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Portfolio

C, C++, STL, C#, Shell script, Linux, Qt, OpenCV, SQL, XML, UML

4/30/2015



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1. Set-Top Boxes Software

Period: August 2010 – Present

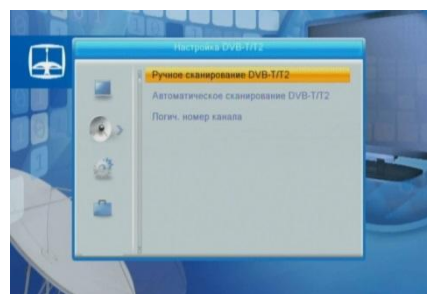
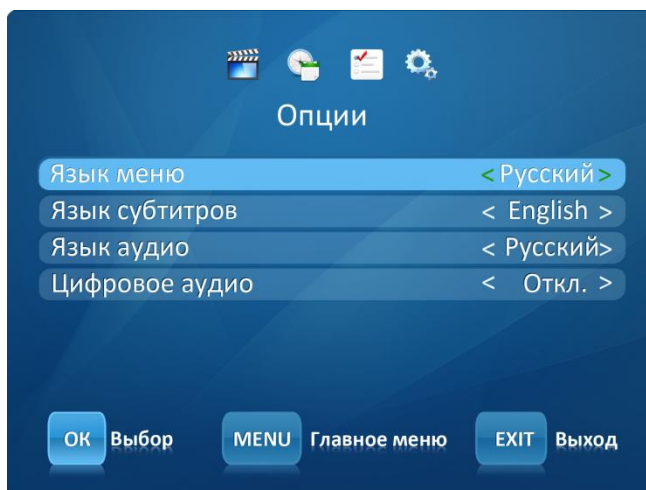
Category: Embedded Software Development and Testing

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C, C++, Shell script, Makefiles, DirectFB, Cross Compilers, Embedded Linux, DVB-T/T2, IPTV, VirtualBox, Minicom, JTAG

Description:

Responsible for developing, refactoring and testing applications for DVB-T/T2 set-top boxes based on Renesas Electronics, ST Electronics, NXP Semiconductors, ALi Corporation and HiSilicon Technologies platforms. Working as part of a development team to deliver set-top boxes using a variety of the latest digital TV technologies. Developing and testing set-top boxes software utilizing C, C++, Shell script, Makefiles and Cross Compilers. The set-top boxes are based on Embedded Linux. A HiSilicon 4K platform has support of an Android Operating System. Started a NXP Semiconductors IPTV set-top box and tested it using VLC media player. Tested Set-Top-Boxes according the Nordig specifications. Configuring development environment and installing SUSE Linux, Fedora Linux, Ubuntu. Finding and fixing faults in set-top boxes via Minicom, JTAG.



