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IoT Based Full Protection Covers for Parked Car at Remote Stations

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Abstract*— The aim of this paper is to give a review on the car covers from distant areas to provide protection to car from rain and hailing. Here, we mentioned many technologies used till now for protection and how we have taken an automation system to protect car by using IOT based system attached with a mobile application which will operate the whole system. The sheet will cover the whole car within seconds after having the command from remote areas. The cover is attached with the car itself. Construction of this automation has been described as the combined use of mechanical and electronic systems to achieve automatic operation or control to reduce problems . This paper briefly describes the problem observed during night when people forgot to cover their cars and how our device would help them to solve these problems.

Keywords- Automation, Vehicle, DC motor, IOT, Smart protection system, Sheet/Canopy, mobile application.

I. INTRODUCTION

In today's world, the use of transportation has increased drastically. The technology nowadays is very modern and it benefits us a lot as compared to the olden days. Each and every person has vehicle for their comfort zone while travelling. In every season, vehicle provides us protection from hazard climate.

Although vehicle provides us more comfort and easy going life , but our duties towards vehicle safety is null. People just want to take the advantage of vehicle. In their busy schedule they even forgot to cover their cars. Coving not only provide protection from direct heat , but also from rain and hailing. Even theft would not able to steal the car as it will be covered from all sides and even not able to recognize it. In summer, the vehicle heats up like an oven ,that not only degrade the quality of exteriors but from interior also it effects. Mud -rains vanish the finish of paint. During the winter, snow and ice cake on the passenger compartment, particularly the windows, requiring the operator to brave the elements to scrape the windows so as to enhance driving safety. Hail may dent the vehicle surface or damage the finish [1]. There were many manual techniques that were used in ancient time. Fabric or plastic covers used for particular vehicle shape. This cover stored in folded state in the trunk of the vehicle, and then taken out and spread over the vehicle to provide protection [5].

Although such covers does protect the vehicle from the elements but there were many drawbacks even. First, manually place and remove the cover.

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Secondly, people forgot to place sometimes as it was very time consuming and become difficult to place by single person. Even the paint of vehicle gets faded due to uncertain climate changes, but if cover will be used vehicle paint will remain maintained over years. Some of recent discovery on car covers invented the installation of cover inside the trunk and re-winded automatically by spring. However it is difficult to take out the cover from trunk and deploy over car. Especially, in bad weather, when it rains or in storm, it is difficult to deploy the cover alone [10].

II. EXISTING SYSTEMS

There are many devices which are designed for the vehicle to have protection from rain. Following inventions are already invented for covering the car.

Starting from the first invention US4432581A [1], here a vehicle cover that automatically extended over the vehicle by using guide element and retracts into a storage position. The cover has one end attached to a roller which is rotatable attached to the vehicle. There are brackets which are positioned on upper body and along with tubes it covers the whole body of vehicle. Here, a compressor is used, when it actuated the flaps covers the sides of vehicle. This cover is stored in the trunk of the vehicle. This invention overcomes the problem by providing a cover which automatically extends over vehicle. Though the above invention is fruitful but there are some drawback of it. The invention includes so many equipments like compressor, brackets, retractable brackets, flaps, roller, motors (front and back). If any of the equipment stop working the whole system will stop working, as all are dependent on one another.

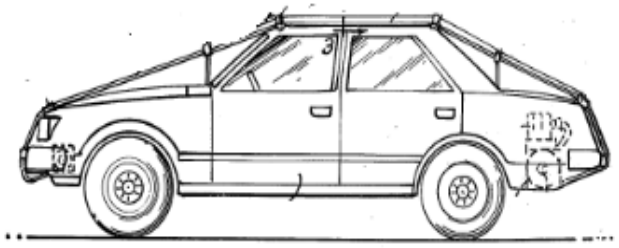

Figure 1: Cover attached on car [Ref. 1]

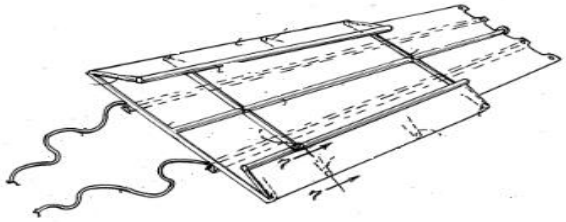

Figure 2: Shield Canopy used in above invention [Ref. 1]

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This is the major drawback of this invention. Secondly, the inventor mentioned that it could operate through a push button even but that should be manually operate.

