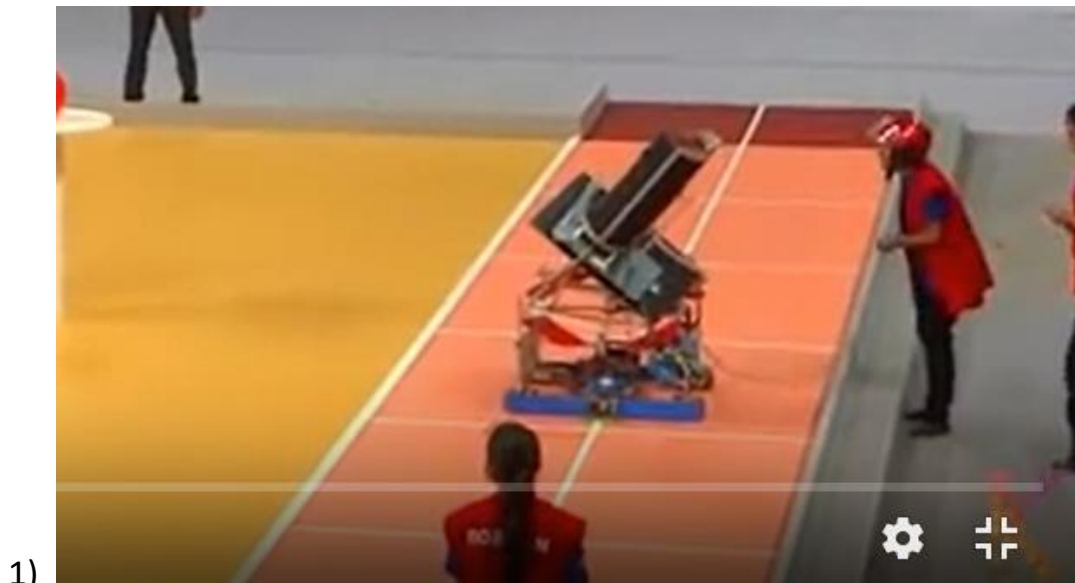


MECHANISMS USED IN PREVIOUS YEAR ROBOCON(YEARWISE)

SUMAN MONDAL

ROBOCON 2017

Few teams used 3 wheel drives whereas others used 4 wheel drives.



Here a hand mechanism is used to actuate. A pneumatic is connected to the hand which helps in throwing the discs.

4-wheel mechanism is used here and for changing the angle, linear actuator can be used.



Here, the discs are in direct contact with the pneumatic which pushes them for actuation. Moreover, a path is provided which guides the way out of the discs.

3)



As the picture is quite clear here, we can see that there is rack and pinion that pushes the discs towards the wheel that is rotating with high rpm and as the discs comes in contact with the wheel and the rectangular channel to the left, it goes straight. In place of the rack and pinion, pneumatics can also be used.

Moreover, for the actuation of the discs, it has to be compressed a little in between the wheel and the rectangular channel.

- 4) Few teams used the same mechanism but with different guided paths.



5)

This team made the competition much more interesting by picking up the perfect points in the rule book as they used a double actuation where they can load discs in two holders and actuate two discs at a time. They also used the rotating wheel mechanism with a guided path and for proper flexibility and movement they have used three wheeled mechanism using omni wheels.

6)



They were much cleverer. They threw three discs at a time with much more loading. Two actuators at the bottom use the same wheel mechanism and throw the disc to land on the desired places whereas the wheel used at the top was to clear out the opponent discs and cancel their points out.

7)



Here, we can see the pulley system used with the small wheels used at each end to actuate and the three-wheeled drive. At the bottom, pneumatics are used for the rotation of the base.

ROBOCON 2016

We know that in 2016, two robots were required: eco robot and hybrid robot.

