



RoboCupJunior CoSpace Dance (Demo) Rule

RoboCup Junior Dance Technical Committee 2011:
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This document contains the official rules for RoboCupJunior Dance – CoSpace (Demo) event for RoboCupJunior 2011. This document is released by the RoboCupJunior Dance Technical Committee. The rules contained in this document have priority over any translations. Differences between RoboCupJunior Dance 2011 and RoboCupJunior CoSpace Dance (Demo) 2011 are highlighted in red.

Preface

CoSpace Dance means human, both real & virtual robots come together with music, dressed in costume and moving in creative harmony in both real and cyber-worlds – Co-existent Space. The CoSpace Dance challenge offers enormous and diverse channels for the theme delivery including speech, gesture, music, dance, and combination of other performing arts.

1. PERFORMANCE

1.1. Kind of Performance

1.1.1 In the RoboCupJunior CoSpace Dance Challenge, human, both real & virtual robots come together to create a dance or theatre performance. The CoSpace Dance can be either ‘Dance’ performance or ‘Theatre’ performance.

1.1.2 In CoSpace Dance, teams are required to build real robots, set-up real environment (props), design virtual robots and virtual environment using 3D objects. The communication between real world (human, real robots, real environment if possible) and virtual world (virtual robots and virtual environment) should be established wirelessly using Bluetooth or Zigbee. The virtual robots and items in the virtual environment will receive the signal from the real robots and react accordingly. At the same time, the real robot or items in the real environment may react based on the changes of the virtual robot and virtual environment.

1.1.3 You may also add music and video to the virtual environment to enhance the overall setup.



1.1.4 There are two score sheets for CoSpace Dance, namely **interview score sheet and performance score sheet**. Both can be downloaded from the official RoboCupJunior website (<http://robocupjunior.org>). Teams are encouraged to use the score sheets when preparing their dance or theatre performance.

1.2. Duration

1.2.1. Each team will have a **total of 5 minutes** for their presentation. This time includes stage performance set-up, introduction and the performance, including any re-starts due to factors under the team's control. It does not include the time needed for packing up and clearing the stage.

1.2.2. The duration of a performance routine must be no less than 1 minute and no more than 2 minutes.

1.2.3. If a team exceeds the time limits explained in 1.2.1 and 1.2.2 with their own fault, the team will be penalized. A judge starts a stopwatch when a team member steps a foot on the stage for the maximum five-minutes period.

1.2.4. Following each performance, a team must fully tidy up the stage, pack up and remove any objects related to their performance. The performing team has a maximum of one minute to clear the stage after the end of their performance.

1.3. Music

1.3.1. **Music may be embedded in the virtual environment. You may have more than one piece of music for the entire routine to enhance the theme delivery.**

1.3.2. Teams are strongly encouraged to bring a good quality audio music source file, since their evaluation also depends on the music quality.

1.3.3. The music should start at the beginning of the audio music source with a few seconds of silent lead time.

1.4. Human Team Members

1.4.1. Human team members are encouraged to perform with their **virtual and real** robots. They will be considered as 'props.' There is no penalty for humans not performing with their robots.

1.4.2. The only physical contact humans can have with their **real** robots are:

- to start the **real** robot(s).
- the physical contact is a part of the performance (This has to be discussed with and approved by the judges PRIOR to the performance).

1.5. Scenery

1.5.1. Real scenery:

Teams are encouraged to provide their own scenery on stage.



1.5.2. Virtual scenery (Virtual environment)

Teams are required to design a virtual environment (virtual scenery) as part of the Co-existent Space. The virtual scenery may include virtual 3D objects (buildings, trees, etc), virtual video display, music, etc that suit the theme. The virtual environment will be projected on the backdrop screen as an extension of the real world. Organizers will provide a projector and projection screen for teams to incorporate the virtual environment as well as virtual robots as part of the CoSpace Dance performance.

1.6. Performance Routine

1.6.1. Each team may perform one and only one Dance or Theatre performance routine. The same performance routine will be repeated if they proceed to the finals. Some minor modifications (improvements) of the performance using the same music may be accepted. Any questions or concerns on performances and/or robot modifications at the venue should be discussed with the chief judge.