In **FR2524398** [2]**,** another device for protecting a car from the sun's rays that includes a flexible sheet which is attached above the vehicle bodywork by using attachments. There are some spacing elements which are arranged with several points to fix the flexible sheet. Along with that there is a device that provides protection from radiation and greenhouse effort to vehicle not during parked time but also in traffic jam this is due to free space large ventilation between canvas and bodywork. This how it did not turn up heat much inside and even protect it from outside. Drawback of this invention is it's not automatically operated.

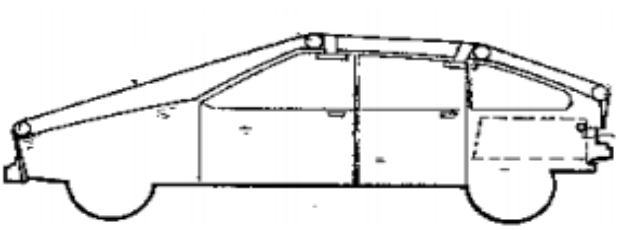

Figure 3: Cover attached on car [Ref. 2]

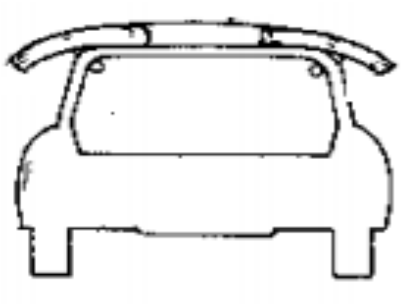

Figure 4: Cover from back view [Ref. 2]

Another invention explained in **KR101276146B1** [3], in which vehicle cover with driven system is mounted on it. It consists of two drive, one that is in each corner that protrudes outward in the vehicle drive. The second one is provided to fold the first drive link. The roller drive motor for driving the cover roller and the first drive motor and second drive motor. This how the whole system functions according to the motor command drive moves and cover/uncover the vehicle. But the drawback of this invention is that it cannot be used anywhere. Though it is an automatic but a fixed system. The system mentioned in prior art of this invention is much more relevant but it does not protect more from pollution and dust.

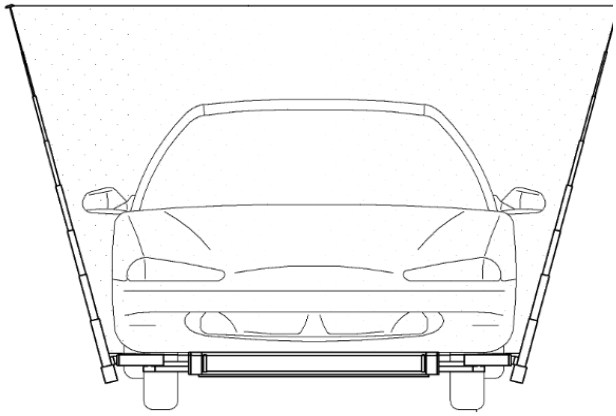

Figure 5: Full cover with drives [Ref. 3]

Method explained in **US8608223B2** [4] is a cover which is removal and installation roller for an automobile particularly operated by hand or by an individual, in order to install or remove a cover from the automobile. The roller includes self-storing hand crank which is connected to cover pool which rotates in order to cover. Drawback of this invention is it is fully manual for installing and removing.

