Instrumented Rubik cube visualization tool

- Some Notes–

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1. **Installation of the *PeakSystem* CAN-USB hub:**
   a. The *PeakSystem* CAN-USB device provides a CD with instructions manual, drivers (Windows, Linux), other tools and code samples for testing.
   b. In *HANDLE*, the *PeakSystem* CAN-USB device has been used in Linux environments (Ubuntu 10.02 and Ubuntu 11.10). For recent versions of *Linux* operating systems, the driver version available on CD may be outdated. **Updated versions of Linux drivers can be found at http://www.peak-system.com/linux** .
   c. The procedures for manual compilation and installation of the driver are described in detail in the instructions manual of the downloaded version of the drivers or in the CD.
   d. In the *"make"* step of the manual compilation and installation instructions, **the flag *"NET=NO_NETDEV_SUPPORT"* should be used**: *"make NET=NO_NETDEV_SUPPORT"*.
   e. If the compilation and installation is performed successfully, the command *"cat /proc/pcan/"* should return something like

   ```
   *------------ PEAK-Systems CAN interfaces (www.peak-system.com) ------------
   *-------------------------- Release_20080220_n ----------------------------
   *---------------- [mod] [isa] [pci] [dng] [par] [usb] [pcc] ----------------
   *--------------------- 1 interfaces @ major 248 found ----------------------
   *n -type- ndev --base-- irq --btr- --read-- --write- --irqs-- -errors- status
   32    usb -NA- ffffffff 255 0x001c 00000000 00000000 00000000 00000000 0x0000
   ```

   f. Make sure that *–ndev-* field is *–NA -*. This indicates that the flag *"NET=NO_NETDEV_SUPPORT" has been used.*
   g. Assuming that the instrumented Rubik cube is functional, correctly connected and *PeakSystem* CAN-USB driver correctly installed, the output of the commands:
   echo "i 0x14 e" > /dev/pcan32 [Sets the baud rate for for 1MBit]
   cat /dev/pcan32

   Should return a continuous stream of messages from the instrumented Rubik cube.

2. **Visualization tool**
   a. The hardware and firmware of the instrumented Rubik cube is described in HANDLE Deliverable 3. However some aspects of the firmware may not correspond to the current version of the firmware installed (different node IDs, tactile sensing cells with different numbers, etc) in the current version of the instrumented Rubik cube.
   b. The code has some main requisites in terms of libraries:
      i. OpenGL/GLUT - visualization of the cube and data;
      ii. ncurses – to format the visualization of the data in the shell;
      iii. pcan – to connect the CAN-USB hub (drivers);
      iv. pthread – to allow simultaneous visualization and acquisition of data.
   c. A live demo video of the instrumented Rubik cube visualization tool is available at
   http://mrl.isr.uc.pt/pub/bscw.cgi/d1103656/InstrumentedRubikCube_VisualizationTool.mp4 .
   d. The tool allows the real-time visualization of the variation of the contact intensity. The cube can be rotated using the keyboard: (7-9 roll variation, 4-6 yaw variation, 2-8 pitch variation).