IC201P: Design Practicum
Proposal Report
Problem Definition and Solution Methodology

Automated Rain Protector for Cricket ground

Group number : 25

Team members

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Faculty mentors

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Abstract:

The "Automated Cricket Pitch Covers" that our team is developing have a variety of features, including being managed by an app that instructs an Arduino to roll and unroll a rod through the motor as well as control motor functionality for moving tires backward and forward. When it rains, eight to ten employees drag a heavy sheet to the ground, consuming a lot of labor and materials. Our project will lower the cost of the additional labor required for this job.

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Introduction

We are making an arrangement for automated cricket pitch covering. This contains a carrier-type robot which will move from ground boundary to the pitch when the rain starts. When the rain starts , the carrier will be manually activated through a switch. Once the carrier-type robot reaches the middle of the pitch it will unroll the sheet and this way the pitch will be covered. After the rain stops, it will roll up the sheet and the carrier will go outside the ground. This will also be done manually through a smartphone application.When it rains heavily, the pitch may get damaged in the duration the ground staff take to cover the ground. So, our product has tried to reduce this duration to save the pitch. Also, if it is done manually, the ground staff need to be always present near the boundary with the sheet. So, our product will solve this issue also.

The beneficiary of our product will be the cricket ground management team. Every cricket ground needs our product. This will be the market for our product. In future, we will update our product which will again be every ground management team's choice to have our product.

Problem Definition:

The ground staff are always present near the boundary with covers to cover the cricket pitch whenever it rains. This requires a lot of human effort for its management, 3 to 4 people have to take the sheet for covering the pitch. For maintaining the workers, a lot of money is required. In cricket, pitch is the most sensitive part. So, we have built our model for the cricket pitch. This will be one time investment and lifetime serving as well as the cost for the model is also affordable.

Other Ideas of our Team (8 best)

S. No.	Idea	Intended beneficiary(ies)
1.	Robot to do chemical reactions and collect the data	Educational institutions
2.	Electrification of sewage cleaning	Government
3.	Robot to clean and align mess tables/chairs	Every institution which is having a mess facility will need it.
4.	Smart mirror which will be enriched with social media filters	Social media users
5.	Quarantine facilities served by the robot	Every hospital in this covid time will need this product. Even after the covid it will be in demand to avoid physical contacts in many communicable diseases.
6.	Volumetric 3D display	Everyone will try to experience this product if it is in their budget.
7.	Smart LPG cylinder which will show the level of LPG in it and it will have a	Every LPG cylinder user will need this. So, it may be taken up by the

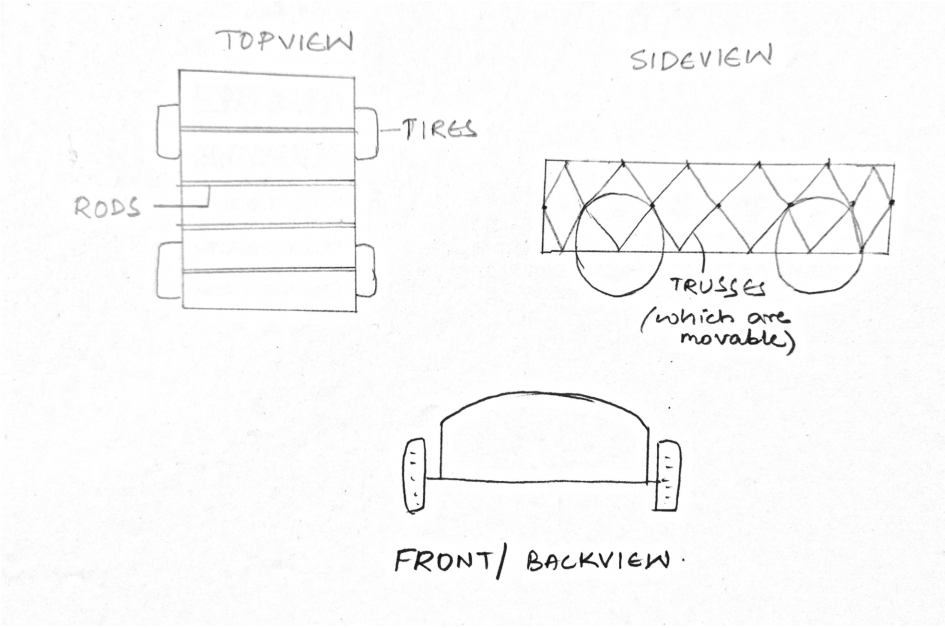
	warning alarm which will detect any leakage from it	government to distribute among the beneficiaries.
8.	Smart water bottle which will show water purity reading	Mostly travelers will prefer to have this product