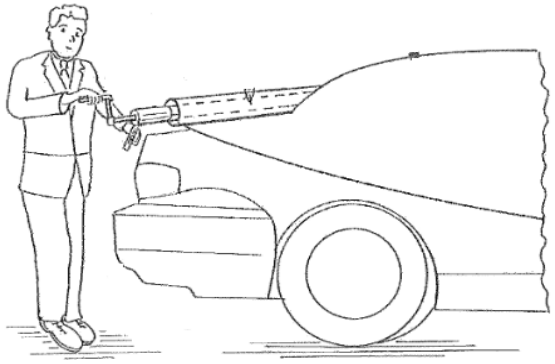

Figure 6: Manually operating the cover [Ref. 4]

Another remotely controlled power-assisted vehicle cover explained in **US4848823A** [5] is cover attached to a take-up winding and unwinding mechanism which is attached to trailing end of cover and is said a cylindrical cover containment tubes and a wireless remote transmitter control for controlling the operational functions.

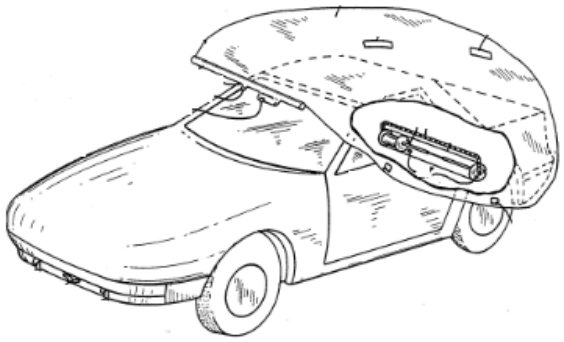

Figure 7: Car Cover [Ref. 5]

Next invention explained in **US5497819A** [6], a modular car cover has a cab covering position and skirt. A skirt is attached to cab portion to extend the latter to become full car cover. It consists of some panels, cruciform piece, with four sections draping over the windshield, two sides, and rear window. All are used to operate multi-part car cover.

Panels along with hooks used to cover the whole car. Main drawback of this invention is it is fully manual.

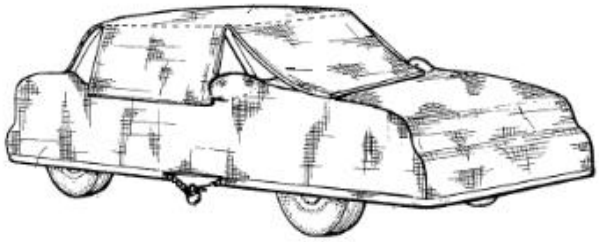

Figure 8: Manual cover [Ref. 6]

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Similarly same invention as explained above is also explained in **US4727898 A** [7]. The cover has one end attached to a roller which is rotatable attached to the object along with brackets automatically fold/ unfold the cover. Difference is here they has used liquid pump and over there compressor was used. Drawback many parts are used , if any part gets damaged full equipment would stop working.

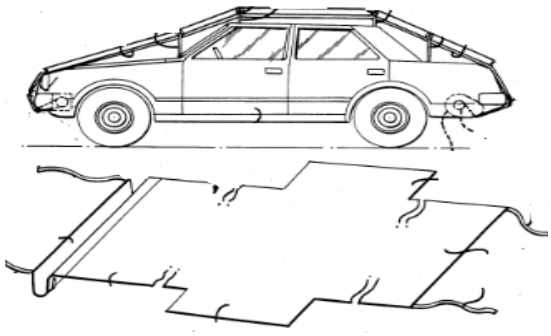


Figure 9: Cover attached with car [Ref. 7]

Invention explained in **US5567002A** [8] is cover for providing protection to vehicle not only from exterior but from interior too. Again this cover has revolved with roller within housing which is attached to trunk and lid by pair of hooks. The entire housing will rotated between a position outside of trunk for development of cover and a position inside of truck for storage. Once the cover is moved to its position the housing will be empty and that empty space will rotate back into trunk. The main drawback of this invention is it's a manual process, which could not be possible in today's life.