1.6.2. A RoboCup official will start the music and if necessary **the virtual environment** for the routine.

1.6.3. One human team member or several members using multiple **real** robots and props can start each **real** robot, either by hand or remote control. Teams are strongly encouraged to program their **real** robot to begin the performance routine a few seconds after the music starts. As it is extremely difficult to judge precisely when the music will sound after the audio source is started. It is hard to time the robot's choreography without knowing exactly when the music will begin. Also, depending on the configuration of the dance stage and the sound system at the venue, it is possible that the human starting the robot will not be able to see the RoboCup official starting the audio source and vice versa. Teams should come prepared for these conditions.

1.7. Restarts and Retakes

1.7.1. Teams are allowed to restart their routine if necessary, at the discretion of the officials. Unless a problem is not the fault of the team, any restart will result in a score penalty. A maximum of two restarts will be allowed. After two restarts, the team must continue with the penalty or leave the stage.

1.7.2. Teams are allowed to repeat their routine at the discretion of the officials.

1.8. Security

In order to protect participants, RoboCup officials and bystanders, routines may not include real explosions, smoke or flame, use of water, or any other hazardous substances. **(All extraordinary effects can be added in the virtual environment if teams wish to do so)**. Each team whose routine includes any situation that could be deemed hazardous, including the possibility of damaging the stage, must submit a report outlining the content of their dance routine to the chief judge BEFORE the competition. The Chief Judge may also request a demonstration of the activity before the stage performance. Teams not conforming to this rule may not be allowed to present their routine. Wherever possible, teams shall avoid the use of none battery source of electricity



for any aspect of their performance. If necessary, teams may apply to the Chief Judge PRIOR to performance for exemption from this rule. The Chief Judge may decide to disqualify the performance for safety reasons.

1.9. Content

Any presentation that includes violent, military, threatening or criminal elements will be excluded. Any team using an inappropriate name or logo will also be excluded. Participants are asked to carefully consider the wording and messages communicated in their presentations. What seems acceptable to one group may be offensive to friends from a different country or culture.

2. STAGE

2.1. Size

2.1.1. The size of the performance stage area will be marked in a rectangular area of 6 x 4 meters(m) for **real** robots with the 6m side facing the judges. When the whole body of a **real** robot (main body itself, not including any huge extension from the body) moves outside the marked boundary of the performance area, it will not be disqualified, but the team will receive a penalty score. Human performers may be inside and outside the marked area.

2.1.2. The boundary of the performance stage area will be marked with a 50 millimeter (mm) black tape line, surrounded by a 20mm red tape line. This can also allow teams to use the black and red line tape boundary to program a **real** robot to identify the performance stage area.

2.2. Surface

2.2.1. The floor provided shall be made of flat (non-glossy) white painted MDF (compressed wood fiber).

2.2.2. While floor joints will be taped to make them as smooth as possible, **real** robots must be prepared for irregularities of up to 3 mm in the floor surface.

2.2.3. Teams are encouraged to practice on the same flooring type to have a better simulation for robot conditions and reduce the set-up time at the RoboCup Junior International competition (RCJI).

2.3. Lighting

The RoboCup organizers will endeavor to make variable lighting including spotlights available. Teams should not expect the performance stage area to necessarily be able to be darkened. We cannot guarantee direct or intense spotlights to be available. It is recommended that teams design their **real** robots to cope with variations in lighting conditions, as lighting naturally varies from venue to venue. Teams should come prepared to calibrate their **real** robots based on the lighting conditions at the venue.



2.4. Performance Stage Utilization

2.4.1. The main performance dance stage will be made available for teams to practice on. In fairness to all teams who may wish to practice, a booking sheet will be used to reserve the stage for a short practice time.

2.4.2. The last team to practice on this stage before performance time starts must fully clean up the stage and clear the stage area at least 3 minutes before the performance start time.

