterns and have good decoupling properties. However, the image moment features that control the camera"s rotation motion around the x-axis and y-axis mainly depend on the target image itself. In this paper, the ultra-redundant manipulator visual positioning and robust tracking control method ...

authors succeeded in positioning the manipulator in various scenes with the same neural network. Yu et al. [33] proposed a new network for CNN based visual servoing to position eye-in-hand manipulator for a VGA-connector insertion task. The desired image and the current image are fed into Siamese architecture. The two

Roof positioning 19 9. Neighbouring solar roofs 19 10. Planning designations 20 ... conventional buildings, and with regard to landscape and visual impacts. This is the case both for the built and the natural environment. ... PV-T systems combine the functionality of solar PV and solar thermal.) The emphasis is on adopting good practice with

The need for automatic orientation of solar panels in order to increase the amount of the collected sun rays is increasing. In this paper, the orientation and positioning of solar panels by employing a robot manipulator is presented. The robot manipulator system structure has first been presented. The robot controller is then modeled. The solar altitude and ...

such systems has therefore gradually become a research focus [13, 14]. The current visual servo system of a manipulator can be divided into two categories according to the position

In this work, we present a comprehensive design scheme that addresses the aforementioned issues in the context of solar panel cleaning, which we consider to be the first step in achieving the final task of efficient solar panel cleaning. 111181 M. Alkaddour et al.: Novel Design of Lightweight Aerial Manipulator for Solar Panel Cleaning Applications Modeling is presented in ...