

MRL Middle-size Soccer Robots Electrical, Mechanical & Software Description

1. Electrical and Control system architecture:

Fig1. MRL robots Electrical system architecture

Tab1. MRL electrical system specifications

Items	Description
Motors	200 watt brushless Maxon Motors
Motor drivers	EPOS70/10
Micro processors and microcontrollers	ARM Cortex M3 [®] -LPC1768
Kicker	200 volts Electromagnetic
Sensors	1000 pulse Dummy shaft encoder
converters	Ethernet to CAN
Image processing	(stereo vision) Omni directional mirror and front camera
Battery	48 volts Li Ion
Controller	Neural Network PID
Spin back	Active 60watt 24V DC motor
Laptop	Lenovo X200

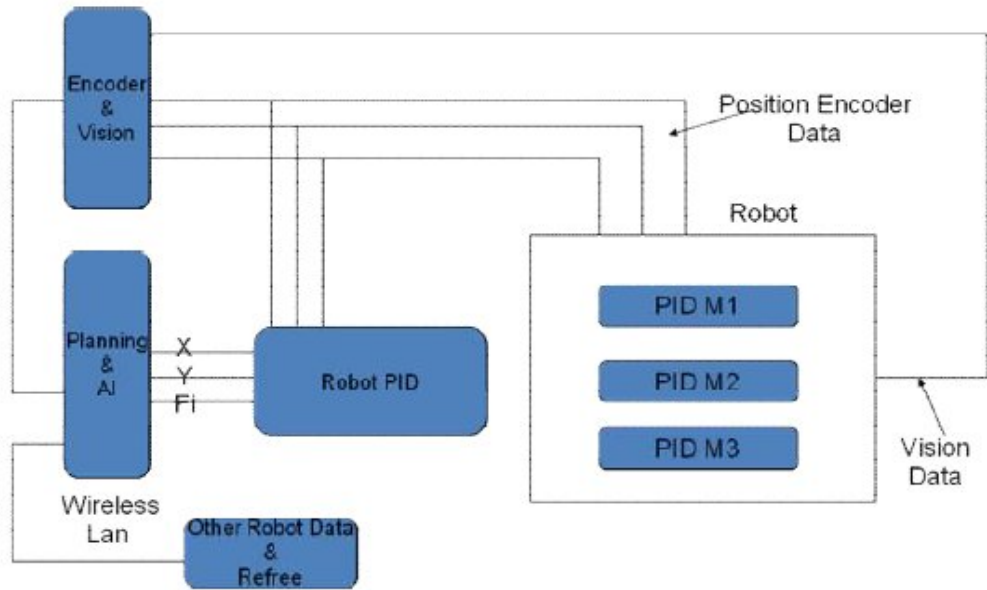


Fig2. MRL robots navigation control diagram

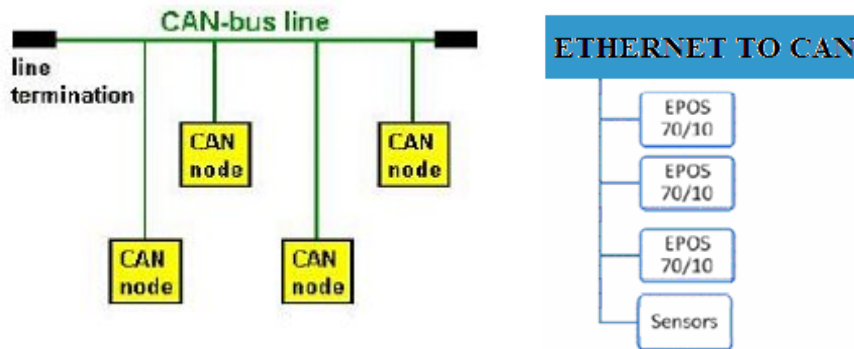


Fig3. MRL CAN-bus network

2. MRL Software Flowchart:

Tab2. MRL software and AI system specifications

Items	Description
Programming language of planner	C++
Programming language of coach box	Qt
Operating system	Windows XP

