SOLAR TREE

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Abstract:

A solar tree is a unique and innovative renewable energy technology that combines the concept of a tree with solar panels to generate electricity. It consists of a metal structure designed to resemble a tree, with branches or leaves that act as solar panels, and a trunk that houses the electrical components. The solar panels are connected to a power inverter, which converts the DC electricity generated by the panels into AC electricity suitable for use in homes, buildings, or the grid. The solar tree offers several advantages over traditional solar panel installations. It is an aesthetically pleasing solution that can blend in with urban environments, and it requires less land compared to conventional solar farms. It is also flexible in terms of placement, as it can be installed in urban areas where space is limited, and it can be integrated into existing infrastructure such as streetlights or parking lots.

I. INTRODUCTION (ARTIFICIAL INTELLIGENCE)

A solar tree is an innovative and sustainable way of generating electricity using solar energy. It is a structure that mimics the shape and form of a tree, with branches made up of solar . The solar tree is designed to be visually appealing and can be used in urban areas where space is limited. offer a unique and eco friendly solution for generating renewable energy that blends in with the environment. The solar tree is made up of several components that work together to generate electricity. The trunk and branches of the solar tree are typically made of steel or other durablematerials that can withstand the elements. The solar panelsare mounted on the branches .The solar panels are made up of photovoltaic cells that absorb sunlight and convert it into electricity.

The electricity generated by the solar panels is then stored in a battery system that can be used when there is no sunlight. This battery system is typically connected to the grid or used to power specific applications, such as street lights or electric vehicle charging stations.

Solar trees offer several advantages over traditional sources of energy. the solar tree has the potential to improve the energy efficiency of cities, reduce carbon emissions, and increase the adoption of renewable energy. It can provide a source of clean energy for public spaces, such as parks, sidewalks, and plazas, and it can also serve as a community resource for charging electric vehicles or powering streetlights.

Overall, the solar tree represents a promising technology that can contribute to a more sustainable and resilient energy future. As the world seeks to transition to a low-carbon economy, the solar tree offers a unique and innovative solution that combines the benefits of solar power with the beauty and functionality of trees..To address these limitations, recent research has focused on developing innovative

technologies, such as the Internet of Things (IOT), to improve CPAP therapy. IOT refers to a network of interconnected devices that can communicate with each other and exchange data through wireless connectivity. IOT-based CPAP systems incorporate sensors, wireless connectivity, and mobile applications to provide real-time monitoring and tracking of patient data, which can lead to more personalized and convenient therapy management.

One of the primary objectives of solar trees is to generate clean energy. By harnessing the power of the sun, solar trees can generate electricity without relying on fossil fuels or other non-renewable sources of energy. This helps to reduce greenhouse gas emissions, combat climate change, and promote sustainable development.Solar trees can also be used as atool to raise public awareness about renewable energy and theimportance of carbon footprint. By incorporating solar treesinto public spaces, people can see firsthand how solar energy can be used to generate electricity and reduce our dependenceon non-renewable sources of energy.

II. DESIGNINGANDFABRICATION

A. PROCESSOFBUILDINGASOLARTREE

Thefirststepinbuildingasolartreeistodesignthestructure.Thedesignshould take into account the location of the solar tree
The desired height and width, and the number and and LED lights .The design should also consider the weight of the solar panels and LED lights, and the wind and weather conditions in the area.

Once the design is finalized, then expertise to gather the necessary materials .The materials needed for building a solar tree include metal pipes for the trunk and branches, solar panels, LED lights, wiring, and a battery bank. The metal pipes should be strong enough to support the weight of the solar panels and LED lights ,and should be rust-resistant to withstand the elements.

Theassemblyprocessinvolvesweldingthemetalpipestogethertocreatethe tree structure. The solar panels are then installed on the branches, and the wiring is run from the solar panels to the battery bank. It is important to ensure that the wiring is properly insulated and protected from the elements to avoid any short circuits or damage.

The LED lights are then installed on the branches and wired to the battery bank. The lights can be programmed to turn on and off at specific times using at light sensor. It is important to choose LED lights that are energy-
efficient and can withstand outdoor conditions.

Oncethesolartreeisfullyassembled,itisimportanttotestthesystemtoensure that everything is working properly. This includes checking the voltage output of the solar panels ,testing the LED lights, and making sure that the battery bank is charging and discharging correctly. Any issues or errors should be dressed before the installation.
The final step in building a solar tree is to install it in the desired location .This may involve digging a hole for the base of the tree and securing it with concrete, or attaching the base to a pre-existing concrete foundation. It is important to ensure that the solar tree is securely anchored and will not tip over in strong winds.
It is important to perform regular maintenance on the solar tree to ensure that it continues to function properly .This may include cleaning the solar panels to maximize their efficiency ,checking the wiring for damage, and replacing any faulty components. The battery bank should also be checked regularly to ensure that it is holding a charge. Building a solar tree is a complex process that requires careful planning and attention to detail. The design should take into account the location and environment of the solar tree, and the materials use should be strong and durable.