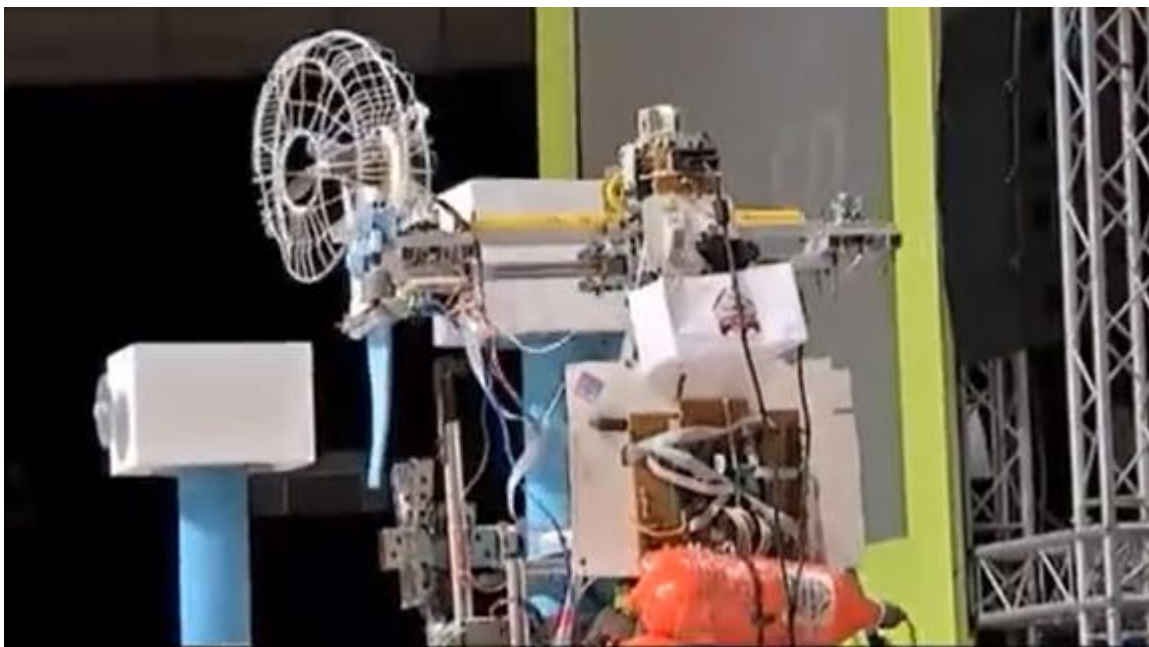
The teams used image processing for the use of line following whereas the hybrid needed to constantly provide a form of energy (almost all the teams used wind energy) to move the eco robot. Also upon reaching, a pole climbing mechanism was needed to be used.



The bottles are used for the pneumatics. A two wheel mechanism was used here. This bot used a fan to power the eco bot. The pneumatics used was to climb the pole.



This picture is much clearer. Apart from the mechanisms mentioned already they have used a gripper (in the blue colour) to hold the star that is attached to the eco bot. Moreover, a pulley system was used so that the fan could move in the vertical direction to the eco bot.



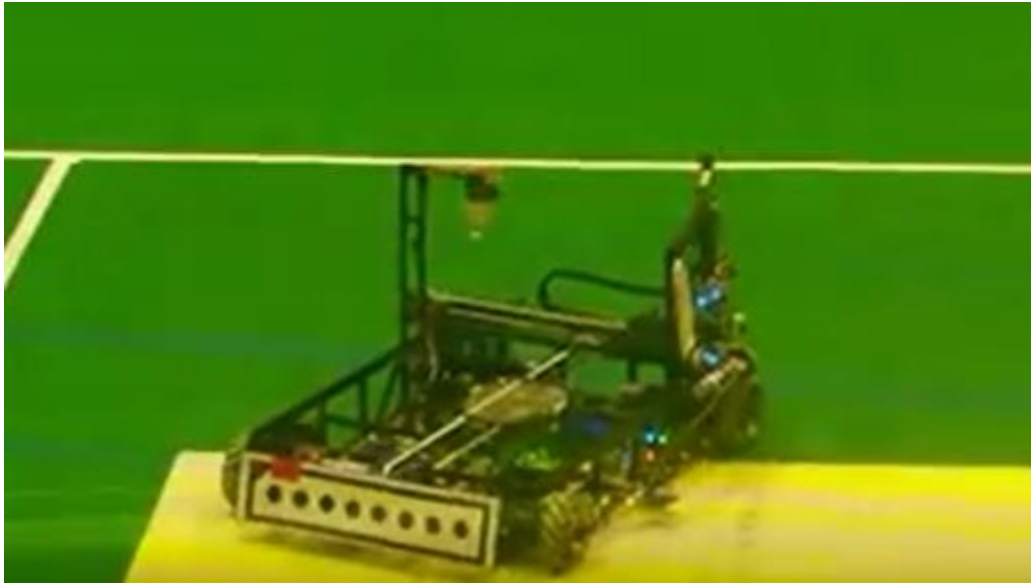
For placing the star, few teams used pneumatics and the others used rack and pinion. In the picture shown, the rack and pinion is clearly shown.