2. Aerodynamic Measurements Software

Period: January 2015 – April 2015

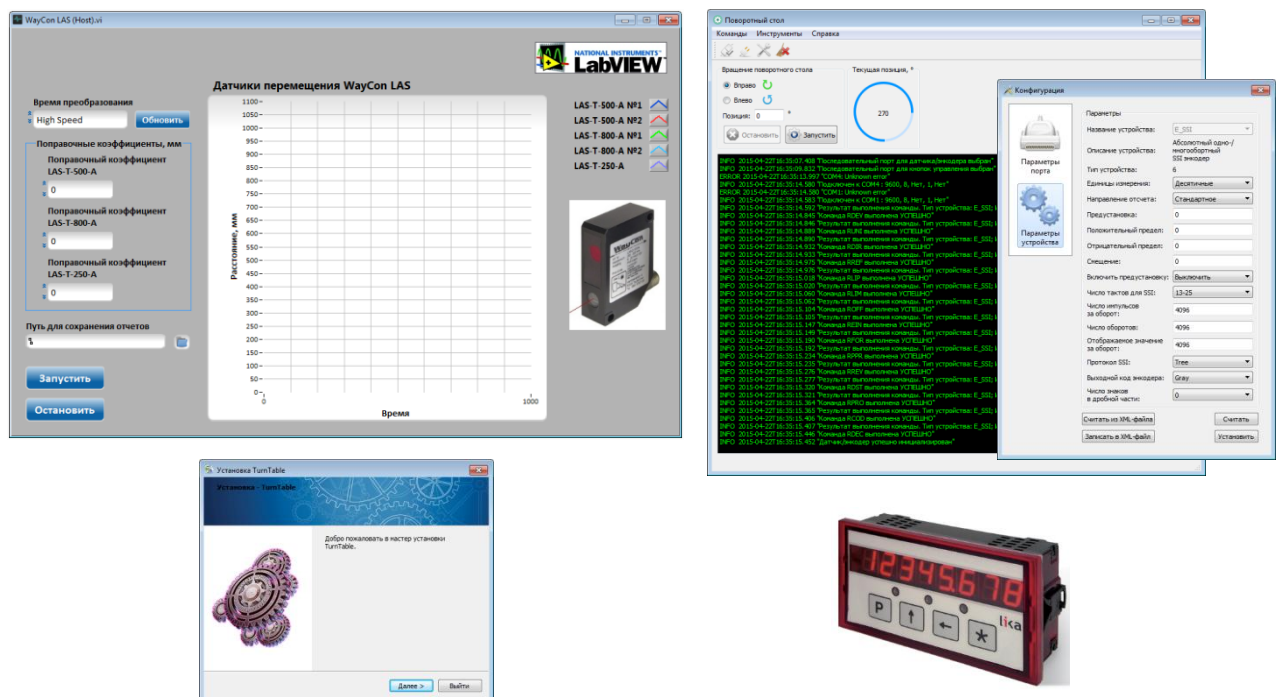
Category: Application Programming

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: NI LabVIEW, C++, Qt, Qt Installer Framework

Description:

Aerodynamic measurements control software was developed and tested for Windows platform. The software is used to implement a physical modeling of wind impact on buildings. A model is positioned at the center of a turntable that can be rotated to simulate wind approaching from any azimuth. The model is geometrically scaled to a building. An application software for laser sensors that detect a distance to the model was implemented in NI LabVIEW IDE. The laser sensors are connected to a NI chassis with FPGA that interacts with PC by Ethernet. Results are saved in Excel files. A turntable management application was realized within Qt Creator IDE using C++. Commands between PC and the turntable are transmitted via a serial port and a universal position display.



3. Algorithm of Character Recognition

Period: March 2013 – June 2014

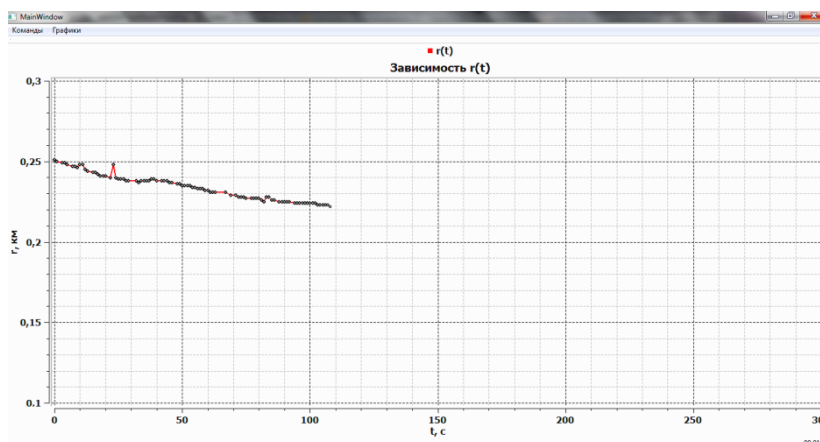
Category: Algorithm Design and Implementation, Research and Development Project

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C++, OpenCV, Qt, Qwt, XML, SQL

Description:

Utilized algorithm design principles and theories to implement a correlation algorithm of character recognition in TV images from satellites. It is used for extraction of telemetry data using binary patterns of characters. Segmentation of characters is performed via contours. To determine the degree of closeness of input image and template is used the cross-correlation with FFT. The algorithm was written in C++. Some steps of this algorithm have been implemented using the OpenCV computer vision library. Recognition results are stored in SQL database. The app processes a real-time video stream. The program utilizes a multi-threaded processing of all parameters. Its complexity and performance were evaluated against other image recognition solutions. The project was developed in Qt Creator IDE for Windows platform.



