

**TDP of SHAYAN Team 2012**  
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**Abstract**

This technical description paper is about our robot and its specification that we have designed and customized to participate in Robocup 2012- Humanoid league- Teen size. This project has started from September 2011 with cooperative of best researchers of Shayan Autonomous Vehicle Laboratory (SHAVL) (fig1). In continue we introduce essential sections of our robot such as mechanical design, controller and computer vision.



fig1. Shayan robot

**1. Introduction**

Robocup is a world project to progress artificial intelligence and related sciences like mechanical structure, flexible software and etc. one of the most important league in robocup is Humanoid league which in this league robot with similarity in human walking and design should play soccer. Humanoid robot soccer concludes 3 sub league: Kid, Teen and Adult, each section with particular properties. Shayan robot is designed to participate in teen size class. In 2011 we have started our simulation design (fig2), then we implemented

mechanical and electrical structure, and final we used camera and processor to have autonomous motion and ball tracking.

## 2. Hardware

In our mechanical robot structure we have used aluminum alloy, 8 RX28 and 10 EX106 Dynamixel motors.

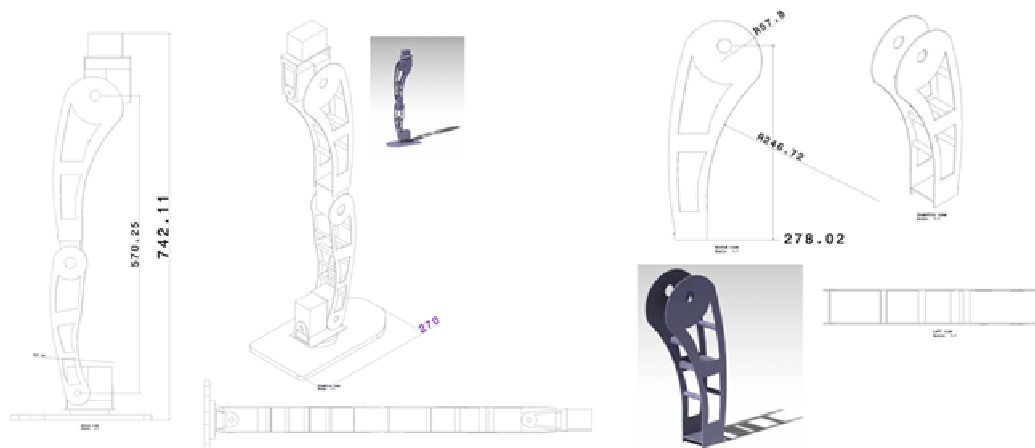
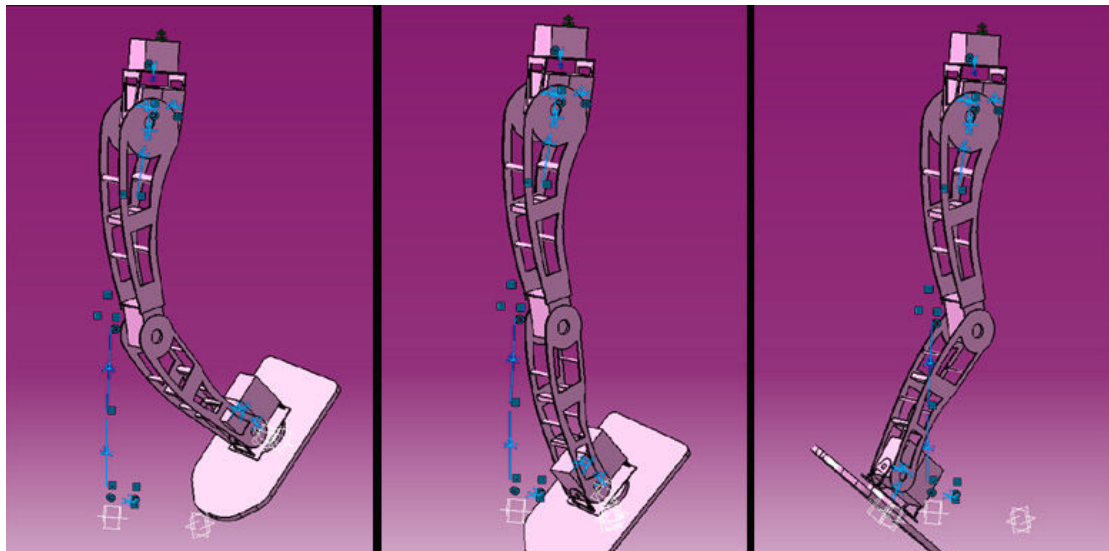


fig2. Simulation design

Shayan robot is 95 centimeter tall and 4.5 kilogram weight, and in electrical structure we use PDA, Gyroscope, Accelerometer and a camera 640\*480 resolution 30fps.

### 3. Software

In behavior control, our robot can makes suitable decisions in game.

In motion control all actuators of the robot will be managed. (fig3)

In image processing all incoming images will be processed and ball position, goal position and other information used to behavior control (fig4). In high level computer vision we use field line detection to have better localization and behavior decision.



fig3. Robot motion

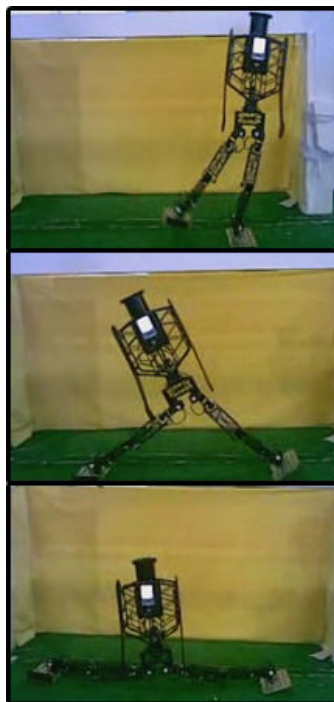


fig4. Ball tracking and goal keeper motion

#### **4. Reference**

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4- Sven Behnke and Jörg Stückler: "Hierarchical Reactive Control for Humanoid Soccer Robots" International Journal of Humanoid Robots (IJHR), vol. 5, no. 3, pp. 375-396, September 2008

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