For pole climbing, the teams used pneumatics.

ROBOCON 2015

The event was robominton and there was actual tennis game in between the bots that were autonomous. Each team had to make two bots each.



For the serving purpose, a gripper was used to hold the cock and as the gripper left the cock loose, a racket was to hit it to serve it to the other side.

The racket was connected to a motor which when rotates hits the cock. Moreover, from the picture we can understand that the racket can move in x and y directions with the help of pneumatics. Also, they have used mecanum wheels whereas some have used three wheeled drive using omni wheels.



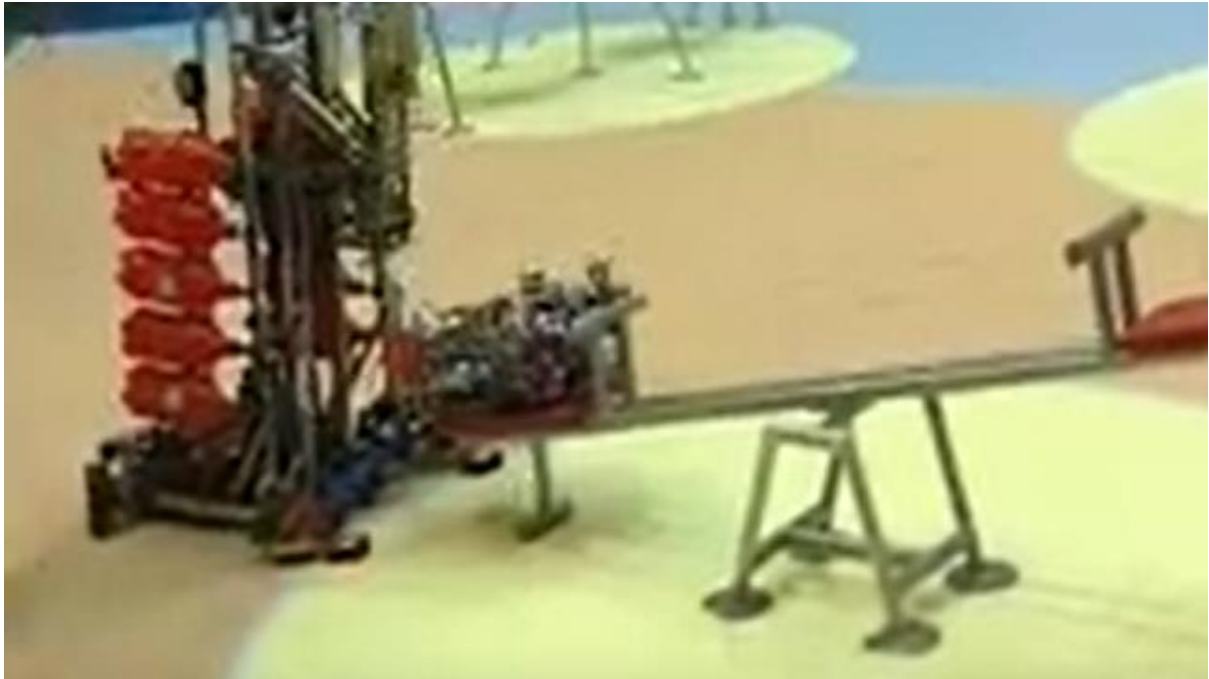
The above team used multiple rackets to hit the cock for the returning purpose. It was all actuated using the pneumatics.



