



Robotics Association of Nepal [RAN]

New Baneshwor-10

Kathmandu, Nepal

Yantra International Robotics Competition 2026: Creating Robotics Industry of Nepal by 2030

Yantra 10.0 : Yantra Autonomous Industries [Yantra AI]





Theme

The Yantra Autonomous Industry competition is inspired by the vision of Society 5.0, an advanced human-centric society where AI-driven intelligent systems enhance daily life. This competition fosters innovation in autonomous robotics by integrating AI, IoT, and machine learning to develop self-sufficient, adaptable, and efficient robotic solutions. Participants will push the boundaries of robotic intelligence, human-robot interaction, and autonomy, reflecting the interconnected smart world envisioned by Society 5.0.

Introduction and Background

An autonomous robot is a robot that acts without recourse to human control. The first autonomous robot environments were known as Elmer and Elsie, which were constructed in the late 1940s by W. Grey Walter. They were the first robots in history that were programmed to "think" the way biological brains do and meant to have free will. Elmer and Elsie were often labeled as tortoises because of how they were shaped and the manner in which they moved. They were capable of photo taxis which is the movement that occurs in response to light stimulus.

The Yantra Autonomous Industry competition is designed to test and improve autonomous robotic systems' capabilities in creative expression, mobility, and automation. The competition consists of three rounds: Dancing, Running, and Autonomous Object Sorting. Each round evaluates different aspects of robotic intelligence and functionality. The event aims to encourage technological advancements in robotics by engaging teams in challenging yet rewarding tasks.

Objective:

The main objectives of this competition are:

- To promote research and innovation in autonomous robotics.
- To integrate AI, IoT, and machine learning for self-sufficient robotic solutions.
- To enhance problem-solving skills through practical automation challenges.
- To develop human-robot interaction and demonstrate adaptability in robotics.

Concept and Task of Competition

In the near future, the world will witness a groundbreaking event—the AI Robotics Championship, where autonomous robots will compete in three thrilling rounds, pushing the boundaries of artificial intelligence and automation. Engineers, researchers, and tech enthusiasts from across the globe will gather to witness these cutting-edge machines showcase their capabilities in an electrifying battle of intelligence and precision.

The competition will kick off with the Dancing Round, transforming the arena into a stage of robotic artistry. AI-powered robots will move gracefully to music, synchronizing their steps with rhythm and fluidity. From intricate human-like movements to mesmerizing geometric patterns, this round will highlight the fusion of creativity and technology.

Next, the Running Round will test the robots' speed, agility, and decision-making as they navigate a challenging obstacle course. With real-time path adjustments, swift acceleration, and





split-second responses, the most efficient and adaptable machines will emerge victorious. The audience will be on edge as robots race through the dynamic track, proving the advancements in autonomous mobility.

Finally, the Autonomous Object Sorting Round will challenge the robots' intelligence and problem-solving skills. Equipped with AI-driven vision systems and machine learning algorithms, these robots must accurately identify, categorize, and sort a variety of objects. This final test will showcase their ability to process data, make intelligent decisions, and execute complex tasks seamlessly. As the competition unfolds, it will not only crown champions but also pave the way for the future of robotics, inspiring innovation and redefining the possibilities of AI-driven automation.

Dimension and Fabrication of robot

1. Any microcontrollers, microprocessor, sensors and actuators can be used for designing a robot and it cannot control manually either wired or wirelessly.
2. Image processing is compulsory for processing the data like color detection.
3. The robot should fit within a box of dimension 45 X 45 X 45cm to 60 x 60 x 60 cm when the extender(robotics arm if used) is in an extended state .
4. Each Team should have a single robot.
5. The robot should not weigh more than 4 to 10 KG.
6. Use of readymade toys is not allowed, but one can use the readymade circuits.
7. Robots should not be manually controlled. It should be completely automatic.
8. Any camera and sensors are allowed.
9. The robot cannot use more than 12V battery and cannot use more than 2 batteries at a time.
10. The robot must have a wireless data transmitter module.

