

## Anti-Juice Jacking Smart Solar Charger

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**Abstract** - Today, the world has shrunk inside a small smartphone. Still, people prefer moving from one place to another place by transportation to virtual communications. In such a case, people use Public Transports like Buses, Trains, etc. During such a large journey, people who take travel alone will get mental loneliness. But because of mobile phones, those feelings are not existing today. Still, a problem again rises, which is nothing but Depletion of mobile charge during usage. The worst-case scenario here is, Lakhs of mobile phones after a long journey start getting misbehave and hacked. The users won't have any symptoms that their mobile has been hacked. The reason is when people use their chargers to charge their mobile in a public charging slot, their phones continuously gets hacked. The reason behind this attack is Juice Jacking. A type of cyber-attack conducted by hackers in public charging slots. Usually, a data transporting chip is inserted in the plug point of the charging slot. This chip when gets connected to the charging mobile starts to transfer all the data from the mobile to the hacker without any permission from the user. To avoid this type of attack, a project is designed and fabricated called ANTI JUICE JACKING SMART SOLAR CHARGER. This is a type of Solar operated mobile charging project. This project also helps in providing awareness to the people on Juice Jacking and Solar Energy's importance.

**Key Words:** Juice Jacking, Solar Panel, Solar Project, Mobile charger, B type and C type, Solar Mobile Charger

### 1. INTRODUCTION

Today, several new types of cyber-attacks evolved. The majority of these cyber-attacks intends to steal data from the user like Bank Details, Passwords, and Personal files, and so on. This includes some attacks like Phishing, Form Jacking, Trojan Virus, Juice Jacking, etc., People who live in the city used to get some awareness via Social Media and Mass Media. But who lives in the village used to be an easy target for the attackers who host such types of cyber-attacks. This paper will discuss the project and how it can also serve as an alternate solution for Juice Jacking cyber-attack. This paper discusses the Solar Auto Tracking Cell Phone Charger project in briefer.



Fig 1. Cyber Crime News Channel

### 2. JUICE JACKING

This attack has reflected in all suburban cities of India in 2019. Business people lost crores of money from their accounts without their consent, and it was founded Juice Jacking was the reason for their loss. This attack works by utilizing the Data Cable of a charger. Generally, the smartphone charger has two separable components, The Adapter, and the Data Cable. As already explained, when data transmitting chips inserted in the public charging slots of public places, they start to act as a data transmission hub. When mobile chargers above explained get connected, they transmit the data from our phone to the hacker via the Chip and Data cable. The default and only protection in our mobile is a program that asks "Do you want to permit data transfer". But the chip ultimately overrides the permission and that's how this attack gets executed.

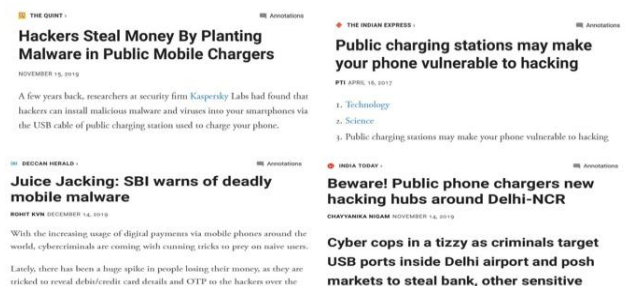


Fig 2. Articles regarding Juice Jacking

These chips even won't let the mobiles to ask or at least indicate the ongoing data transfer processes. Reports say that, for some kind of old model mobiles, this data transfer even works well at switch off mode. The attack comprises two main types namely Data Theft and Malware Installation. In Data Theft, once all the data from the user gets transmitted to the hacker, and won't create any disturbance. The second attack or the Malware Installation will create or let to install a live Invisible Malware app or program in the

user's mobile. This program acts as a Parasite and transmits all live data of the user whenever the internet is connected. The worst-case scenario is, it will also spread or transmit to another mobile which gets connected with the help of any file sharing mobiles that gets connected to the affected mobile.

**3. EASY TARGETS**

Hackers very well know that not all people own a power bank. Definitely, people at some point will charge their mobile at a public charging slot in a public place. And it is not possible to isolate or identify, whether which charging slot is affected by the chip and which one is good. Awareness was given by all sorts of Articles and news, but still, people become to be easy prey for this attack. Cyber experts believe nearly 45 – 50% of public mobile charging slots get affected. Reports also indicate that middle-aged business people were the actual targets for this attack.