Here, this bot uses the same mechanism.

ROBOCON 2014

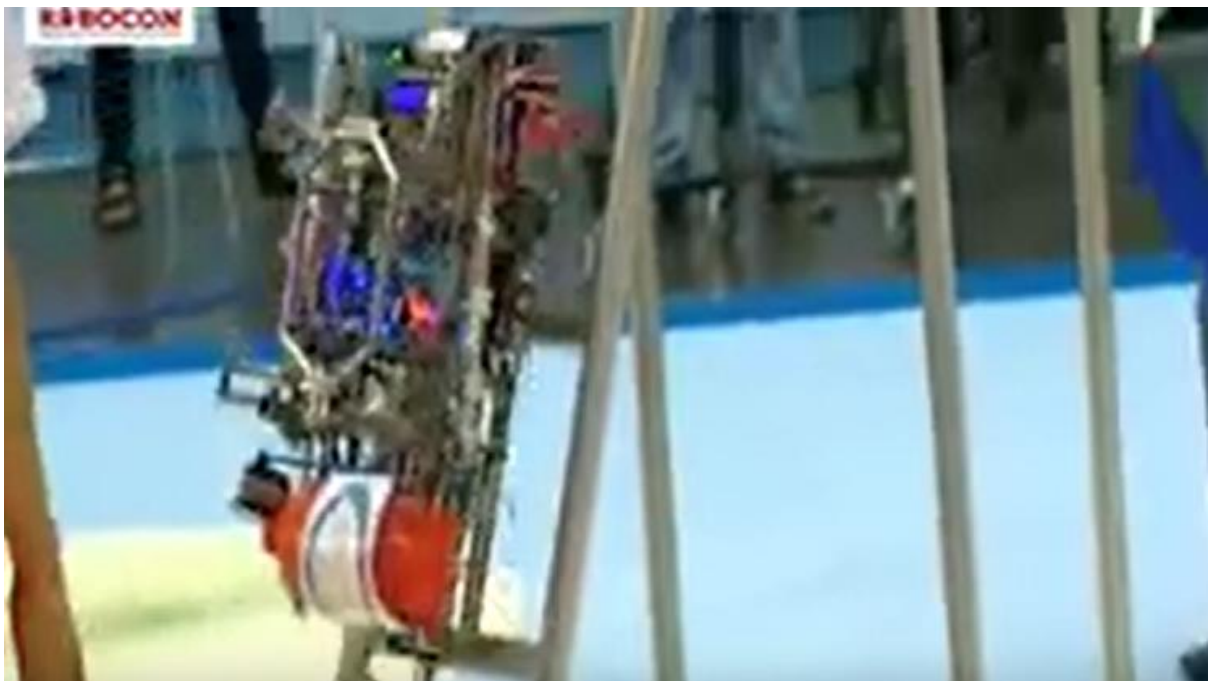
A lot of tasks were given in this year of robocon so the bots made had complex mechanisms used. There were two bots: one was to carry the other bot which was comparatively a lot smaller in size.



The carrier had to place the small bot on the platform shown in the picture above. A gripper mechanism was used to hold the small bot.



The parent bot then had to make the small bot play with it. Pneumatics is used here for this purpose. Otherwise, pulley system can also be made.



The final act which was to climb up the stairs using the child bot was mostly done using the rack and pinion that was connected to a motor.

ROBOCON 2013



There was allowance of two bots. Both the bots had the purpose of pick and place. The first bot made use of grippers and rack and pinion to hold the objects and elongate according to the places they were to be placed.

Few teams used many holders (grippers) place them together to save the time.