III. OUR PROJECT EXPLAINATION

The aim of the Solar Tree project is to provide a sustainable and eco-friendly source of renewable energy for communities. The Solar Tree is a unique and innovative concept that involves the installation of solar panels on a structure that resembles a tree, with branches and leaves that provide shade and shelter.

The primary objective of the Solar Tree project is to promote the use of renewable energy and reduce dependence on non-renewable sources of energy such as fossil fuels. The Solar Tree aims to generate clean and renewable energy that can be used to power homes, offices, and public spaces. The system aims to provide a practical solution for communities that are looking to reduce their carbon footprint and transition to a more sustainable way of living.

The Solar Tree project aims to have various practical applications in different settings. In public spaces such as parks and plazas, the Solar Tree can provide shade and shelter while also generating clean energy. In residential areas, the Solar Tree can be installed in backyards or front lawns and used to power homes. In commercial areas, the Solar Tree can be used to power offices, factories, and retail stores.

A. Visualisation

Fig 1.control panel

B:components

Solar Panel:

Asolarpanelisadevicethatconvertssunlightintoelectricitythroughphotovoltaiccells.Thecellsaremadeofsemiconductormaterial,suchassilicon,thatgenerateselectricitywhenexposedtosunlight.Theelectricalenergyproducedbythecellsisconvertedintousablepowerthroughaninverter.

Fig 2.solar panel

i) Solar charge controller:

A solar charge controller is an electronic device used in solar power systems to regulate the voltage and current that is coming from solar panels before it is fed into a battery bank.

ii) SolarC10Lead acid Battery:

C10 lead-acid battery refers to a type of lead-acid battery that is designed to be discharged over a 10-hour period. The C10 rating is a standard used to measurethedischargecapacityofleadacidbatteries.Itreferstotherateatwhichabatterycanbedischargedovera10-hourperiodwhilemaintainingaspecificvoltage.

iii) Cleaning Pump:

A diaphragm style water pump that is used to clean solar panels is a compact and powerful pump designed to provide reliable and efficient water pressure for cleaning solar panels. It is specifically designed to be used with a water-fed pole system for cleaning solar panels, which is a common method used in the solar industry.

iv) LED clock:

The clock's design includes a circular LED display with a diameter of 36inches, which is encased in a durable aluminum frame that is weather-resistant. The LED lights are bright and have a viewing angle of 180 degrees, making its easy to read the time from a distance. The clock has a sleek and modern complements any outdoor space.

C:Outlook

Fig 3.setted solar panel

D:COMPONENTSOFINVERTER

i) Inverter Circuit Board:

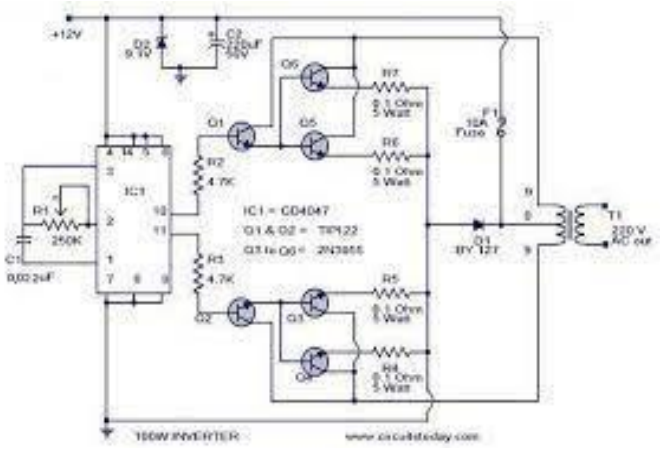

Fig 4.circuit diagram

ii) Lithium Ion Battery:

This is a Li-ion Rechargeable Battery. It is cylindrical in shape. This battery has 7.4Wh power capacity per cell. It is reliable and offers long service life so this battery can be recharged again and again after use.
Embedded C" because they apply to programming embedded controllers. The language in which Arduino is programmed is a subset of C and it includes only those features of standardC that are supported by the Arduino IDE.

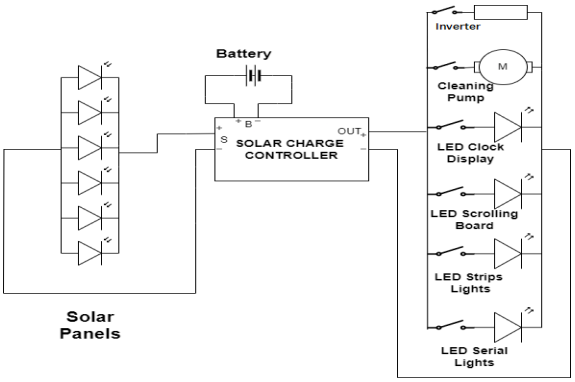

Fig 5.circuit panel

iii) Battery Management system:

A BMS is an electronic system that manages and protects the battery pack, ensuring that it operates safely and efficiently. The 3S BMS is specifically designed for use with 3-cell Li-ion battery packs, which are commonly used in portable electronic devices such as laptops, tablets, and smart phones.