Proposed solutions/concept :

For each solution, include the following.

1.) First design proposed :

- **Design of the bot :** Bot consist of 4 tyres, several rods, some to be fitted on top and some to be fitted via a movable pin joint, as a structure of trusses, so that the bot can fold like curtains. Rod that joins the front wheel contains a thin, light weight sheet, that is rolled along the rod, that opens when the detector detects using gps that the front wheel of bot has reached the pitch.



- **Feasibility :** Product is feasible to make. Design is quite amazing and achievable by using appropriate materials available in the market.
- **Cost/time needed :** To make this bot, around **₹30,000** is required. The bot will be ready till the end of semester.
- **Impact of Product on Society :** Increase in productivity of society, which in a sense leads to economic growth. Manpower required is less, this tech will also save money that is given to people who take the sheet into ground when it rains

in a match. Time will also be saved as our bot will move,roll,unroll faster than the current method used.

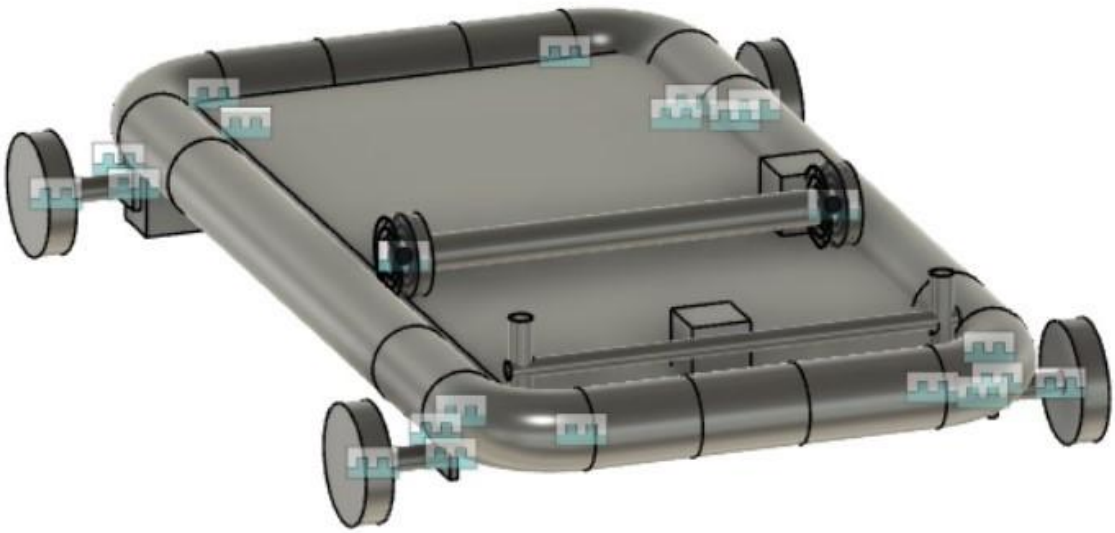
2.) Second design (final):