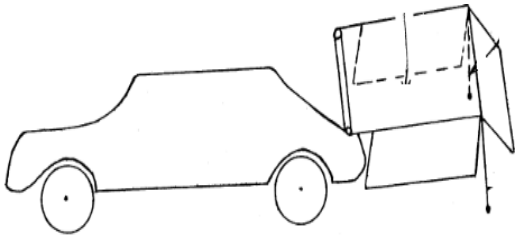


Figure 10: Cover attached at trunk area of car [Ref. 8]

Now apart from this , let's have an example for van camper , which already have a lot of features inbuilt, like for covering, changing the interior exterior according to the requirement. So an invention related to van campers is explained in **US4867502A** [9]**.** Many van campers have their own style of exteriors. Here, a text–like structure is used. This is constructed for extension and combined with one end attached to van . But the problem is once it come out, it needs to be done manually.

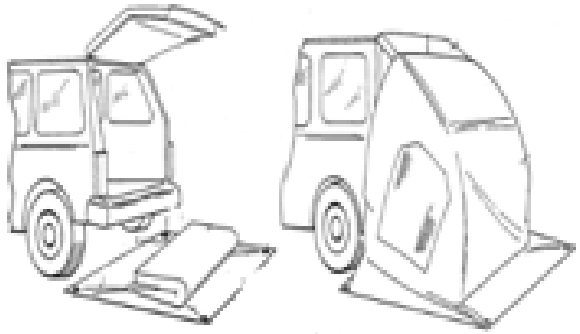
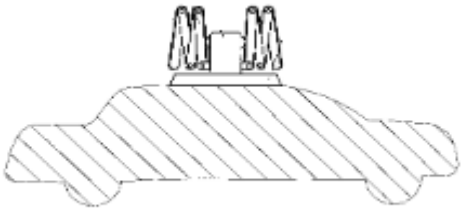
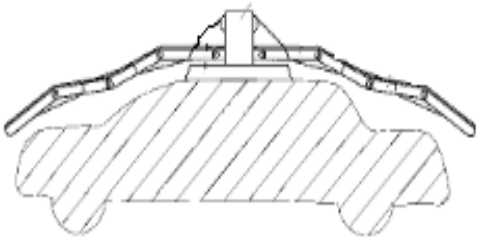


Figure 11: Cover attached with van camper [Ref. 9]

Invention explained in **CN201261381Y** [10] is an automatic jacket for vehicle. The cover here is mentioned as coat, jacket. The protection device is in umbrella shape mounted on the top of vehicle. The umbrella frame comprises plurality of support rods made up of four connection rods hinged together. When the cover is not in use then it will be multi-folded and form an umbrella at top , and when it is in use it will spread on whole vehicle. The whole process is remote controlled.



(a) Closing of umbrella cover



(b) Opening of umbrella cover

Figure 12: (a) and (b) umbrella invention [Ref. 10]

Invention mentioned in **US20090140541A1** [11]**,** is an automatic car cover driven by electric motors for opening/ closing the trunk lid. The system consists of one cover runner, one holster, one holster casing, one guide, one cover sheet, and one cover sheet un-folder. It comprises of magnetic plates covered with rubber with helps the cover for opening and closing. The holster is packed in truck itself. With the help of spring the cover deploy over car and come back into trunk. All this automatic system operates automatically just by pressing a press button.

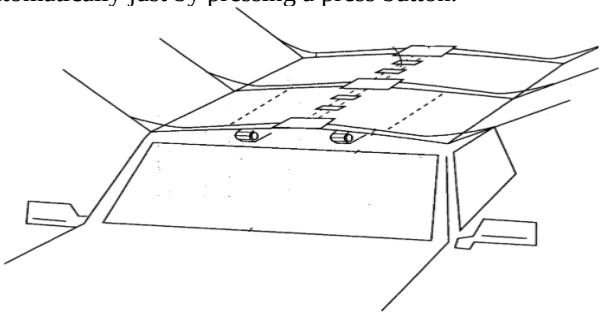


Figure 13: Cover on top of vehicle [Ref. 11]

Though the system is beneficial as it automatically deploy and restore into trunk itself just by pressing a key. But the drawback of this is the person needs to press the button which is attached with the system .In hazard conditions , the person would not able to press the button as to protect himself would be the priority and in rain he will protect himself first and then press the button if necessary. So this is the drawback person coulc not able to access it from anywhere.

