



Robotics Association of Nepal[RAN]

Talchikhel
Lalitpur, Nepal

Yantra International Robotics Competition 2025: Creating Intelligent Robotics Industry in Nepal by 2045

International Robotics Competition

International League

Yantra X

Theme Book:

Introduction:

Yantra X: International League, the competition where football clubs play with robots. It's an Yantra International Robotics competition event and its title is "Kicking into the Future: Where Soccer Meets Robotics." It's not only a competition; it's simply one fun party to experience with friendship, great inventions and great things when football and totally cool robots unite. Yantra X combines the lovely game into new technology which will give you an experience that will lead you to look at soccer from totally different perspectives and even encourage you to try your hand at tech yourself! Three robots and their drivers will battle each other in a bid to score as many goals as they can.

Theme Description:

"Society 5.0" envisions a human-centric society with digitalization and intelligent systems in harmony to solve social problems and enhance the quality of life. It is a theme common to the shift from this information society (Society 5.0) to one that integrates **AI, Robotics, IoT, and big data** into every element of human endeavor—be it agriculture and healthcare to industry, education, and urban planning. Yantra X, the Soccer Bot Challenge, realizes this transformation by not merely rejoicing in technological advancements but also challenging how good its participants can develop flexible, intelligent systems that translate problem-solving into the real world. It is an appeal to engineer not machines, but better future.





Relevance and Significance:

In an era of technology, Yantra X is proving that humans and machines are able to coexist. It's changing the way things are done, breaking the mold, and showing that the future of robots kicking soccer balls !

Task:

Here's your mission: Design 3 robots that can play soccer against other robots, with a cool shooting feature. It's like giving your robot superpowers for the match!

Scoring Criteria:

- Goals are only counted when the ball fully crosses the goal line.
- The competition begins with a league stage, where teams play group matches.
- The top two teams from each group will proceed for the quarterfinals.
- In the league phase, a win earns 3 points, a loss earns 0 points, and a draw earns 1 point to each team.
- From the quarterfinals onward, the competition follows a knockout format — one defect eliminated!

Prizes and Recognition:

Prizes: Rs.

- Winner: Rs.(worth)
- Runner up: Rs.(worth)
- Certification and Medals for outstanding performance.
- Certificate of Participation: All participants receive digital certificates.

Note: Prize money is subjected to applicable government taxes.

Certification Policy:

1. Winners will receive a certificate of appreciation, medals, and a trophy for their outstanding performance.
2. All teams will receive a digital certificate of participation.





3. Sponsors will also receive a special certificate/recognition (This should be informed to the organizer 3 weeks before the event).
4. If the team plays unfairly or misbehaves, including disrespecting others, during or after the event at the premises, their certificates may be canceled or invalidated .

Get ready for Yantra X – where soccer meets the future, and robots take center stage!

Rule Book:

General Rules

1. **Voltage Limitation:** The potential difference between any two points within the robot or any external components must not exceed 24 volts.
2. **Team Composition:** Each team can have a maximum of 5 members, inclusive of a mentor.
3. **Age Group:** The competition is open to participants of all age groups.
4. **Robot Verification:** Robot verification shall be done two weeks before the competition. Teams must submit videos, photos, and an abstract detailing their robot's construction and design during the verification process.
5. **Safety Precautions:** Throughout the event, all participants must follow safety guidelines and precautions.
6. **Fair Play and Sportsmanship:** Unsportsmanlike unfairly or misbehaves, including disrespecting others, during or after the event at the premises is unacceptable.
7. **Identity:** Bots and pilots must always be clearly identifiable through team tags, uniforms, or markings for effective smooth coordination and fair play.
8. **Robot :**Participants may bring up to five robots and are allowed to make up to two substitutions during a match.
9. **Referee's Decision:** Decisions made by the event referees are final and binding.





Robot Specifications

1. **Control:** Each robot must be manually wirelessly controlled.
2. **Dimensions:** The robot's size must not exceed 45 cm (length) * 45 cm (width) * 45 cm (height).
3. **Components:** The use of ready-made toy cars or Lego in robot construction is not allowed.
4. **Weight:** The robot's weight must not exceed 6 kg with a 3% tolerance.
5. **Shooting Mechanism:** A functional shooting mechanism is mandatory; failure to include one will result in disqualification.
6. **Keeper Robot Extension:** The keeper robot is allowed to extend its structure or mechanism by up to 15 cm only during gameplay..
7. **Drive Motor:** Motors such as planetary motors, brushless motors, hybrid motors, or any kind of modified stepper or high-gear motor are not allowed.