- **Design of the bot :**

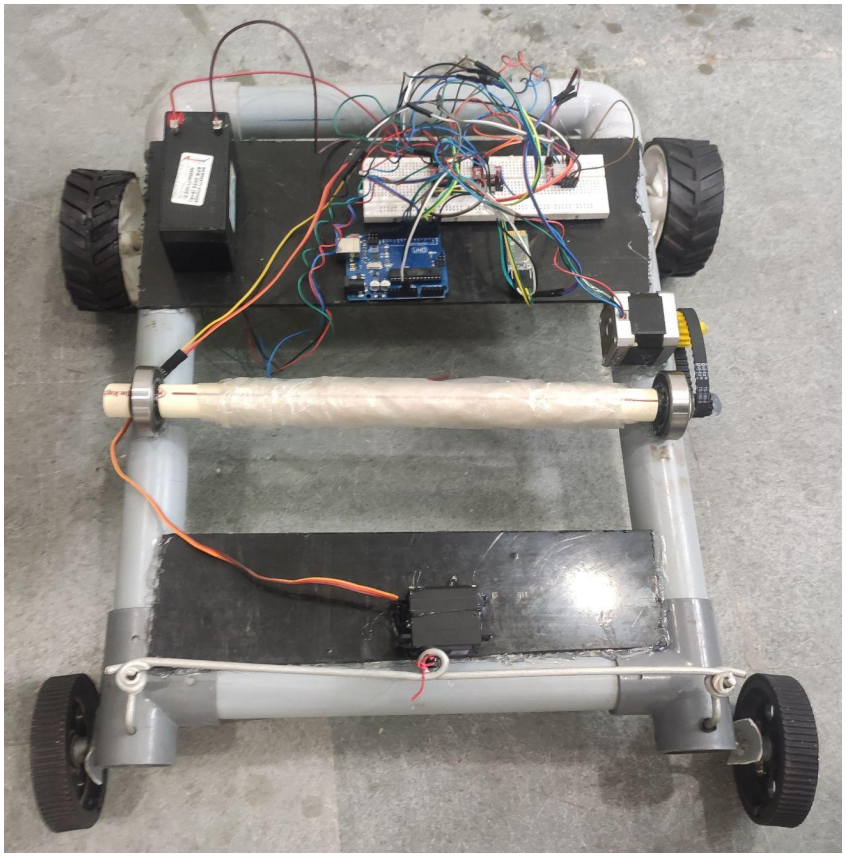
  The bot is made up of four tyres, four steel rods, an Arduino, three motor drivers, pvc pipe, three motors, and a battery. The four rods are used to create a rectangular structure and in the middle of the rectangular structure, PVC pipe has been fitted between two parallel rods so that we can use a motor to roll and unroll the pipe. The app controls the arduino to perform all of the functions, including rolling, unrolling of the rod, and movement of the tyres. Two tyres have been connected with motors on both corners, and another two have been connected without motors. All of the motors are connected through wires to the motor driver, which is connected to the arduino.

- **Cost :** To make this bot, around **₹33,000** is used.
- **Feasibility :**Making the product is viable. The use of suitable materials that are readily available on the market allows for some very outstanding design.

Cad Model :



Fabricated mini model :



Major concerns in successful realization of the product.

The major concerns were as follows:

