

# TECHKRITI'19

## ROBOTICS PROJECT

(MANUALLY CONTROLLED WIRED ROBOTS)

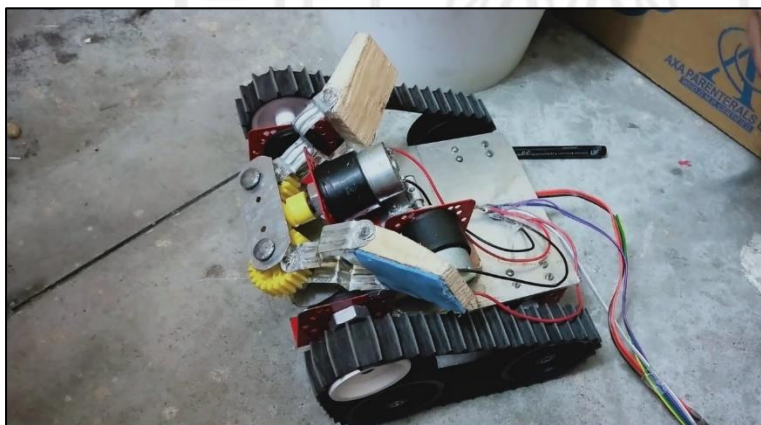
Team Lead: Shikhar Verma

Date: - 24/1/2019

College: Institute of Engineering and Technology (IET), Lucknow

### MEMBERS:

- |                        |                      |
|------------------------|----------------------|
| 1. Shikhar Verma       | 2. Divyansh Tripathi |
| 3. Anuj Pratap Singh   | 4. Anurag Raj        |
| 5. Aman Raj Srivastava | 6. Rishabh Balaiwar  |
- 



**RAZER**  
THE GRIPPER

**STEALTH**  
THE RACER



# TECHKRITI'19

## ABSTRACT

### ROBOGAMES 2019

EVENT NAME: - Manoeuvre

#### Introduction

It's time to flaunt our military style approach with Tank-type design robot which you might have often in movies like G.I. Joe and many more. We have created a bot which is a demon love child between a fully armed military tank and a rapid muscle car.

Our robot is built in such a way that it can overcome any consequences and tackle any obstacles and hurdles that it faces along the way. The bot's design makes it unique and much more stable. This provides an extra edge to its performance. The track belts provide a higher turning speed and extra grip over any surface.

The bot has a twin-directional moving gripper for easy handling of the blocks and a much tighter grip. The gripper also has a padding inside each of its claws for tightening an object of any shape between them. The gripper is designed in such a way that it does not interfere with the movement of the robot, as a result the bot can function efficiently.

Our second bot, which is a non-gripper, is much faster for completing the course with ease. The bot is much more stable so it can perform quicker turns. It can go over obstacles much more swiftly because of much better traction. The gripper bot can also perform well in sync with the gripper bot.

Thus, with our strong will and confident approach, we, with our tirelessly working team, are ready to bring our bots onto the battleground and compete for the title.

*"If you want something you never had, you have to do something you have never done."*

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## CONSTRUCTION

### Anatomy of the gripper bot:

- The robot uses 2 automotive grade rubber track belts for its movement wrapped around 4 wheels from each side.
- The robot uses bottom 4 wheel-power supply, running on 150 RPM DC Motors, while smaller wheels transmit power throughout the track belt.
- The bot is connected to the remote controller using DPDT switch through ribbon wire.
- The custom-made chassis is casted out of aluminum.
- The top wheels are of radius 25mm.
- The bottom two wheels are of radius 10mm.
- The dimensions of the chassis are 25cm X 20 cm.
- The clamps of the gripper are made of wood with rubber pads.
- The gripper is controlled by 2 motors: one controls opening and closing of the clamps using 3 gear system and the other controls upward and downward movement through direct rotation.



### Anatomy of non-gripper bot:

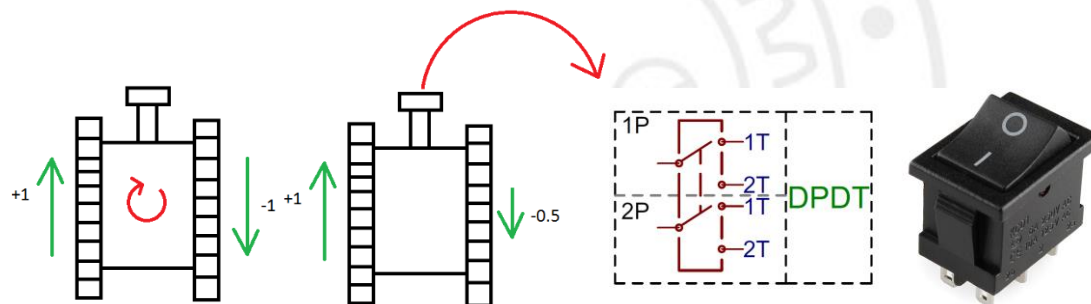
- The robot sports a minimal design with a unique alternate wheel arrangement for improving turning in tight spots.
- All four wheels run 200 RPM Johnson motors
- The bot is connected to the remote controller using DPDT switch through ribbon wire.
- The custom-made chassis is casted out of aluminum.
- The wheels are of radius 25mm.
- The dimensions of the chassis are 18cm X 2cm.