Game Play Rules

1. **Match Duration:** Each match consists of two halves, with each half lasting 3 minutes, for a total match time of 6 minutes.
2. **Half-Time:** A 2-minute half-time break is provided between the two halves, allowing teams to perform quick repairs on their robots if needed.
3. **Extra Time and Penalty Shootout:** Extra time and penalty shootouts apply during the knockout phase, starting from the quarter-finals. Extra time lasts 3 minutes, divided into two halves of 1.5 minutes each. If the match remains tied after extra time, a penalty shootout is held — with no goalkeepers allowed during the shootout.
4. **Kick-Off:** Each half begins with a kick-off from the center circle. The team that wins the coin toss chooses which goal to defend and starts the game.
5. **Goal Scoring:** A goal is scored when the entire ball crosses the goal line between the goalposts and beneath the crossbar. The team with the most goals at the end of regulation time, extra time, or the penalty shootout is declared the winner.





6. **Out of Bounds:** If the ball goes out of bounds, the opposing team receives either a throw-in or a corner kick, depending on where it exited. The robot that last touched the ball before it went out must remain inactive until the ball is back in play.
7. **Pushing Goalkeeper:** At any given time, one bot at a time can push the goalkeeper. Pushing the goalkeeper simultaneously by two bots is not allowed.
8. **Fouls:** Standard soccer fouls such as pushing and tripping come into play. Subject to the placement and extent of the foul, the opposing side is awarded free kick or penalty kick.
9. **GoalKeeper:** The goalkeeper robot is not allowed to cross the halfway line of its own side of the field. Incase if two bots are only in the ground then both bots are allowed to cross the line.
10. **Robotic Interference:** If a robot distrup the movement or activity of an opposing robot in a way that affects gameplay, the referee can award a free kick or penalty kick to the team.
11. **Player Ejection:** For repeated or severe fouls or unsportsmanlike behavior, a robot may be shown a red card and removed from the match, as determined by the referee.
12. **Referee's Decision:** Decisions made by the event referees are final and binding.

Event Rules

1. **Ball Handling:** Robots are not allowed to drag or pick up the ball. They must use their designated shooting mechanisms to interact with the ball during gameplay.
2. **Air Blowing Mechanism:** The use of air-blowing mechanisms for kicking or handling the ball is not allowed under any condition. Robots must rely solely on their shooting and kicking mechanism.
3. **Ball Out of Arena:** If a robot throws the ball out of the arena, the opposing team will be awarded a throw-in or a corner kick, based on the location where the ball exited the field.
4. **Free Kick Distance:** During a free kick, the robot taking the kick must maintain a minimum distance from any defending robot. The exact distance will be determined by the referee based on the position of the kick.
5. **Penalty Kick:** Penalty kicks, awarded for fouls committed within the penalty (D) area, will be taken from the center of the field to ensure fairness for both the kicker and the goalkeeper.





6. **Penalty Shootout:** A robot will have 15 seconds to shoot for a goal during a penalty shootout. Robots take turns, and the team scoring the most goals wins.
7. **Yellow and Red Cards:** Yellow card is a warning for foul play. Repeated offenses or significant violations can lead to a red card, and the team or robot gets disqualified.
8. **Physical Damage:** A robot that causes physical damage to an opponent robot on the field will get disqualified immediately, it will be immediately disqualified. Safety is a top priority.
9. **Strict Adherence to Schedule:** Teams must arrive on time for scheduled games. A 5-minute grace period is allowed for delays in case of unavoidable situations. Delays after this duration will result in a warning for the first offense; repeated delays will have a 3-point deduction from the total score of the team.
10. **Disqualification for Persistent Violations:** Repeated violations of timing rules, failure to inform organizers of delays, or attempts to manipulate match timings may lead to immediate disqualification from the competition.
11. **Team Identification:** Bots and pilots must always be clearly identifiable through team tags, uniforms, or markings for effective smooth coordination and fair play.

Arena Specifications

1. **Arena Size:** The arena is an 20ft * 16ft rectangle with a boundary wall, standing at a height of 20 cm.
2. **Markings:** All markings within the arena are consistent with those found on a standard football field.
3. **Ball Size:** The soccer ball used in the competition is approximately 10 cm in diameter.
4. **Goalkeeper Area:** A designated goalkeeper area, often referred to as the "D area" is marked within the arena. Pushing the goalkeeper is not allowed in the D area.
5. **Referee's Station:** A designated referee's station is set up adjacent to the playing arena.





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