**4. WAYS TO PREVENT**

To prevent this type of cyber-attack, an alternate existing solution is available called Data Blocker (or) USB Condom. This Data Blocker is a type of chip drive that gets fixed to the mobile end of a USB Charger. It only allows Electrical DC Waves from the USB cable to the user's mobile and restricts any type of Data transfer from the user's mobile. And therefore, the data transmission could be avoided. On internet and E-Commerce sites, this Data Blocker is available in a price range of Rs. 1200 – 4500. The image of this Data Blocker is displayed below.

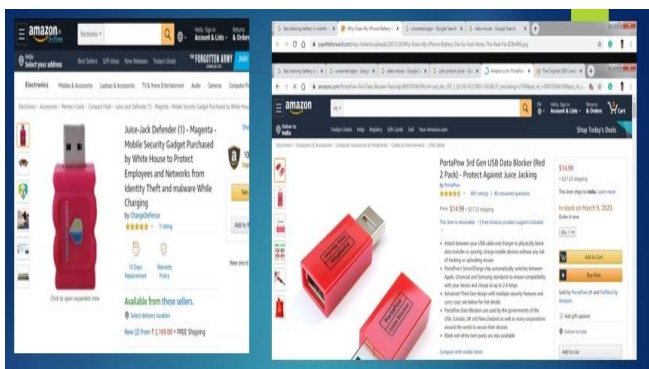


Fig 3. USB Data Condom in E-Commerce sites

**5. PROPOSED SOLUTION**

The proposed project is nothing but an Auto – Tracking Solar Cell Phone Charger. This project has a few LDR (Light Dependent Resistance) Sensors in its circuit. So, it helps to track the live angle of the sun and tune the solar panel to acquire maximum efficiency in day times. A 12v DC Wiper motor is connected behind the Solar Panel and LDR Sensor. This Motor after getting output from the Sensor moves the Solar Panel to get maximum heat from the sun. A 12v DC Battery gets connected to all components of the project

(From Solar Panel To LDR Sensor, To Micro Controller, To Output wires, To Wiper Motor). This 12v DC Battery charges all the mobiles which get connected to them via data cables. The reason to provide a Battery is that during daytime the solar panel's output will match the requirement. But at night enough energy wouldn't be available to the panel for output. That's why a 12v DC Battery is connected as an Energy Reservoir. A Mild Steel Frame is made to a height of 4m to carry the Motor, Panel, and Battery. This gives strength to the project even in stormy weather conditions.

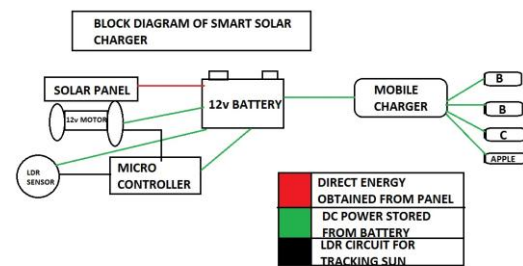


Fig 4. Circuit Explanations

**6. WORKING PRINCIPLE**

When sunlight falls on the panel, it produces Photons. These photons produce both protons and electrons. When electrons touch the solar panel, they move from one end to another end. This flow of electrons produces electricity in the panel. The produced electricity gets saved in the 12v DC Battery. When the battery gets charged, it gives power to all the charging cables connected with it. An LDR (Light Dependent Resistor) Sensor is placed on the side of the solar panel. This LDR sensor tracks the movement of sunlight. A Microcontroller is fixed near to it, for reading the data from the sensor. Further, this Microcontroller controls a 12v DC Wiper Motor connected to it. The solar panel is attached with spur gear and shaft. This gear and shaft mesh with the gear in a 12v DC Wiper motor. The battery gives power to all of these components.