3. ROBOTS

There will be two types of robots – real robots and virtual robots.

3.1. Size

3.1.1. Real Robots:

Real Robots may be of any size. Any real robot(s) or real prop(s) taller than 4 meters from the stage floor must be discussed with the judges and permission sought.

3.1.2. Virtual Robots:

Virtual Robots may be of any size and any design. For example, the virtual robot(s) can be designed as a car, a track, a Barbie, a spider-man, etc. The virtual robots should move and act in the virtual environment.

3.2. Team

There may be any number of real robots and virtual robots in a team. However, using multiple robots does not necessarily result in obtaining higher points.

3.3. Control

3.3.1. Both real robots and virtual robots must be controlled autonomously. During a performance, real robots must also be 'wirefree' in that they must not be connected to a computer or other devices including power sources. No member of the team may make physical contact with the real robot during its performance UNLESS it has been discussed and approved by the judges PRIOR to the performance.

3.3.2. Real robots may be started manually by human contact or with a remote control at the beginning of the performance. Virtual robots may start automatically according to the sequence of the performance. See also 1.6.3.

3.4. Costumes

Costumes for real robots and human performers are encouraged, and points will be awarded.



3.5. Communication

3.5.1. Interaction and Communication between real robots on stage

During the performance, any **real** robot on stage may communicate with another **real** robot from the same team. **The communication and interaction mode must be infrared (IR), Ultrasonic, Bluetooth or Zigbee.**

3.5.2. Interaction and Communication between real robots on stage and virtual robots or items in the virtual environment

During the performance, any real robot on stage may communicate with virtual robot or any item in the virtual environment, however the communication mode must be Bluetooth or Zigbee.

3.5.3 Interaction and Communication between virtual robots in virtual environment

During the performance, virtual robots in virtual environment can communicate with each other via programming.

3.5.4 It is the teams' responsibility to be aware that their communication does not interfere with other teams' robots when practicing or performing. No team is permitted to use radio frequency (RF) signals like WLAN wireless communication, as this may interfere with robots in other leagues. Teams with robot communication **MUST** explain the device as well as the program to the judges at the interview.

4. JUDGING

The **CoSpace** Dance score sheets can be downloaded from the official RoboCupJunior website (<http://robocupjunior.org>).

4.1. Authenticity and Originality

4.1.1. All teams are asked to present their **real** robots, props and **virtual environment with virtual robots** in an interview. Each team's overall score will be decided by the total of their BEST performance and their interview score.

4.1.2. The performance is to be unique. Teams who, in the opinion of the judges, have knowingly produced duplicate robots, costume or performance movement (duplicate music is allowed) of another team or reused previous year's robots of the same team will be interviewed by a panel of three Dance officials. Penalties range from a possible 10% score reduction to a maximum penalty of exclusion from the competition.

4.2. Creativity

4.2.1. The **CoSpace** Dance challenge is intended to be very open-ended! Teams are encouraged to be as creative and entertaining as they can. Teams who show creativity and innovation might be rewarded high point scores in the relevant sections.

4.3. Judging Categories



4.3.1 Stage performances will be judged according to the following categories:

Programming (e.g., use of loops, jumps, sub-routines, type of programming language used, etc)

Construction (e.g., **real** robots should be a solid construction, components should not fall off , appropriate use of gearing, smooth and reliable operation, interesting movements, effective use of mechanics to achieve a purpose, designing own electronics, etc)

Using Sensors effectively (e.g., to trigger different parts of the program, for detection of boundary line, etc. This category also includes 'other technologies' apart from sensors. Teams can earn more points for complexity and creativity of the sensor use.)

Virtual Robots (e.g., the design of the robot should suit the performance theme. The virtual robots should equip with necessary sensors to perform the designated task. The creative design of virtual robots helps team to gain more points.)

Virtual Environment (e.g. the virtual environment designed should enhance the performance. Adding of music and videos in the virtual environment and the creative design helps team to gain more points.)

Choreography (e.g., robots to move in time with music, and change actions as music changes tempo or rhythm. Choreography of humans and robots will be scored separately.)