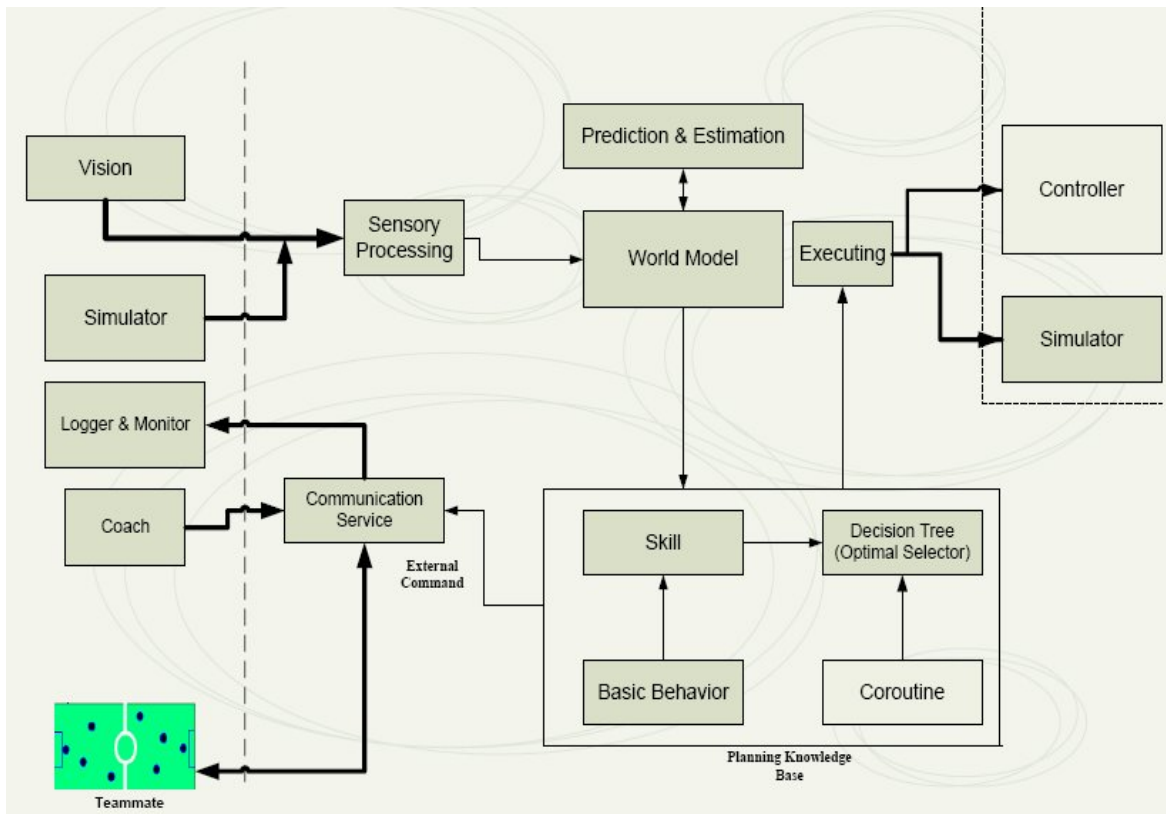


Fig4. MRL (old) Software Architecture

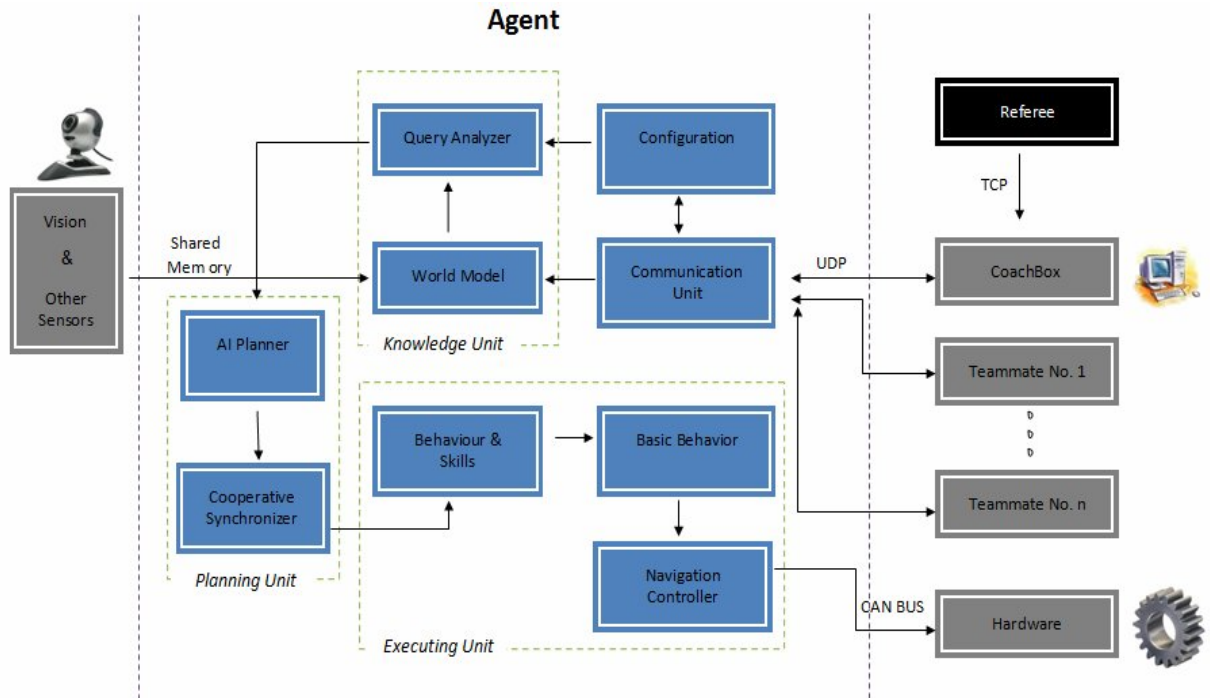


Fig5. MRL (new) Software Architecture

3. MRL vision flowchart:

Tab3. MRL vision system specifications

Items	Description
Programming language	C++
Cameras	Front: uEye UI-2210-C (USB)
	Top: uEye UI-2210-C (USB)
Other sensors	IMU (MTi-24A53G35)