The next invention is power operated vehicle cover mentioned in **US2688513** [12]**.** The invention is to provide a protection covering of pliable material for vehicle which should be carried all times by vehicle and will compact when not in use. Power is provided for retracting and storing the cover upon a reel.

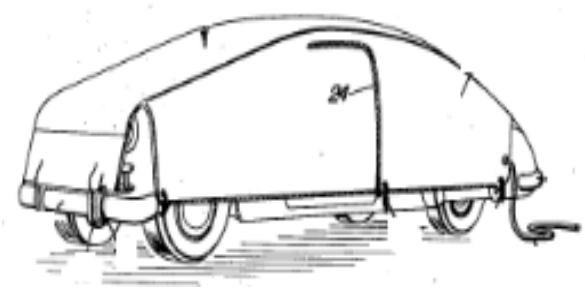


Figure 14: Cover attached with car [Ref. 12]

Another invention, in **CN202986780U** [13] the aims is to provide a vehicle automatic sewing coverage using motor driven roller forward and reverse. It comprises of an automatic sewing member and telescopic member, vacuum chuck, a base, four motor bracket, four motors, the four pairs roller shaft and roller shaft.

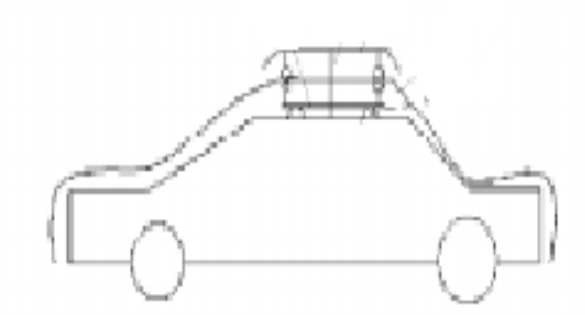


Figure 15: Sewing Cover attached with car [Ref. 13]

III. LATEST TECHNOLOGY

One more latest technology hitting the market is a square box of cover that will automatically cover the whole car in just 15seconds. How it works? Initially put that square box at the top of the vehicle. Push the button to operate. After having the command the box will start rotating and leaving cover in all directions. Though the system is automatic, but that is of no use because once the whole cover will be out from box the person need to cover the car from all directions. Initially, placing the box above the top of car and when the cover will be out , manually placing the cover in all direction is the major drawback. The rotation of box is only controlled by remote.

Figure 16: Square box

Figure 17: Square box placed at car

IV. OUR INVENTION (SOFTWARE/HARDWARE IMPLEMENTATION)

For IOT based system , we need an mobile application. There are so many application which we can use example, DZone , Blynk, remote link , Anydesk remote control, etc. Initially we just download the app. called Blynk (as it is most popularly used for IOT systems).

This is the first step. Secondly , we need to connect the mobile application with hardware, so that the car cover will move according to the app commands.

So secondly, to connect application with hardware we need to install Arduino Software (IDE) on windows PCs. Add library in Arduino sketch sheet. Process with broad specifications. As we are using NodeMcu ESP8266. Add broad in the sketch .Write the full code and then attach the software part with hardware.