Costume (e.g., costume of both humans and robots will be scored).

Entertainment Value (e.g., how much does the performance entertains or delights the audience? Originality and creativity of the presentation will be scored.)

Innovation (creative 3D virtual environment, real and virtual robots design, effective using of sensors and communications, entertainment value).

4.3.2 Each category might be weighted differently. Teams are encouraged to study the score sheets during their preparation performance.

4.3.3 Standard score sheets will be used for judging the interviews and performances.

4.4. Awards

4.4.1 The championship will be awarded to the top three teams that achieve the highest total score as determined by combining the interview and their best performance score.

4.4.2 Best Presentation Award will be awarded to the outstanding presentation.

4.4.3 Best Innovation Award will be awarded to the most innovative team.

4.4.4. RoboCupJunior is an educational project. It is important that team members learn from their experiences with RCJI, and have the opportunity to improve in later years if they so choose. The organizers will provide feedback on each team's performance by providing a modified score



sheet to each team captain after presentations are made at the conclusion of competition. The sheet will indicate to the team their areas of strength and also areas needing improvement, as rated by the event judges. It is important to note that these sheets are not to be used to debate positions, decisions or competition scores with the judges.

5. DOCUMENTATION

5.1. Authentication

All teams are encouraged to bring paper or digital documentation describing their preparation efforts. The documentation should be no more than 5 pages (A4 size) and contains a briefing description of the development of their robots and photos. The documentation must be presented during the interview, and may be called upon to help establish the authenticity of a teams' performance. Team should also complete the Dance Technical Robot Information Sheet before the interview. *See Interview Score Sheet for more details.*

5.2. Presentation Displays

5.2.1. Teams will be given some public space to display their materials on a poster board. Since the space available could be limited by the local organizers, teams are encouraged to bring some kind of electronic presentation in Power Point and/or other electronic format that will be displayed in the venue. The organizers will provide screening equipment. The size of the area available for a team's presentation will be announced prior to the event.

5.2.2. Posters or electronic presentations should be made in an interesting and entertaining format, as they will be viewed not only by the judges, but by other teams and the visiting members of the public. Presentations will be judged and an award made to the Primary and Secondary team with the best presentation. The presentation should provide information about the team and how you prepared for the international event. Areas that need to be covered include: team name, division (primary or secondary), team members' names (and perhaps a picture of the team members), your country, your location in your country, a little about your district and school, pictures of the robot(s) under development, and information about your robot and team. Viewers will be interested to learn about:

What you hope to achieve in robotics

What made you decide to come to RCJI this year?

Who/what helped you to get to RCJI?

Any interesting or unusual feature about the team, robot, your background or your entry.

5.2.3. Officials will review the documentation and may discuss the contents with team members. A prize will be awarded to the team with the most outstanding presentation. Please refer to section 4.4.2 for Presentation Award.

6. CODE OF CONDUCT



6.1. Spirit

6.1.1. It is expected that all participants, students and mentors, will respect the RoboCupJunior mission. In addition, participants should keep in mind the values and goals of RoboCup Junior.

6.1.2. It is not whether you win or lose, but how much you learn that counts. You will really miss out on a lifelong learning experience if you don't take this opportunity to collaborate with students and mentors from all over the world. Remember this is a unique moment!

6.2. Fair Play

6.2.1. It is expected that the aim of all teams is to participate in a fair and clean competition.

6.2.2. Humans that may cause deliberate interference with robots or damage to the stage will be disqualified, if part of a team. If not part of a team they will be asked to leave the venue.

6.2.3. The team is responsible for removing all debris left from their routine that may interfere with the performance of subsequent activities.

6.2.4. Remember: Helping those in need and demonstrating friendship and cooperation are the spirit of RoboCupJunior as well as for making a better world.

6.3. Sharing

6.3.1. It is understood that RCJI events with rich technological and curricular developments should be shared with other participants after the competition.