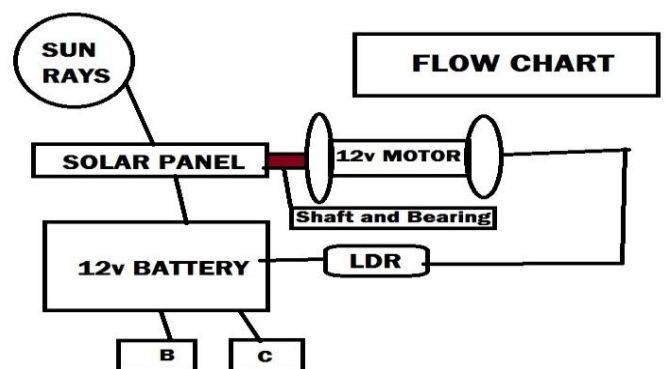


Fig 5. Flowchart of the Solar Charger

When the sun starts to move, the LDR sensor tracks the movement of sunlight. This LDR sensor guides the movement of solar panels parallel to the sun rays. The LDR sensor gives its output to a Micro Controller. This Microcontroller further guides the motor to turn the shaft. The shaft and gear meshed with the motor rotate the panel straight to the sunlight, to get maximum efficiency at all times during Day. This project has an output of 7 charging cables and the ability to charge 7 mobiles at a time. The 7 charging cables include 1 apple type, 2 USB type, and 1 C type charging cable.



Fig 6. Fully Functional Project Image

7. CALCULATIONS

Time	Panel Output Volts	Temperature in °C
8 AM	12.12v	26
9 AM	12.80v	28
10 AM	15.79v	31
11 AM	16.45v	33
12 PM	17.45v	34
1 PM	18.66v	35
2 PM	19.40v	35
3 PM	18.38v	35
4 PM	17.20v	33

Table 1. Reading obtained from panel in Multi meter

The reading obtained from the panel’s output during operation and calculated with time and temperature.

8. COMPONENTS

I. 10W Solar Panel



Fig 7. Photograph of Solar Panel

S. No	Contents	Value
1.	Power	10w
2.	Type of the Panel	High Efficiency Monocrystalline Silicon
3.	Dimensions	Length = 14.7 Inch, Breadth = 6.5 Inch
4.	Output Voltage	5.5v
5.	Output Current	1000mA
6.	No. of Cells	13
7.	Cell Temperature	25°C

Table 2. Solar Panel Properties

II. LDR Circuit

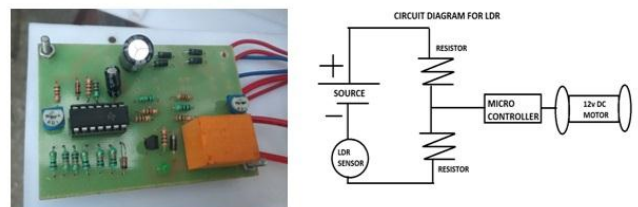


Fig 8. LDR Circuit

**III. 12v Battery**



**Fig 9.** 12V Battery Image

**IV. 12v DC Wiper Motor**



**Fig 10.** DC Motor Image

S. No	Contents	Value
1.	Type	DC Car Wiper Motor
2.	Power	12v
3.	Make	BOSCH

**Table 3.** Motor Properties

**V. Mild Steel "L" Frame**



**Fig 11.** " L " Frame Base

**VI. Multi Charging Cables**



**Fig 12.** Charging Cables utilized

**9. ADVANTAGES**

A 12v DC Battery has been introduced in this project, which acts as an energy reservoir. So this project can charge the mobiles for 24\*7. A strong Mild Steel frame is provided for this project, it will help the model to stand alone independently without any support and it can withstand any tough climatic conditions. It has a multi-model mobile charging ability. The cost is comparably less and the design is compact for implementation. It is also preferable for temporary public places like Exhibitions, Concerts, and Events, etc. Easy Transportation is an added advantage in this project. All applications that work with a 12v Battery can be implemented with this project, it will also act as an added advantage.

**10. COST ESTIMATE**

S. No	Item	Price
1.	LDR Circuit with Sensors	500/-
2.	10w Solar Panel	1500/-
3.	12v DC Car Wiper Motor	1200/-
4.	MS Frame	2000/-
5.	12v DC Battery	600/-
6.	Miscellaneous Expenses	400/-
	<b>Total</b>	<b>6200 /-</b>

**Table 4.** Cost Estimation Table

The total cost needed to complete the project were from Rupees Six Thousand Two Hundred only.

**11. CONCLUSION**

In considering the above-explained Juice Jacking cyber-attack as a problem statement, this project can be utilized as the best alternate solution. It is independent, Anti - Hackable, cheap in cost, able to withstand rough climatic conditions, and more.

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