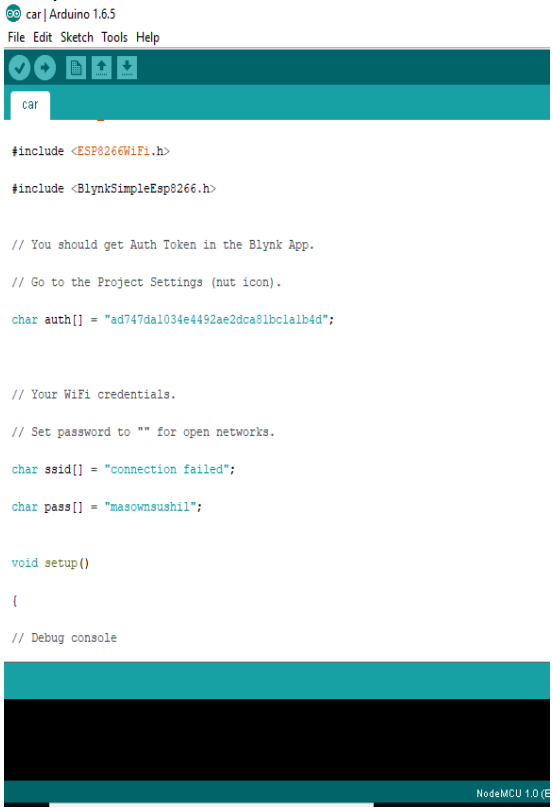


Figure 18: Software Implementation

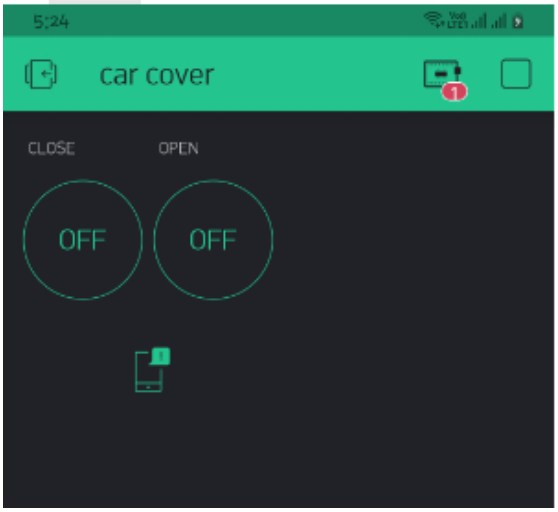


Figure 19: Hardware Implementation with Blynk app

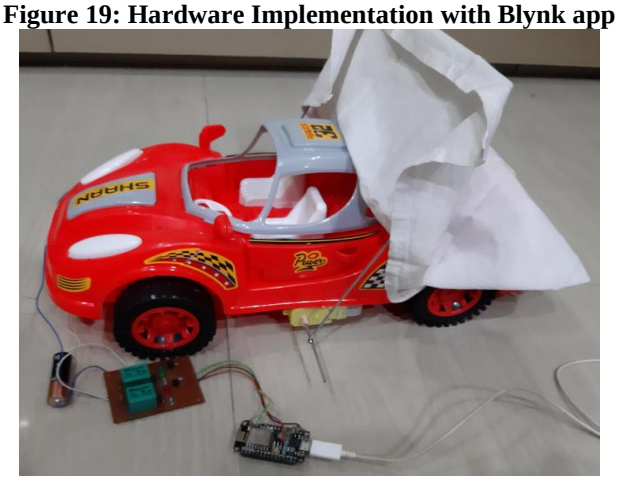


Figure 20: Live Implementation of concept

V. CONCLUSION AND FUTURE SCOPE

The conclusion of all the inventions mentioned above are relevant at that time when they were launched. Now technology has changed everything and made the world to next level. The inventions that mentioned are automatic, remote controlled and even cover the whole car within few seconds, but the main drawback is that none of the system could operate from distant area. These systems would not work if person could not able to press the button on time or wireless connection will break. So, for all this, the solution is to make the system IOT based. In this the whole system will operate though an mobile application which could operate from anywhere at any time. The command will be given by application and through cloud the canopy will cover the whole car within seconds. By this the person could operate the system at distant areas from parked car. The system shows 100% efficiency , and has no failure rate. It could operate from 10m, 20m ,30m , and so on as much distant area.

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