6.3.2. Any developments may be published on the RoboCupJunior Web site following the event.

6.3.3. Sharing information furthers the mission of RoboCupJunior as an educational initiative.

6.4. Collegiality

In keeping with the spirit and collegiality aspects of RCJI, a party will be provided by the organizers for all team members, mentors and supporters. It is strongly requested that all such individuals delay their departure sufficiently to attend, even if the party is held after the finals and presentations. The organizers request all team members bring business-sized cards to share with other teams at the party. These cards could include the team name, its members' name(s) and contact details, so students can remain in contact with each other after the event. This is optional, but encouraged. It is also requested, but not compulsory, for team members to wear either national dress, or some icon that identifies them with their country. This can be done in a humorous manner, such as an animal mascot from their country or another creative idea.

6.5 Behavior

6.5.1. All movement and behavior is to be of a subdued nature within the event venue.



6.5.2. Competitors are not to enter set-up areas of other leagues or other teams, unless expressly invited to do so by other team members.

6.5.3. Participants who misbehave may be asked to leave the building and risk being disqualified from the event.

6.6. Mentors

6.6.1. Mentors (teachers, parents, chaperones and other adult team-members) are not allowed in the student work area, except to assist carrying equipment in or out of the area as teams arrive or depart, and to assist with moving equipment on or off the stage. If a problem is encountered with a computer or other device that is clearly beyond the reasonable ability level of a student to repair, a mentor may request permission from the organizers to enter the work area for the sole purpose of attending to that repair. They must leave the work area immediately after this is completed. Rule 6.6.2 still applies at these times. Mentors are not allowed to set up such equipment on stage, as this should be the responsibility of team members. Organizers will assign volunteers to teams that need an assistant for stage set-up. Teams should request this assistance to the officials. A mentor found in the student work area without an acceptable reason may lose his/her access to the venue.

6.6.2. Mentors are allowed to place a heavy piece of equipment on stage, however, they are not allowed to repair robots or be involved in programming of students' robots. See 6.6.1.

6.7. Officials

6.7.1. The referees and officials will act within the spirit of the event.

6.7.2. Interviews will be judged by at least two RoboCup officials. Stage Performances will be judged by a panel of at least three officials. One of the performance judges is the RoboCup official who judges the interview as well.

6.7.3. The officials shall not have close relationship with any of the teams **participating in the CoSpace Dance performance.**

6.8. Bulletin

6.8.1. Teams will be responsible for checking the updated information during the event. The updated information will be provided on notice boards in the venue, and possibly on the RoboCup website. The information will be announced at the beginning of the event and will be posted on the notice boards as well.

Queries regarding these rules or their interpretation may be sent to the Chairman of the Technical Committee for Dance, Martin Bader(Germany), at martin_bader@gmx.de.

Appendix: Competition Platform Requirement

1. Real robot

The communication between real robots, virtual robots, and virtual environment is shown in Fig. 1.

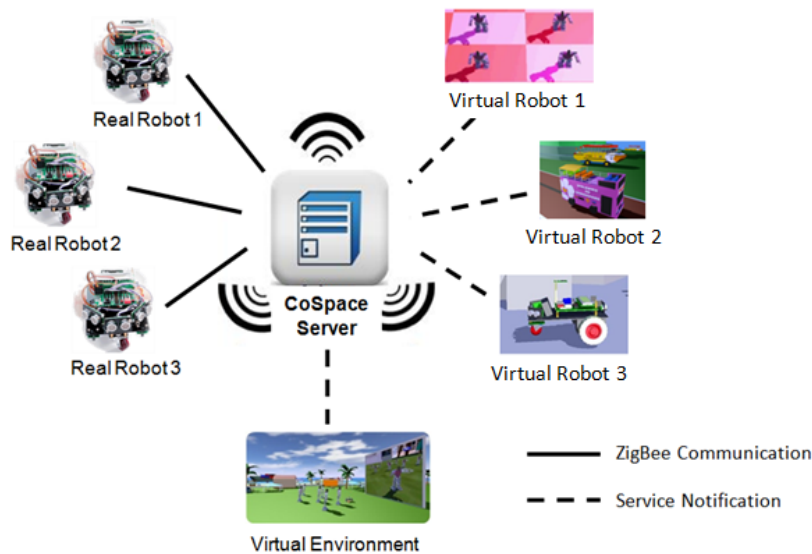


Fig. 1: Communication

In order to communicate with the virtual objects, including virtual robots, in the virtual environment, the real robot must be equipped with a controller board which supports serial communication.

