The Minimum PC requirements for running iSoccerBot system

- Pentium 2GHz processor or faster
- Windows XP with at least Service Pack 2
- At least 1GB or RAM
- At least 2GB of available space on the hard disk
- CD-ROM or DVD-ROM drive
- Keyboard and mouse
- Video adaptor and monitor with (800x600) or higher resolution Firewire card
Camera for Computer Vision

• BASLER A311fc - High performance camera
• Progressive Scan CCD
• High Frame Rates - 73 frames/sec
• Resolution: 659 x 492
• Lens: Tamron Lens 1:1.4 6-12mm Dia 35.5
• Small size 40.8 x 62 x 62mm
• Weight: 310 grams
• 8-36VDC, low power max at 3 Watt (@12VDC)
1. Copy the directory CMU1394 to the C drive
2. Connect your Basler camera to firewire card
3. From the Windows Start button, select My Computer
4. Right click and select Properties. The following dialog box will be displayed:

Download driver pack at
www.inovamicro.com/isoccerbot.html
5. Select the Hardware tab and press the [Device Manager] button

6. Click on the Image devices
7. Right Click on the Generic 1394 Desktop Camera and select Update Driver

8. Select the [Install from a list or specific location (Advanced)] radio button
9. Click on [Don’t search. I will choose the driver to install] radio button

10. Click the [Have Disk] button
11. Click the [Browse] button

12. Navigate to the CMU 1394 directory and select 1394Camera.inf file. Then click [Open] button
13. Click [OK] button

14. Click [Next] button
15. The following dialog box will be displayed. Click on the [Continue Anyway] button

Hardware Installation

The software you are installing for this hardware:
CMU 1394 Digital Camera Device

has not passed Windows Logo testing to verify its compatibility with Windows XP. (For more information about Windows Logo testing, contact your hardware vendor.)

Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.

16. Finally, click on the [Finish] button. You have successfully installed the driver for acquiring images from the camera

Hardware Update Wizard

Completing the Hardware Update Wizard

The wizard has finished installing the software for:
CMU 1394 Digital Camera Device

Click Finish to close the wizard.
The FTDI driver is required so that the PC will recognize the USB port connected to the transmitter box as a COM port. Simply execute the CDM_Setup.exe file. The program should display following dialog box, indicating that it has successfully installed the FTDI driver. Click [OK] button.

System Installation – C++ Builder Compiler

The user is able to design and implement their own game strategy using C++. We provides the game strategy for FIRA 2011 Final as reference.

In order to compile and run the iSoccerBot program, the Embarcadero C++ Builder XE compiler is required.

http://www.embarcadero.com/products/cbuilder
1. Under the folder HASP, run the installation program HASPUserSetup.exe

2. Click on the [I accept the licence agreement] radio button and press the [Next] button
3. Click the [Next] button to begin installation

4. The setup program will display the following dialog to show the progress of the installation
Driver Installation – HASP Hardlock

5. The following dialog will be displayed when the Sentinel HASP Run-time has been successfully installed:

![Sentinel HASP Run-time has been successfully installed dialog]

The Sentinel HASP Run-time Environment uses port 1947 to communicate with local and remote components. If you use a firewall, ensure that it does not block this port.

System Setup – Setting up the camera

![System Setup – Setting up the camera diagram]
1. Run the iSoccerBot program, Click [Color and FOV] button

2. Click [Color and FOV] button
3. Click [Start Grab] button to start acquiring images from the camera. Click on the [F5] button to give a full-screen display of the image.

4. White-Balancing

Place a piece of gray patch in the soccer pitch. Drag the small white square on the screen to the gray patch and click on the [Auto White Balance] check box.
System Setup – Calibration of Ball Color

1. Put the ball on the soccer pitch. Drag the square on the image to the ball.

2. The color of the pixels on the ball are indicated on the HIS chart on the top-left of the dialog box as little black crosses. To learn the ball color, drag the black boundary to encircle the little black crosses.
System Setup – Calibration of Ball Color

3. Click on the [Segmented Image] check box. The image displayed is a binary image. The white pixels are all pixels having their HIS values within the limits that you have set.

System Setup – Calibration of Our Team Color for the soccer robot

1. Select [Our Color] from the combo-box
2. Place Team Color Patches on the soccer pitch

3. Drag the white rectangle in the image area to your team color. Let us assume that you are using the yellow team color. Adjust the HIS limits for the yellow color.
4. This step is to grab the Green Team ID Color. Select [Id0 Color (Green)] from the combo-box.

5. Drag the white rectangle in the image area to your team green id color. Adjust the HSI limits for the green color.
6. This step is to grab the Pink Team ID Color. Select [Id1 Color (Pink)] from the combo-box.

7. Drag the white rectangle in the image area to your team pink id color. Adjust the HIS limits for the pink color.
System Setup – Calibration of Our Team ID Color

8. To confirm that all colors have been trained properly, click on the [Show All Colors] and [Segmented Image] check boxes.

System Setup – Calibration of Coordinates

1. Select the [Click Calibration] tab. Check the [Magnifier] checkbox. The square sub-image is the magnified version of the image in the green square.
System Setup – Calibration of Coordinates

2. First drag the green square to the top corner of the soccer pitch. In the magnified image, drag the cross to the inner corner of the pitch. Repeat 10 times as illustrated then press [Calibrate] button. To save press [Save] button.

System Setup – Exit Calibration Page

9. Press the [OK] Button to return to the main application window
Running a Game

1. Under the main application window, press the [Grab] checkbox. The application will grab images continuously.

Tracking the Robots

1. Press the [Tracker] button. Click the [All robots] check box. Close the dialog box and return to the main application window.
1. Place the robots and ball on the field. The main application window should look like the following.

Notice that the robots are labeled with their robot numbers. You can also choose to display the segmented image or the line drawing image by selecting the respective radio buttons.
1. In the main application window, select the [Enable COM Port] check box.

1. Make sure the robots are switched on. Press the [Test] button. If the transmission is set up correctly, the robots will rotate a quarter turn and return to its original position.
Arrangement of robots

1. The buttons in the red box as shown in the following diagram of the main application window is for the positioning of robots.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>GK</td>
<td>Goal-Kick</td>
</tr>
<tr>
<td>FB</td>
<td>Free-Ball</td>
</tr>
<tr>
<td>FK</td>
<td>Free-Kick</td>
</tr>
<tr>
<td>P</td>
<td>Penalty</td>
</tr>
<tr>
<td>KO</td>
<td>Kick-Off</td>
</tr>
<tr>
<td>GKL</td>
<td>Goal-Kick Left</td>
</tr>
<tr>
<td>GKR</td>
<td>Goal-Kick Right</td>
</tr>
<tr>
<td>Home</td>
<td>Bring all robots to home position</td>
</tr>
<tr>
<td>Stop Position</td>
<td>Press this button to abort any position action</td>
</tr>
</tbody>
</table>
1. To start play, check the [Start] checkbox. To stop play, uncheck the [Start] checkbox.
2. Note that the system will not run if the valid hardware lock is not present
3. You can now enjoy the game and start writing your own code for strategy!