

Robotics Pro Category

(30 + years Old)



(Community Guardian Robots)

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Summary for Safe Cities: Robotics Pro Category Competition

This document outlines the competition rules for the STEM Festival Pro Category with a focus on "Community Guardian Robot." You have 2 to 3 months to design, program, and test your robot before traveling to the host city of the competition, Port Harcourt.

Key Points:

- ❖ These rules are a guideline for STEM Festival competitions.
- ❖ The missions can be adapted for different skill levels, making them suitable for beginners and experienced teams.
- ❖ Focus on completing missions that showcase your robot's capabilities in:
 - Networked camera system design
 - AI software for video analysis and suspicious activity detection
 - Autonomous response system based on detected activity
 - Adaptability to different environments
- ❖ While completing all missions is not mandatory, strive for creativity and innovation in your design.
- ❖ Be prepared to present your robot's functionalities clearly to the judges.

Ethics Code for Teams:

- ✓ Participating and learning are more important than winning the prizes.
- ✓ Teams are encouraged to learn and master new skills while having fun together.
- ✓ It is not whether you win or lose, but how much you learn that counts.
- ✓ Join the global community of inventors and practical problem-solvers.

STEM Festival Team

Safe Cities

Open Category (30 + years old)

Category Focus: Community Guardian Robots

Introduction:

Welcome to the Pro Category, where your imagination sets the limits! The Safe Cities: Robotics - Pro Category empowers individuals aged 30 and above to design a robotic solution for a safer, more supportive community. This category focuses on Community Guardian Robots: robots that integrate seamlessly into your neighborhood, enhancing the lives of residents and fostering a stronger sense of security.

The Mission:

Develop a Community Guardian Robot that addresses a specific and critical need within your community, fostering a safer, more supportive, and well-connected environment. Your robot should seamlessly integrate into the daily lives of residents, offering practical assistance and promoting a sense of security.

Tasks:

These tasks are designed to showcase your robot's effectiveness in addressing the chosen community need. Focus on demonstrating real-world functionality and user interaction.

1. **Needs Assessment and Target User Identification:** Clearly define the specific community need your robot addresses. Who is the target user group (e.g., elderly residents, children, people with disabilities)? How will your robot directly benefit them?
2. **Robot Functionality Demonstration:** Showcase your robot's capabilities through a simulated scenario relevant to the identified need. This could involve:
 - **Safety:** Navigating a simulated environment to detect suspicious activity or assisting with deliveries.
 - **Social Connection:** Facilitating communication between residents or providing companionship for isolated individuals. (Simulate interaction through pre-recorded messages or a mock conversation).

- **Well-being:** Demonstrate features like medication reminders or assistance with chores (simulated through object manipulation or role-playing).
3. **User Interaction:** Highlight how your robot interacts with users in a safe, user-friendly, and intuitive manner. This could involve voice commands, touch screen interfaces, or other appropriate methods.

Sample Image



This is just an example. Your robot does not need to look like this or have the same design to be successful in the competition. Use it as a source of inspiration!

Design Tools (Your Free Choice):

- **3D modeling software** (e.g., SolidWorks, Fusion 360, FreeCAD) for designing robot parts and manipulator arms.
- **Simulation software** (e.g., Gazebo, V-REP) for testing robot navigation and manipulation capabilities in a virtual disaster zone environment.
- **Robotics development kits** (e.g., Arduino, Raspberry Pi, etc.) for prototyping and programming robot functionalities.

Programming Software (Your Free Choice):

- Python: Popular language for robot control, sensor data processing, and communication.

- C++: Powerful language for real-time robot control and complex autonomous decision-making algorithms.

Scoring/Earning Points:

NB: Teams may opt to focus their efforts on the software aspect of the tasks if they encounter any constraints with their hardware design. This allows them to concentrate on the remaining 75% of the points allocated for the competition.

Section 1: Robot Design (25 points)

Criteria	Description	Points Awarded (Max)
Design Creativity and Innovation	Uniqueness and originality of the robot's design concept.	10
Feasibility and Cost-Effectiveness	Practicality of the robot's design for potential construction and implementation within the community, considering materials and cost.	5
Scalability and Adaptability	Potential for the robot's design to be adapted and implemented in different community settings.	5
Detailed Design Documentation	Comprehensiveness and clarity of the robot's design documentation (e.g., sketches, blueprints, 3D models).	5

Section 2: Community Impact (30 points)

Criteria	Description	Points Awarded (Max)
Specificity & Relevance of Need Addressed	Clarity and focus of the identified community need that the robot addresses. Significance of the need within the chosen community.	15
Potential to Improve Lives	Potential for the robot's design to make a positive and measurable impact on the lives of residents and the overall well-being of the community.	15

Section 3: Robot Functionality (30 points)

Criteria	Description	Points Awarded (Max)
Effectiveness for the Task	Suitability of the proposed functionalities to directly address the identified community need.	15
User-Friendliness and Safety Considerations	Consideration of user needs and safety features in the robot's design and functionalities.	15

Section 4: Presentation and Communication (15 points)

Criteria	Description	Points Awarded (Max)
Clarity & Comprehensiveness	Clear and persuasive presentation of the robot's design concept, potential impact, and target user group. Effective communication of the problem your robot solves and the benefits it offers to the community.	5
Visual Aids & Demonstration	Use of engaging visual aids (e.g., pictures, videos, detailed design mock-ups) to showcase the robot's design and functionalities.	5
Addressing Questions	Comprehensiveness and clarity in responding to judges' questions about your robot's design concept, functionalities, and potential impact on the community.	5

Section 5: Bonus Points (up to 10 points)

Criteria	Description	Points Awarded (Max)
Exceptional User Experience	Evaluation of the robot's design and functionalities based on user experience during the competition.	up to 5
Sustainability	Assessment of the robot's design for sustainability factors such as materials, energy efficiency, etc.	up to 3

Overall Comments:

- Judges may award bonus points for exceptional performance, unique functionalities, or innovative solutions beyond the core requirements or for an extra challenge.
- Well-developed design concepts with strong potential for functionality will be highly valued.
- Bonus points can be awarded for exceptional user experience considerations within the robot's design and potential sustainability of the solution.

Remember:

- Prioritize safety in your robot design and operation.
- Focus on real-world application by considering the needs of the community during daily interactions.
- Be prepared to demonstrate your robot's capabilities and explain its design decisions to the judges.

We wish you the best of luck in creating a Community Guardian Robot for Port Harcourt City!

STEM Festival Judges