- If you wish to design your own robot with your own controller board, please make sure that the real robot must be equipped with a controller board which supports serial communication. Teams can follow the communication protocol provided to setup the communication. It will be released to teams together with the CoSpace challenge platform.
- Advanced Robotics and Control Centre (ARICC) provides two types of controller board for teams. They are able to support various sensors and motors as well as Lego products. If teams wish to use the controller board developed by the ARICC,

please refer to <http://www.robocupsingapore.org/cospace/rescue-challenge/system-requirement/76-controller-board> for details.

- To help RCJ participants without real robots to participate in the CoSpace Dance Challenge, the Artificial Robotics and Intelligent Control Centre (ARICC) will provide limited sets of Tribots as in Fig.2 on site for teams. Teams may decorate the robots to suit the performance theme.

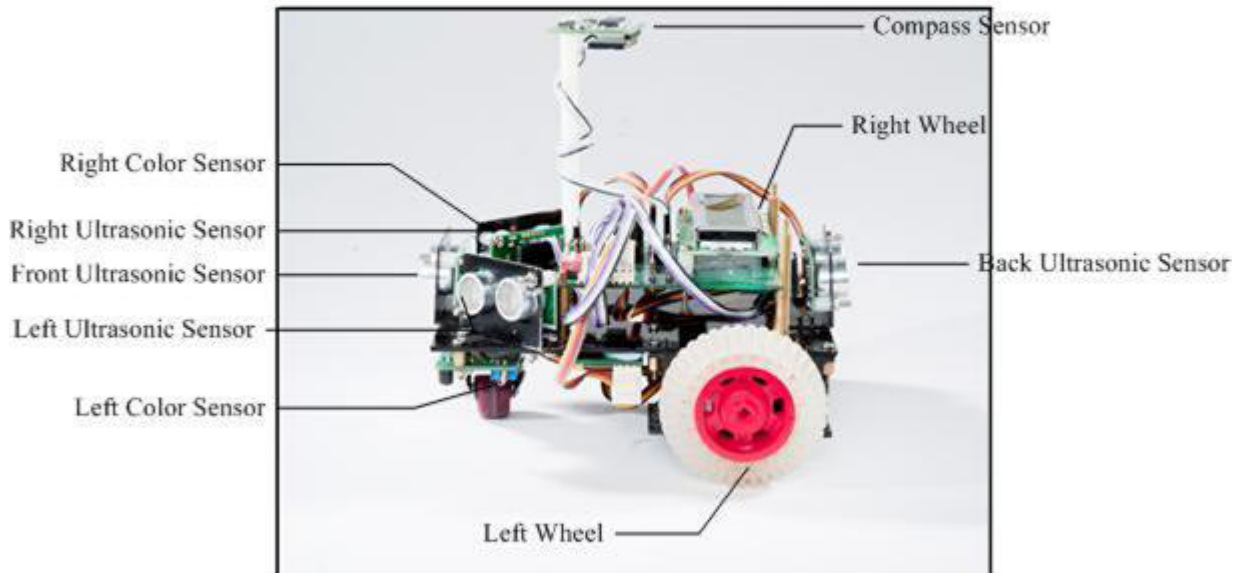


Fig. 2: Tribot

2. Computer System

- CPU: Intel i5 2.8GHz and above
- Memory: 4GB DDR3 RAM
- Graphics Card: Support for DirectX 9 graphics with 1 GB of graphics memory (non-integrated with motherboard)
- Operating System: Window 7

The CoSpace Dance Challenge RE-VSS-CSD platform is powered by Microsoft Robotics Developer studio. It operates in the Window environment.