System for robotic e-learning

SyRoTek

How to install Player/Stage on Ubuntu

ver. 1.0

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This guide helps new users to install robotic platform Player/Stage on the client computers with Ubuntu Linux (by the time Ubuntu 12.04). Beside some of the typical issues during compilation and running up are described in section Troubleshooting. Installation on other platforms may be similar, but we cannot assure it will be exactly the same or you will not face any other difficulties. The following steps are based on tutorial at http://eecs.vanderbilt.edu/research/hmtl/wp/index.php/player-stage/
Chapter 2
Installation

At first we have to make sure which version to use. There are separate packages for Player and Stage. Currently recommended version of Player is 3.0.2 and for Stage it is 3.2.X (where X is arbitrary). Please be aware that Stage version must be older that 4.0 to be compatible with Syrotek. There are some changes in sensor models and versions 4.0 and higher do not accept Syrotek configuration files.

2.1 Required dependencies

Before you start installing the dependencies, make sure your system is up to date. You can do so in Update center or via command line

```
sudo apt-get update
sudo apt-get upgrade
```

Listing 2.1: Test

All packages can be installed with Ubuntu package manager apt-get

```
sudo apt-get install <pkg1> <pkg2> ... <pkgN>
```

Listing 2.2: Test

2.1.1 List of dependencies for Player

```
autotools-dev
build-essential
cmake
cpp
libboost-thread1.42.0
libboost-thread1.42-dev
```

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Here is command you can use to copy/paste to terminal and install all packages at once

```bash
sudo apt-get install autotools-dev build-essential cmake cpp libboost-thread1.42.0 libboost-thread1.42-dev libboost-signals1.42.0 libcv2.1 libcv-dev libhighgui2.1 libhighgui-dev libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-dev libgnomecanvas2-dev libgsl0ldbl libgsl0-dev libjpeg62-dev libtool libxmu-dev swig
```

Even though all packages are surely in the repository, there might be error such as package was not found. This error is raised when package manager has not found package with exactly the same name as specified in the list of packages. It is caused (the most probably) by version number in the name of package because list might be outdated (e.g. libboost-thread1.42.0 was not found because there is already libboost-thread1.48.0).

If you want to find out which version is available, type

```bash
apt-cache search pkg_name_without_version *
# Example with libboost-thread
apt-cache search libboost-thread*
```

This command searches for all packages in repository beginning with libboost-thread and you should see all available versions and extensions of the package.

2.1.2 List of dependencies for Stage

```bash
freeglut3
freeglut3-dev
libfltk1.1
```
2.2. Download and compile

On the websites of Player/Stage project [http://playerstage.sourceforge.net/index.php?src=index](http://playerstage.sourceforge.net/index.php?src=index) there are links to downloads. You can choose sourceforge.net or github. But be careful and download the right versions as discussed above (Player 3.0.2 and Stage older than 4.X, for example 3.2.2 was working fine).

You can download it also in command line using (for example into Downloads directory in your home)

```bash
# Go to Downloads directory
cd ~/Downloads
# Create playerstage directory and jump in it
mkdir playerstage
cd playerstage
# Download Player
wget sourceforge.net/projects/playerstage/files/Player/3.0.2/player-3.0.2.tar.gz
# Download Stage
```

2.1.3 Other dependencies

```bash
# Copy/paste command
sudo apt-get install libplayerc++ libplayerc++-dev python python-dev ruby ruby-dev
```

Listing 2.6: Test

Listing 2.7: Test

```bash
libfltk1.1-dev
libgtk2.0-dev
libltdl7
libltdl7-dev
libpng12-0
libpng12-0-dev

# Copy/paste command
sudo apt-get install freeglut3 freeglut3-dev libfltk1.1 libfltk1.1-dev libgtk2.0-dev libltdl7 libltdl7-dev libpng12-0 libpng12-0-dev
```

Listing 2.7: Test
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Because we have downloaded archives, it is necessary to unpack them