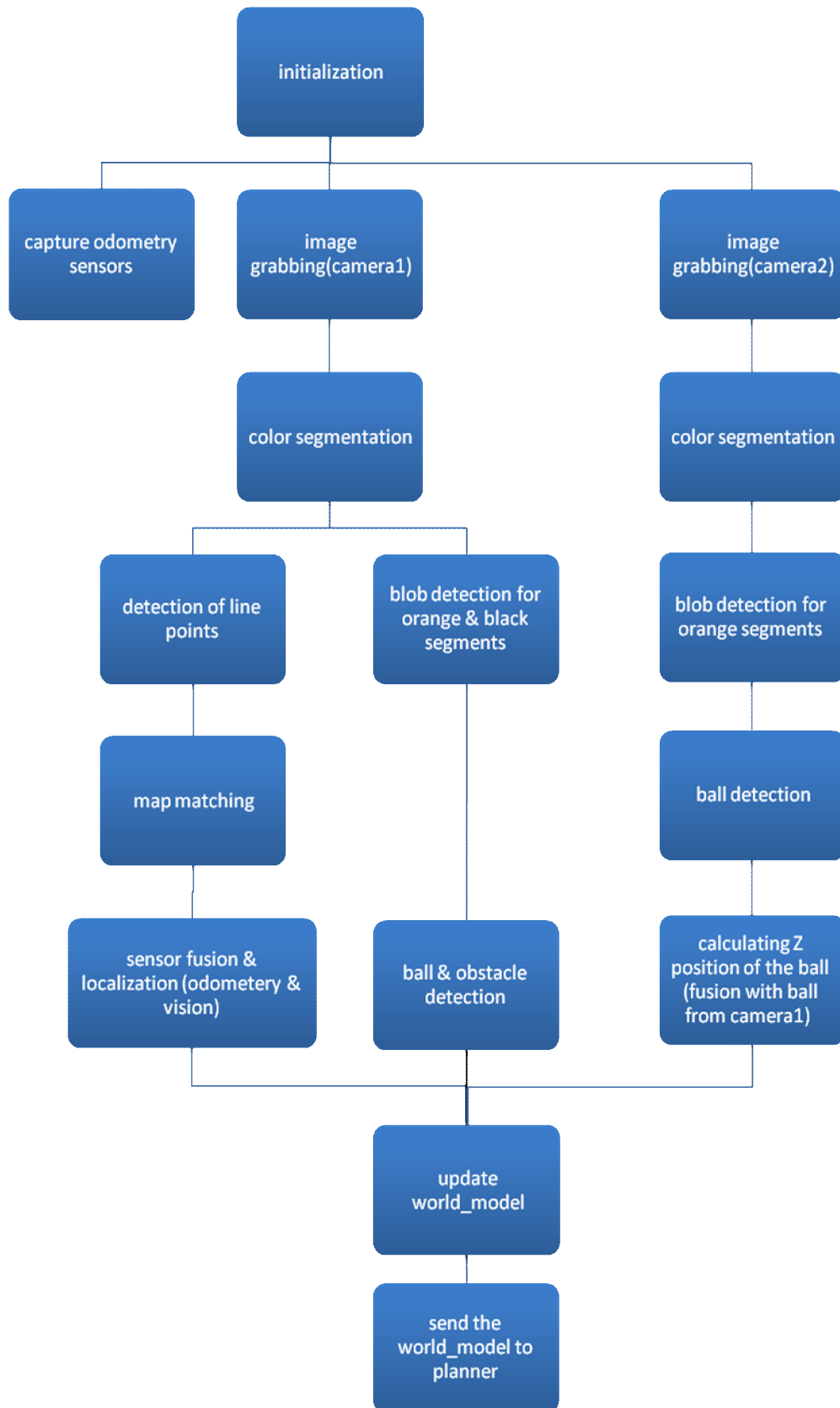


Fig6. MRL vision flowchart

4. MRL mechanical structure:

Tab4. MRL robots mechanical specifications

Items	Description
Platform	4 wheel Omnidirectional
Max speed	4.5 m/s
Max acceleration	4 m/s ²
Kicker	Multi power Electromagnetic
Weight	35 Kg
Size	51 X 51 cm
wheels	Omni wheel
Motor-wheel coupled	With Belt
Spin back	Active (60watt 24V DC motor)



Fig7. Mechanical structure