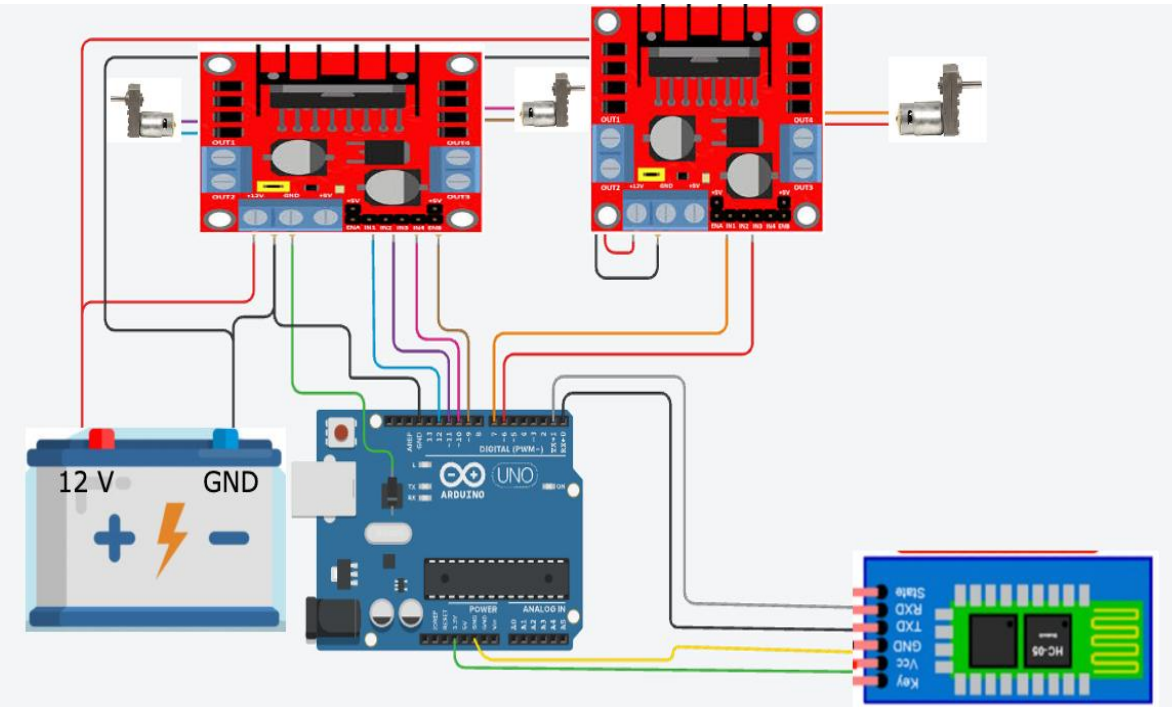
1.) If the sheet to cover the pitch is already present on the ground somewhere near the pitch like hanging it over the pitch or installing it around the boundaries of the pitch. This way it will reduce the duration of the sheet coming from the boundary. But, it will cause hindrance in matches if the ball hits this arrangement or digging ground for installing it may create some other problems and the product may become too complex.

2.) The first design of the product was very expensive to implement. Also it was a very complex structure. So, its management will also be very costly. So we dropped this idea.
3.) The current design of the project is such that the weight of the product is very less as it requires very less material.

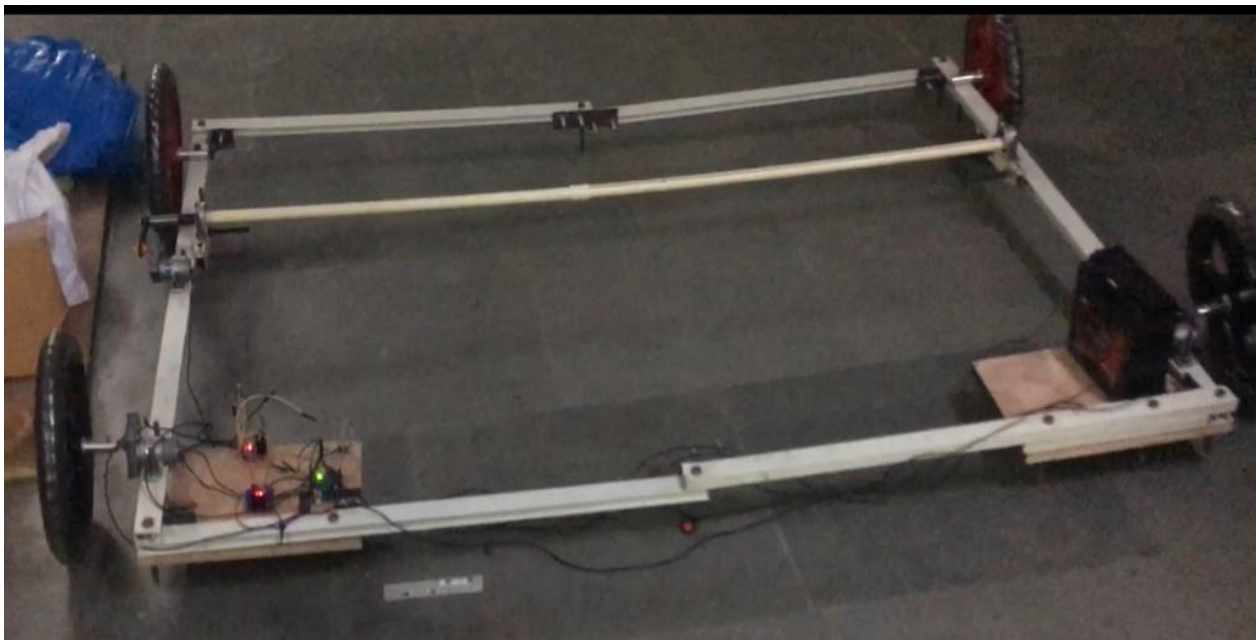
Major components used :