1. `tar -xzvf player-3.0.2.tar.gz`
2. `tar -xzvf Stage-3.2.2-Source.tar.gz`

If this throws an error such as file is not an archive, replace those commands with (if `gunzip` command was not found, install it with `sudo apt-get install gzip`)

1. `gunzip player-3.0.2.tar.gz`
2. `gunzip Stage-3.2.2-Source.tar.gz`
3. `tar -xvf player-3.0.2.tar`
4. `tar -xvf Stage-3.2.2-Source.tar`

When the sources are downloaded and unpacked, enter player directory and compile it

1. `cd player-3.0.2`
2. `cmake`
3. `make`
4. `make install`

In case you don’t want CMake let install player to `/usr/local` add parameter `-DCMAKE_INSTALL_PREFIX` with desired path to `cmake` in the above code.

1. `cmake -DCMAKE_INSTALL_PATH=/new/path`

Similarly make the stage

1. `cd Stage-3.2.2-Source`
2. `cmake`
3. `make`
4. `make install`

After process has finished, restart the system.
2.3 Testing

Now when everything shall be installed, we can test the Player/Stage. Suppose we are still in Stage source directory, where examples are also located. Try to run

```
stage worlds/simple.world
```

Listing 2.14: Test

and simple arena with robot shall appear. If so, congratulations, you have just successfully installed Player/Stage and are ready to develop applications for Syrotek!

2.4 Troubleshooting

2.4.1 Libboost

If you face difficulties while installing boost libraries separately, try to install them all

```
sudo apt-get install libboost-all-dev
```

Listing 2.15: Test

2.4.2 Launching Player - libplayerdrivers.so.3.0: cannot open shared object file: No such file or directory

This error says that system cannot find Player’s libraries in standard system paths. Therefore open bash configuration file with `sudo gedit /etc/bash.bashrc` and at the end add

```
# Player/Stage
export PATH=${PATH}:/usr/local/lib64
export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:/usr/local/lib:/usr/local/lib64
export PLAYERPATH=/usr/local/lib:/usr/local/lib64
export STAGEPATH=/usr/local/lib:/usr/local/lib64
```

Listing 2.16: Test

Once edited, save and source the file. Note that if your system is 32bit, you shall omit lib64 paths or replace it with just lib in the case of the first line.

```
source /etc/bash.bashrc
```

Listing 2.17: Test
2.4.3 Undefined reference to ‘Fl:run()’

During compilation of Stage, there is a bug in its CMakeLists.txt. If you encounter this error, open Stage’s CMakeLists.txt and replace

```cmake
1 SET (CMAKE_CXX_FLAGS_RELEASE " -O3 -DNDEBUG ${WALL} " CACHE INTERNAL "C Flags for release" FORCE)
2 SET (CMAKE_CXX_FLAGS_DEBUG " -ggdb ${WALL} " CACHE INTERNAL "C Flags for debug" FORCE)
3 SET (CMAKE_CXX_FLAGS_PROFILE " -O3 -ggdb -pg ${WALL} " CACHE INTERNAL "C Flags for profile" FORCE)
```

Listing 2.18: Test

with

```cmake
1 SET (CMAKE_CXX_FLAGS_RELEASE " -O3 -DNDEBUG -Wl,--no-as-needed" CACHE INTERNAL "C Flags for release" FORCE)
2 SET (CMAKE_CXX_FLAGS_DEBUG " -ggdb -Wl,--no-as-needed " CACHE INTERNAL "C Flags for debug" FORCE)
3 SET (CMAKE_CXX_FLAGS_PROFILE " -O3 -ggdb -pg -Wl,--no-as-needed " CACHE INTERNAL "C Flags for profile" FORCE)
```

Listing 2.19: Test

2.4.4 OpenCV

Because OpenCV was went through many changes during development, there may be (and the most probably will be) problem with incompatibility of Player/Stage and new OpenCV versions available as packages in standard system repository. Therefore it is necessary to download source of the older version and compile it yourself.