The 3S BMS is responsible for monitoring and controlling the charging and discharging of the battery pack. It includes a microcontroller unit (MCU) that reads data from sensors to measure the battery's voltage, current, and temperature. Based on this information, the MCU can control the charging and discharging of the battery to prevent overcharging, over-discharging, and overheating.

iv.LED battery indicator*:*

A battery indicator is a compact device that helps you keep track of the batterylevel of your system. It is designed to work with any 12V lead-acid battery. Theindicator is usually mounted on the control panel of the system and provides aninstant visual indication of the battery voltage.

The indicator typically consists of a display unit, which shows the batteryvoltage in real-time, and a wiring harness that connects the indicator to thebattery. The display unit is usually a small, rectangular-shaped module with an LED screen that shows the battery voltage in volts and represents visually in bars.

IV. RESULTS

A solar tree is a structure designed to resemble a tree, but instead of leaves, it has solar panels that generate electricity from the sun's energy. The solar panels are typically mounted on branches or leaves that can be adjusted to optimize the angle and orientation of the panels to maximize the amount of sunlight they receive..

Firstly, the controls of the inverter are designed to be intuitive and easy to use. Most models have simple buttons or switches that allow you to turn the inverter on or off, and select the desired function. For example, if you want to use the inbuilt flashlight, you would simply need to flip the switch on the control panel

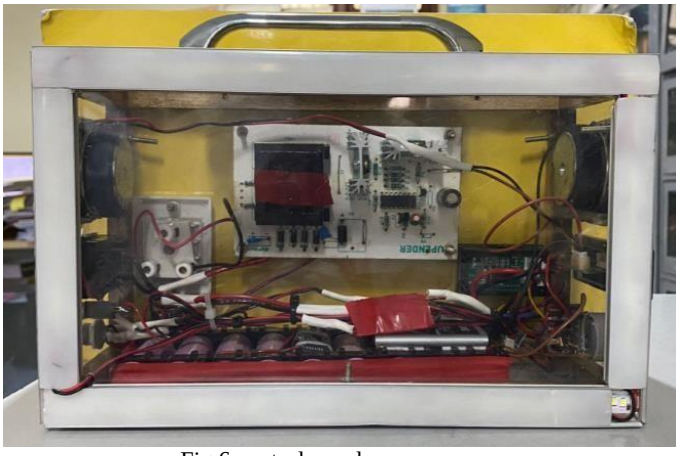

Fig 6.control panel

Furthermore, this device comes with a LED screen that displays battery level, charging status, and output power. This information is presented in a clear and easy-to-understand way, which helps users to monitor the performance of the ir inverter and ensure that it is working correctly.

Another aspect of user-friendliness is the design of this portable inverter .It is compact and lightweight, making them easy to carry around and store when not in use. It comes with a built-in handle, which makes it easy to transport the in to different locations.

In addition, the portable inverter is equipped with safety features that protect the user and their devices. For example, short-circuit protection ensures that the inverter automatically shuts off if a short circuit is detected, preventingdamagetotheconnecteddevices.Similarly,over-voltageprotectionandoverloadprotectionhelptopreventdamagetodevicesandtheinverteritself.

Fig 7.solar tree

Theuserfriendlinessofthisportableinverterwithadditionalfeatur essuch as emergency flashlight, USB charging port, and inbuiltBluetooth speaker, makes them a convenient and reliable

power source for a wide range of applications. They are easy to use, safe, and equipped with features that enhance their functionality and usefulness in various situations.

The LED lights are typically mounted on the pole and controlled by a timer or a smart controller that is programmed to turn them on and off at specific times of the day. The LED lights provide bright and energy-efficient lighting that is ideal for illuminating path ways, public spaces, and other out do or areas. he text display is also mounted on the pole and can be used to display messages, announcements, or other information. The text display is typically controlled by a separate timer or smart controller that is programmed to turn it on and off at specific times of the day.

The solar tree system is designed to be a self-contained and self-sufficient source of renewable energy that can provide clean and reliable power. The system is a little complex to install and requires little maintenance, making it an ideal solution for colleges and other organizations looking to reduce their energy costs and improve their sustainability efforts.

Overall, a solar tree can provide multiple benefits for college campus, including clean energy generation,improvedcommunication,andenhancedaesthetics. Itcanalsoserveasasymbolofthecollege'scommitmenttosustain ability and innovative technology, helping to attract and retain students who are passionate about environmental issues.

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