1.) Arduino UNO
2.) Dc motors
3.) Bluetooth module
4.) Tyres
5.) Aluminum rods
6.) Battery
7.) Bearing
8.) PVC pipes

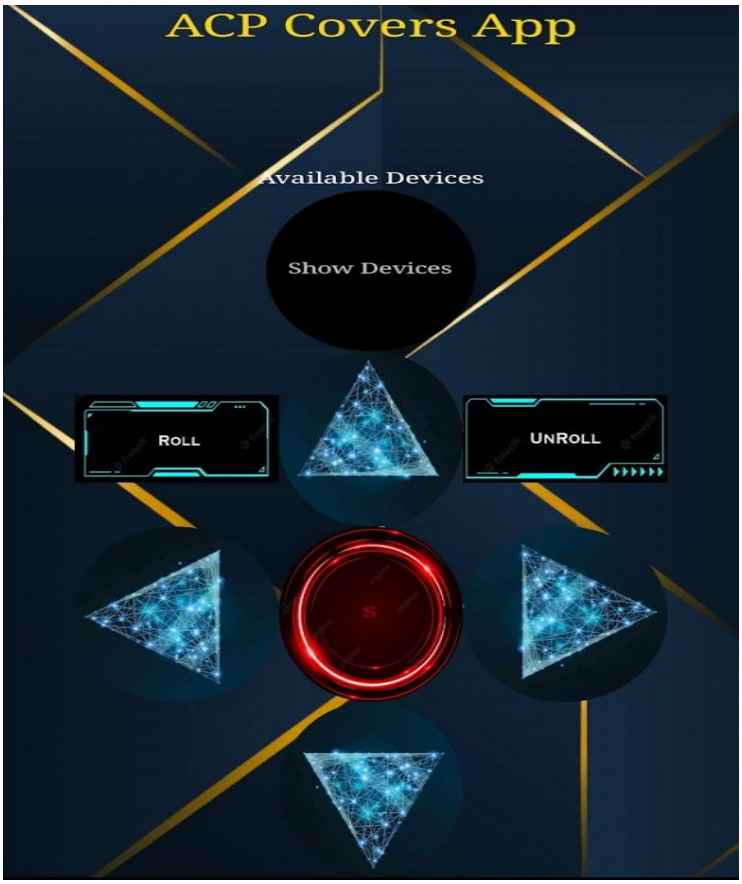
Circuit Diagram :



Final fabricated product:



Smartphone application :



Conclusion

Automated cricket pitch covering will save the pitch from getting damaged through an application than doing it manually. Every cricket ground should have this product. If it is started from India, it will be great for our country also. Further modifications might come in this product in near future which will make it even more interesting. This will be the best product at a low cost and will require minimal human effort to operate this. If this comes in the market, it will be a little revolutionary kind of thing in cricket.