Pneumatics was used to make movement in the vertical direction.





The smaller bot used the line following method to reach the locations and place the objects. Proper use of gripper was made with pneumatics.

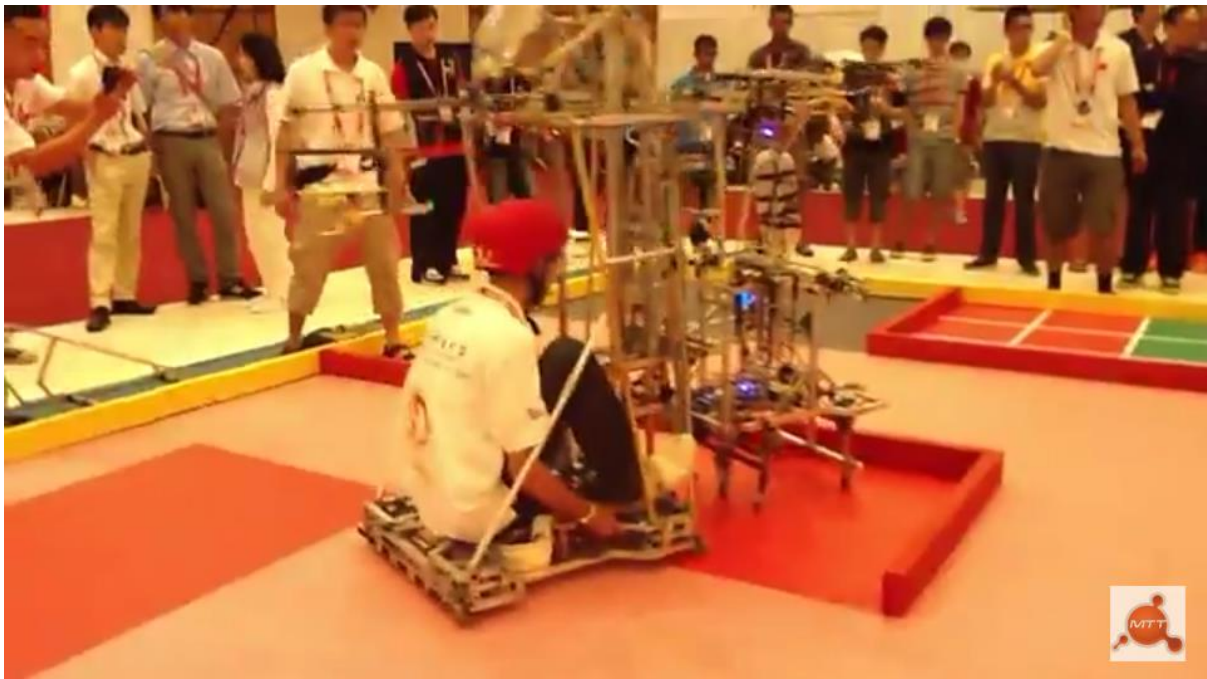
Moreover, for the throwing purpose of the bigger bot, pneumatics was used by some teams. Some used motors to actuate the hand mechanism for the longer throw.

ROBOCON 2012

Honestly, this was a difficult problem statement and even to understand what the teams had used just by looking at the videos.



Using a gripper, the disc was placed inside. It was actuated using either a motor or a small pneumatic. The torque the manual bot was good enough to carry the weight of a person.



The same gripper was used to hold the automatic bot. Pulley system or rack and pinion was used for the vertical motion of the carrier.



The automatic robot was placed on another autonomous robot and was carried.

The automatic robot then places the bot on the platform using the pulley system.



At the final stage, as the manual robot picks up the automatic robot, it uses a gripper mechanism to actuate and turns using another mechanism that I failed to understand.