Team Specification

- Each team can have a maximum of four members.
- Teams can be formed from schools, colleges, or independent groups of robotic enthusiasts.
- Teams must submit a technical document detailing their robot's design, fabrication process, and working principle before the competition.

Specification of Arena and items placed on Arena

For Dancing Round

- The designated performance area for the Dancing Round will be a **3m × 3m** smooth surface with a **white-colored** floor.
- The arena is enclosed by a **30cm high wall** on all sides.





- The arena is divided into **two equal halves** by a **long thread**, creating separate sections for each participant. Each participant's robot must perform within its designated section without crossing into the other half.
- The starting zone will be the center of the section.

For Running Round

- The race track for the Running Round will be **4 meters long** and **70 cm wide**, featuring a **smooth, white-colored floor**.
- The arena consists of **four parallel tracks**, each separated by a **5 cm wide black boundary line**. The tracks will follow a **straight path** throughout the race.

For Sorting Round

- The Sorting Round will take place on a **3m × 3m platform** with a **smooth, white-colored floor**.
- The arena is enclosed by a **30cm high wall** on all sides.
- Inside the arena, **three cube-shaped objects** (each measuring **10cm × 10cm × 10cm**) will be placed at random locations. These objects will be **colored red, blue, and green**.
- There are **three sorting platforms**, each positioned in a **corner of the arena**, marked with specific **colored shapes** on two adjacent walls:
Red – Circle
Blue – Triangle
Green – Rectangle
- Each sorting platform has a **height of 10cm, a length of 20cm, and a width of 20cm**.
- The **remaining fourth corner** serves as the **starting zone for the robot**.

Bot Verification

- The designed robot by participants will be verified by the organizer member one week or 2/3 days before competition.
- So a team must come to the office of the Robotics Association of Nepal[RAN] to verify the bot(flexible for those participants who are far from the valley).
- If the bot is not verified by the organizer then the team cannot participate in the competition.
- After verification the design of the bot cannot not change.

Operation of the Game

The competition consists of three rounds, each testing a specific capability of the robots. The total points for the entire game will be **100 points**.





Gameplay Overview

Dancing Round – Showcasing AI-Driven Movements in an Artistic and Expressive Manner (30 points)

- The robot must perform robotic movements and poses for **two minutes**, showcasing as many steps and stances as possible.
- Two team's robots in the arena dance at a time.
- **Performance Ranking (20 points):** Based on the fluidity and creativity of the robot's dance performance.
- **Balance Points (10 points):** The robot will be evaluated based on its ability to maintain balance in different stances:
 - **One-legged stance:** 10 points
 - **Biped stance:** 8 points
 - **Tripod stance:** 6 points
 - **Quadruped stance:** 2 points
- A **1-point deduction** for each manual correction made if the robot falls.

Running Round – Highlighting Robotic Mobility and Navigation Efficiency (30 points)

- The robot must complete a **4-meter race track** as quickly as possible.
- Four robots(teams) will race on the track at the same time.
- The round lasts for **10 minutes**.
- Robots are ranked based on the time it takes to complete the track.
 - **Points Allocation:**
 - **1st place:** 15 points
 - **2nd place:** 14 points
 - **3rd place:** 13 points
 - **4th place:** 12 points
 - The points decrease by 1 point for each subsequent rank.
- If the robot is bipedal, the points earned will be **doubled**.
- A **1-point deduction** for each manual correction if the robot falls.

Object Sorting Round – Demonstrating Problem-Solving and Automation through AI-Based Object Sorting (40 points)

- The robot must autonomously pick up and place three colored objects in their respective designated sorting platforms.
- There are three objects: **Red, Blue, and Green**.
- The objects must be placed in the sorting platform corresponding to their color and shape:
 - **Red object** goes to the red-colored circular platform.
 - **Blue object** goes to the blue-colored triangular platform.
 - **Green object** goes to the green-colored rectangular platform.
- The sorting platforms are **10cm in height** from the surface.