## WORKING PRINCIPLE

### WORKING PRINCIPLE:

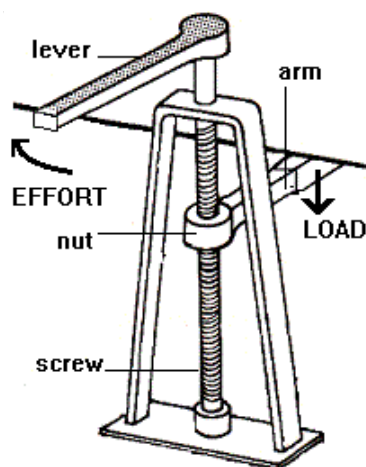
The robots use track belt for its movement. Tracked vehicles have better mobility over rough terrain than those with wheels. Tracks are much less likely to get stuck in soft ground, mud, or snow since they distribute the weight of the vehicle over a larger contact area, decreasing its ground pressure.

The gripper works on the principle of constraint movement. The DC motor supplies power to the centre gear, which transmits mechanical power to the side gears, which are directly attached to the clamps. When the motor is turned clockwise, the clamps open and when the motor is turned anticlockwise, the clamps close. The movement of the gripper is controlled by DPDT switch.



### INNOVATION:

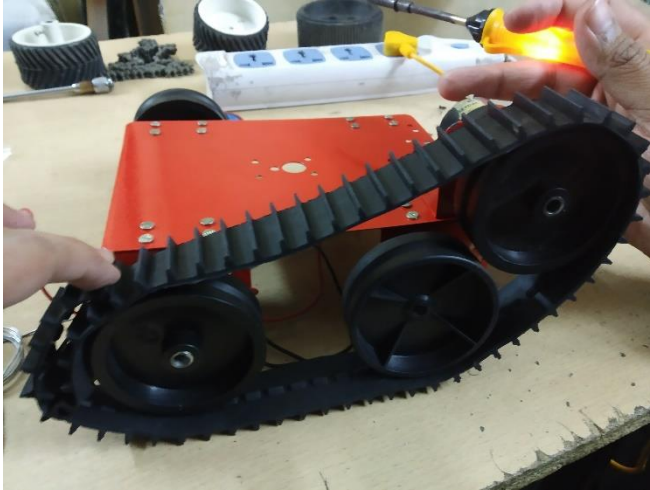
The gripper's up and down movement is controlled by screwing. When the motor is turned clockwise, the screw tightens, bringing the arm of the gripper down while when turned anticlockwise, unscrewing takes place; just like in a car-jack.



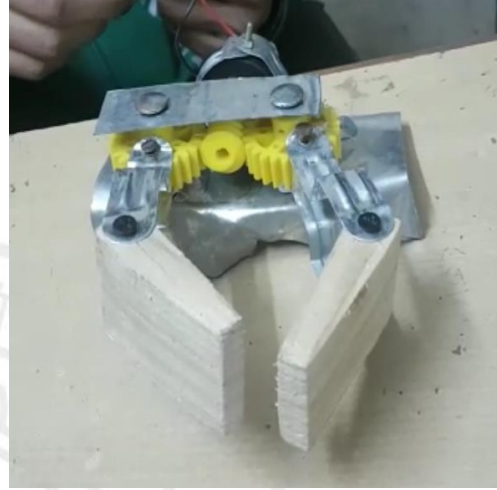


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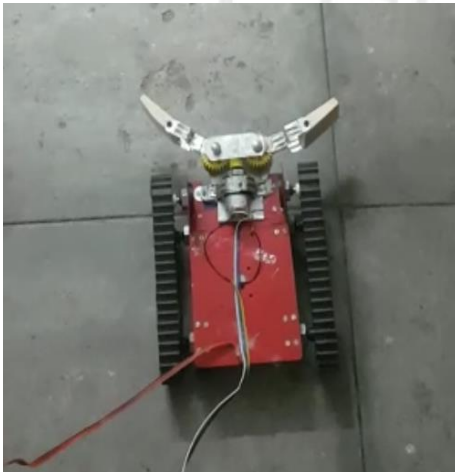
## ACTUAL IMPLEMENTATION



(1) Mounting the wheels and track on the first prototype.

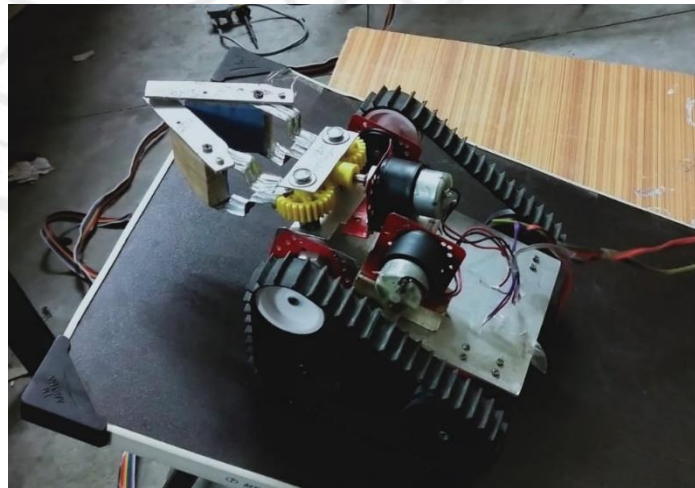


(2) First working gripper model to be mounted.



← (3) Gripper mounted on the prototype chassis (only claws movement)

(4) Final bot with upgraded aluminum chassis and added gripper pivot movement ↓



↑ (5) Round 1 performing arena

(6) Finalized Razer and Stealth models →



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## TESTING VIDEOS



CLICK HERE ↑

Video Link: <https://youtu.be/RbMghTve5Ws>

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## ACHIEVEMENTS

- Cleared Round 1 of Manoeuvre Competition, held at Techkriti '19, IIT Kanpur