Typical error is such as `opencv/cv.h not found`. If you are sure you have installed OpenCV, check `/usr/include`, where you should find `opencv2` directory instead of `opencv`. This is the case you have to compile your own OpenCV. From [http://sourceforge.net/projects/opencvlibrary/files/opencv-unix/](http://sourceforge.net/projects/opencvlibrary/files/opencv-unix/) download version 2.1, unzip it and execute these commands (dependency installation is included):

```bash
1 sudo apt-get -qq remove ffmpeg x264 libx264-dev
2 sudo apt-get -qq install libopencv-dev build-essential checkinstall cmake pkg-config yasm libjpeg-dev libjasper-dev libavcodec-dev libavformat-dev libswscale-dev libd1394-22-dev libxine-dev libgstreamer-plugins-base0.10-dev libv4l-dev python-dev python-numpy libtbb-dev libqt4-dev libgtk2.0-dev libfaac-dev libmp3lame-dev libopencore-amrnb-dev libopencore-amrwb-devc  dev-libtheora-dev libvorbis-dev libxvidcore-dev x264 v4l-utils ffmpeg
3 # Goto OpenCV unpacked directory whatever it is named
```

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5 cd opencv-2.1
6 mkdir build
7 cd build
8 cmake -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local
   -D WITH_TBB=ON -D BUILD_NEW_PYTHON_SUPPORT=ON -D WITH_V4L=ON -D
   INSTALL_C_EXAMPLES=ON -D INSTALL_PYTHON_EXAMPLES=ON -D
   BUILD_EXAMPLES=ON -D WITH_QT=ON -D WITH_OPENGL=ON ..
9 make -j2
10 sudo checkinstall
11 sudo sh -c 'echo "/usr/local/lib" > /etc/ld.so.conf.d/opencv.conf'
12 sudo ldconfig

Listing 2.20: Test

If error related to ffmpeg raises, just turn off the ffmpeg support (we won’t need it in
Syrotek anyway). To do so add to cmake params at the end -DWITH_FFMPEG=OFF and build
again.

1 cmake -D CMAKE_BUILD_TYPE=RELEASE -D CMAKE_INSTALL_PREFIX=/usr/local
   -D WITH_TBB=ON -D BUILD_NEW_PYTHON_SUPPORT=ON -D WITH_V4L=ON -D
   INSTALL_C_EXAMPLES=ON -D INSTALL_PYTHON_EXAMPLES=ON -D
   BUILD_EXAMPLES=ON -D WITH_QT=ON -D WITH_OPENGL=ON -DWITH_FFMPEG=OFF ..

Listing 2.21: Test

2.4.5 OpenGL

If you install Player/Stage on virtual machine (e.g. in VirtualBox) you had to install
host addons including X11 driver which does not support OpenGL support. This appears
as a blank window when you try to run Stage (see for example Testing section) and in
terminal the warning Insufficient GL support pops up. Following command should solve
this as it installs GLX support.

1 sudo apt-get install xserver-xorg-video-intel libgl1-mesa-dri libgl1-mesa-glx

Listing 2.22: Test

Note that if you run Linux as a host in VirtualBox, you have to enable 3D Acceleration
support for virtual machine. You can also test GL support with

1 /usr/lib/nux/unity_support_test -p

Listing 2.23: Test

after which shall appear something like
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OpenGL vendor string: VMware, Inc.
OpenGL renderer string: Gallium 0.4 on llvmpipe (LLVM 3.4, 128 bits)
OpenGL version string: 2.1 Mesa 10.1.3

Not software rendered: no
Not blacklisted: yes
GLX fbconfig: yes
GLX texture from pixmap: yes
GL npot or rect textures: yes
GL vertex program: yes
GL fragment program: yes
GL vertex buffer object: yes
GL framebuffer object: yes
GL version is 1.4+: yes
Unity 3D supported: no

Listing 2.24: Test