

Design and Implementation of an Android-Based Omnidirectional Robot for the RoboCup Junior Rescue B Competition

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Abstract. This work presents the design, programming and prototype construction of an omnidirectional robot to be used on the RoboCup Junior Rescue B competition. The main robot controller was written in Java and runs in an Android-based mobile phone. The phone is connected to an IOIO board that was programmed to serve as an interface between the main controller and the robot's motors and sensors (see Figure 1). The IOIO board connects to an Arduino that is responsible for the distance and temperature sensors readings, and to an MBed board that controls the motor drivers. There are four infra-red distance sensors mounted on a rotary base on the top of the robot. The base angle is constantly changed by a servomotor, which allows a 360° distance measuring. The robot mechanical structure was designed using a 3D modeling software (Figure 2). It has four omnidirectional wheels that allow the robot to move in any direction without the need of turning itself. The structure was built using acrylic (Figure 3). So far, some tests were executed (Figure 4) and the results indicate that the system works as designed. The robot was entirely designed, built and programmed by the team students.

Keywords. Robotics Competition, RoboCup Junior, Rescue B, Robot Design

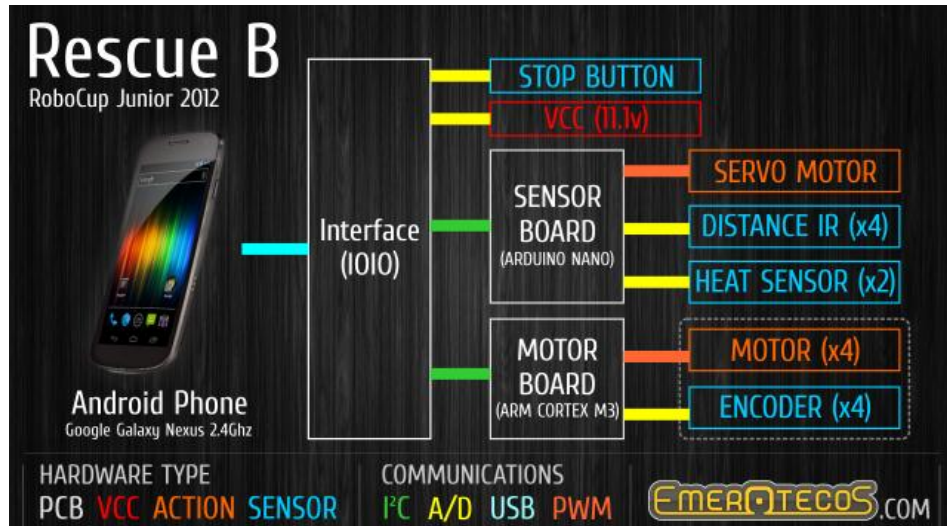


Figure 1. System overview.



Figure 2. Mechanical design.

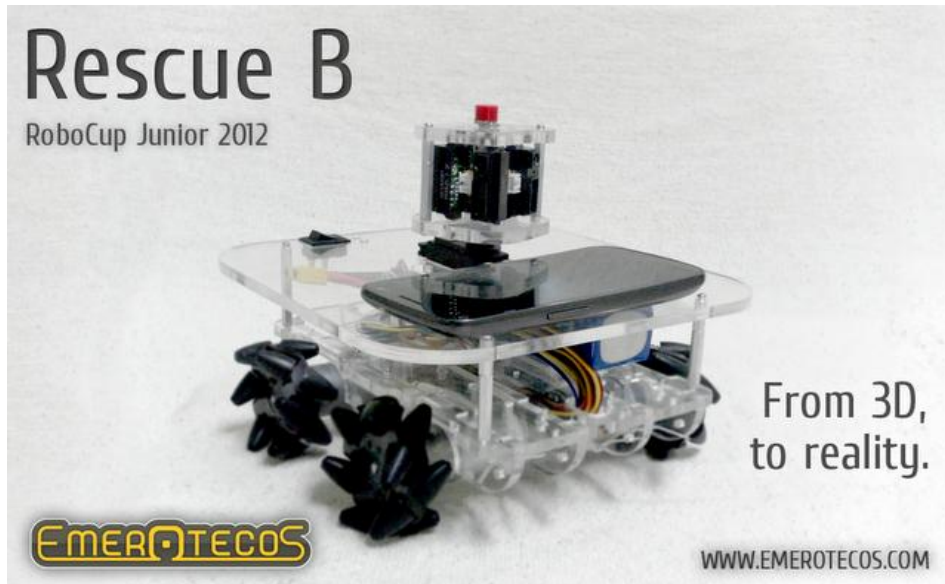


Figure 3. Robot mechanical prototype.



Figure 4. First electronics test.