ROBOCON 2011

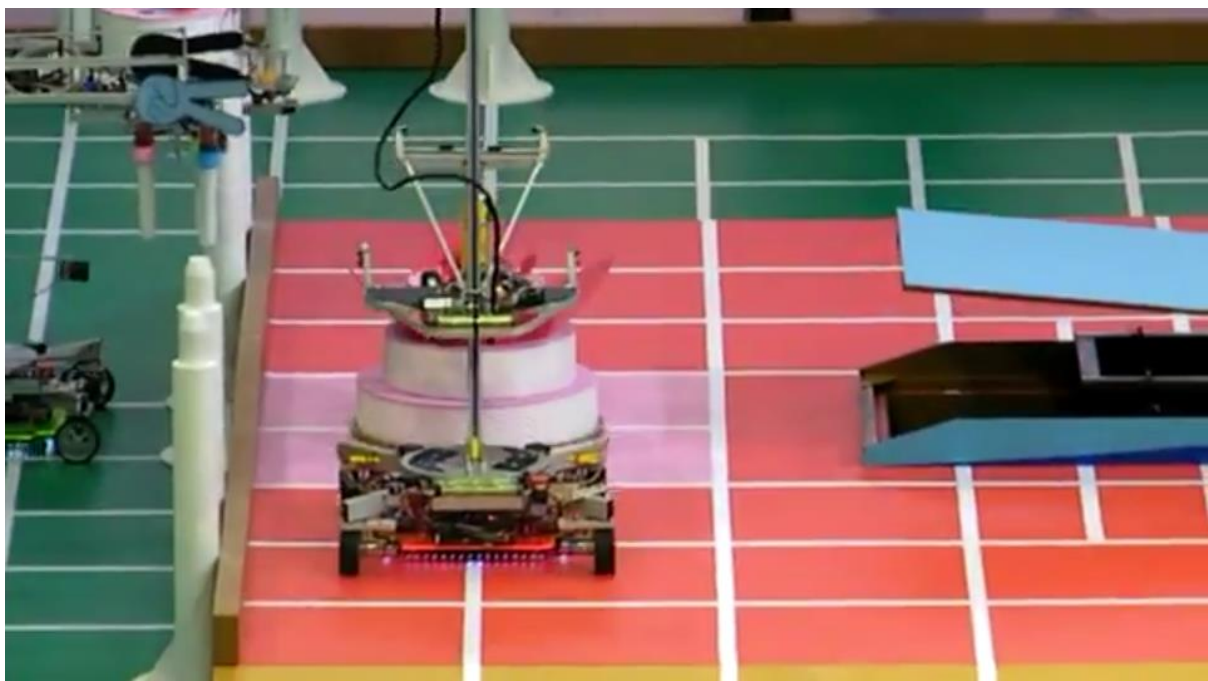
The problem statement was on pick and place. A manual robot was to be used and one or two automatic bots were used.



The manual robot here picks up all the three objects and places them. Some teams placed all the three together whereas others placed one by one. For the picking purpose some have made use of the holes in those objects and picked them up with a vertical rod and some have used simple grippers using rack and pinion or pneumatics. Moreover, for placing of those objects the team above used rack and pinion in place of pneumatics so as to get the accuracy according to the need.



The autonomous bots were also made to do the same purpose of pick and place but certainly on the different heights. Here we can see the use of a gripper. Also, the movement of those autonomous bots were made by the line following method.



Here we can see the autonomous bot placing the object.

ROBOCON 2010

There were four robots for each team in this year from which only one was manual.



The first bot carried the locks using the rod that is connected to the rack and pinion. Moreover, the vertical movement is carried out using the pulley system.

For pushing the blocks inside, rack and pinion was used. Whereas few other teams made use of the pneumatics.



The top part is kept using the rack and pinion as shown in the picture above. Few teams used the pulley system for this purpose also.



Here the autonomous bots used pneumatics for placing the blocks. The team on the left used the rack and pinion system to move the blocks inside.



The other autonomous bot on the other hand used the same mechanism as that of the manual robot to place the top portion. Rack and pinion was mostly used for this purpose.



This last task was done using the scissor mechanism. The block was pushed and placed.

Moreover, the bot quickly grabbed the top part and placed it.