- One robot performs the sorting task in the arena at a time.
- The round lasts for **10 minutes**.
- **Scoring Criteria:**
 - **All three boxes correctly placed:** 40 points
 - **Two boxes correctly placed:** 25 points
 - **One box correctly placed:** 10 points
 - **Incorrect placement but still on the platform:** 1 point per box
 - **Penalty:** If the robot falls, the performance will be terminated, and the robot will be disqualified from the round.

Competition Structure

1. Preliminary Rounds:

- After the **Dancing Round** and **Running Round**, the total points (out of 60) from both rounds will be accumulated for each robot.
- The **top four teams** based on their total score will advance to the **Object Sorting Round**.
- Robots that do not make it into the top four will be eliminated from the competition.

2. Final Round: Object Sorting Round

- The four remaining robots will compete in the **Object Sorting Round**. The total points from this round (out of 40) will be added to their preliminary round scores, bringing the total possible points to **100**.
- The final scores are calculated, and the **robot with the highest total score** will be declared the winner.

3. Tie-Breaker:

- In the event of a tie, the final ranking will be determined based on the **time taken to complete the Object Sorting Round**. The robot that completes the task in the shortest time will be ranked higher.

Penalties during the Game

1. If a team does not show up with enough notice before a match to prepare, it will be considered that the team is absent.
 - a. Absences will not count towards scores, and will be noted for tiebreaking purposes.
 - b. The organization will define how much notice is needed to prepare for the match.
 - c. Exceptionally and duly justified, the organization may decide to postpone a match.
 - d. Matches can very rarely be postponed. Make sure you have the robot with the correct program, charged batteries and all the pieces you need before the match.
 - e. If you believe you will have scheduling restrictions on the day of the tournament, send an email to the organization before the day of the tournament to find a solution.
2. If a team presents a non homologated robot, it will have to be removed from the Competition Field and cannot be used.





3. If the team manipulates the robots or the objects on the field.
 - a. Very serious offense if it occurs with the intention of deceiving the referee or significantly altering the result of the match.
 - b. Serious offense in other cases.
 - c. In case of a very serious offense, a penalty of 50 points will be applied and the match will be rejected.
 - d. In case of a serious offense, the match will be rejected.
4. If there is interference with the other field or the other team.
 - a. Minor offense, if the interference does not affect the conditions of the other team. In particular, if it does not interact with the robots (directly or indirectly) or the objects of the opponent, or if the referees manage to restore the previous conditions before it affects the match (for example, by removing foreign objects).
 - b. Serious offense, if it affects the other team.
 - c. Very serious offense, if the interference is part of a deliberate strategy with the aim of harming the other team.
 - d. The minor offense carries a penalty of 20 points.
 - e. The serious offense carries a penalty of 40 points. In addition, the other team can be scored as if the interference had not occurred. In case of doubt, it will be calculated as if the immediate action that the robot was making at that moment had been successful.
 - f. The very serious offense carries a penalty of 50 points and the match will be rejected. The other team can be compensated as in a serious offense.

Sanctions during the Competition Day

1. A disqualified team will not be able to play any more games. In addition, it will not be considered to move on to the next round and will lose any awards or mentions that it has obtained.
2. If the team does not arrive in time to register before the registration closing time, it will be disqualified.
 - a. The registration closing time will be specified the day before the competition, and it will always be within the event's schedule.
 - b. The organization can make exceptions. If you believe you will not arrive on time, send an email in advance.
7. If a team member disrespects any participant, coach, member of the public, or member of the organization, the incident will be reported to their coach and the organization will take appropriate measures, which may include the expulsion of the participant or disqualification of the team.
8. If a team damages the facilities, or the materials of other teams, the same process as in the previous point will be followed.





9. If a team has been repeatedly sanctioned, it may be called to a meeting with the organization. If it is considered that the team shows disregard for the rules, it may proceed to its disqualification, or the expulsion of some of its members.

Registration charge

Normal Registration: Nrs 4,500 (August, 2026 to September, 2026)

Late Registration: Nrs 6,000 (October, 2026 to November, 2026)

Contact Details:

For any questions, feel free to contact us at :

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**** Some of the rules and regulations, and minor gameplay are subject to change as required in future ****

Note: Prizes are subject to applicable government taxes