0,238

0,238

0,238

0,238

4. Widget for Samsung Smart TV

Period: June 2012 – November 2012

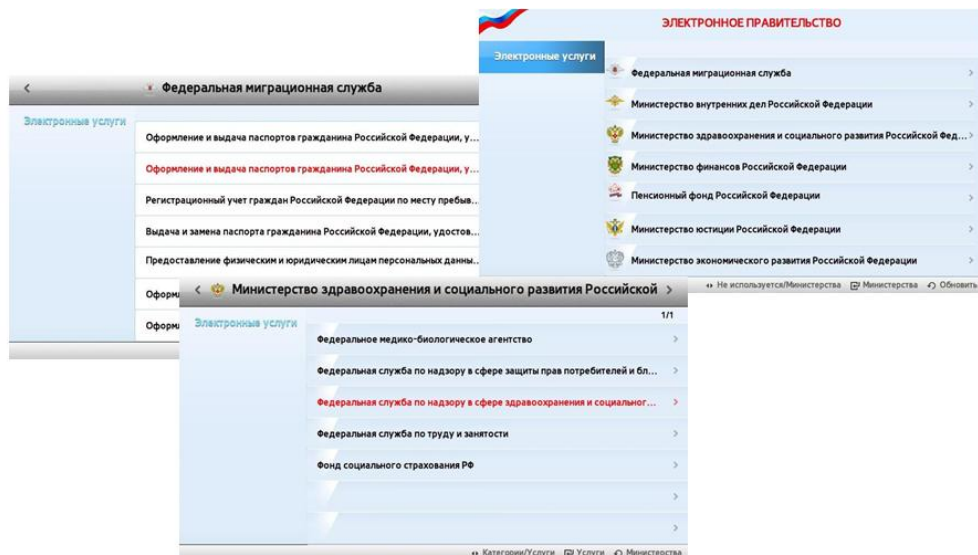
Category: Web Development

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: HTML, JavaScript, XML, AJAX, CSS, Eclipse, Samsung Smart TV SDK

Description:

Designed, developed and tested a widget for Samsung Smart TV scripted in JavaScript. The widget was designed to provide a simple and easy-to-use way of giving information about the public services in Russia. The app displays the structure of ministries and departments, the list of services and information about them. Other web technologies: resources are extracted from XML files via AJAX requests. The widget is managed by remote control. The project was developed within the Eclipse IDE included Samsung Smart TV SDK.



5. Porting Device Drivers

Period: January 2012 – May 2012

Category: Device Driver Development

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C, C++, Shell script, Linux I2C Core, Embedded Linux, SVN

Description:

Frontend (tuner and demodulator) drivers were integrated in DVB-T and DVB-T2 set-top boxes based on Renesas platform with Embedded Linux. Used two frontends:

1) MaxLinear tuner and Sony demodulator; 2) DiBcom tuner and demodulator. Each frontend has two channels (two tuners and two demodulators). The demodulators are connected to a set-top box CPU by I2C bus. The set-top box CPU is a master, the demodulators are slaves. Each tuner is joined with demodulator by I2C bus. Each demodulator is a gateway for appropriate tuner. Software was written in C and C++. Used Linux I2C Core. A kernel module wrapper calls open demodulator functions and interacts with user space.

```
File Edit View Terminal Help
File View Source Command Plugins Light
... Eclipse C++ IDE/cxd2020r_wal201rf_fe.porting/src [-]
# Name Size Modify time
./adapter 4094 Jul 2 2014
./osmed 4094 Jul 2 2014
./i2c 4094 Jul 2 2014
./platform 2287 Jan 16 2012
./tuner 271 Feb 16 2012
*vdvtt2_fe.c 33489 Feb 20 2012
# Name Size Modify time
../media/sf/Projects/Eclipse C++ IDE/dvbt port [-]
./ # Name Size Modify time
./tests 0 Jul 2 2014
./perproj 0 Jul 2 2014
*cpuproj 4067 Jan 16 2012
*projact 2287 Jan 16 2012
*makefile 271 Feb 16 2012
*dvbt_apl.ak 235 Dec 7 2009
*logbl Table.c 1155 Apr 27 2010
*logbl Table.h 624 Apr 27 2010
*nec dvbt_def.h 8386 Sep 8 2010
*nec dvbt_hal.c 7126 Feb 16 2012
*nec dvbt_hal.h 2085 Jul 15 2010
*nec dvbt_main.c 16146 Oct 4 2010

./adapter 8146/10246 (79%) UP->DIR 8146/10246 (79%)

Hint: To look at the output of a command in the viewer, use W-1
silvianmanuel@ukulan:/media/sf/Projects/Eclipse C++ IDE/dvbt ports
```



6. Software Engineering for Microcontrollers

Period: August 2009 – July 2010

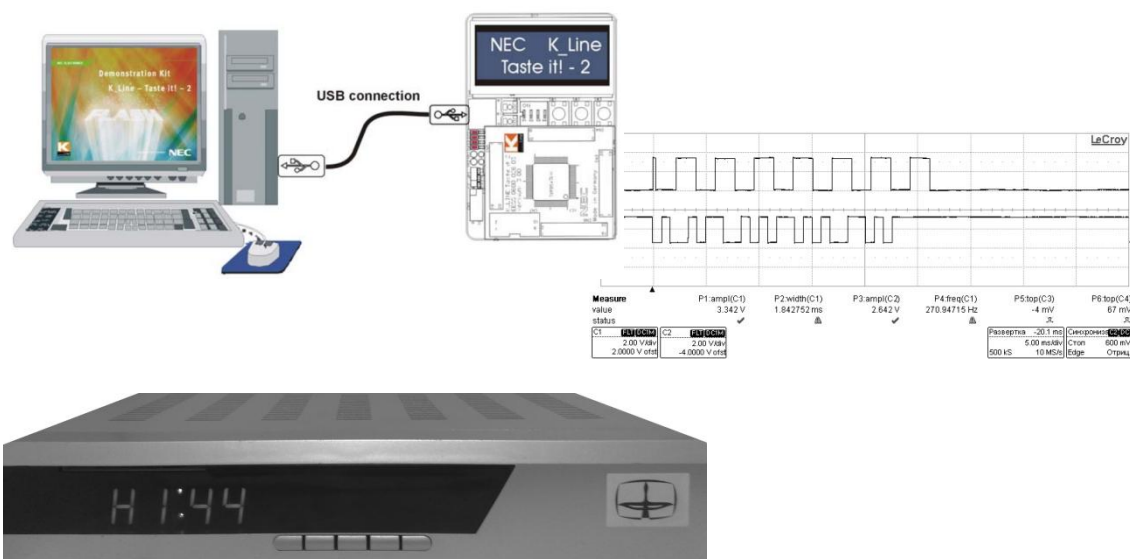
Category: Microcontroller Programming, Embedded Software Development, Low-Level Debugging

Company: Moscow Scientific Research Television Institute, Moscow, Russia

Technology: C, I2C, IAR Embedded Workbench EW78K, Green Hills Multi, SVN

Description:

Developed and tested software for a front panel of digital set-top box in IAR Embedded Workbench EW78K IDE using C language. A model is based on Renesas Electronics components. A microcontroller of front panel interacts with an LED indicator driver and a set-top box CPU by I2C bus. The app controls and synchronizes the current time, processes key presses, decodes a remote control signal by Philips RC-5 protocol, supports standby. Developed a communication protocol between the set-top box CPU and the micro of front panel. Software for the set-top box CPU was developed in Green Hills Multi IDE. Oscilloscope was applied to low-level debugging. The developed software is used in two set-top boxes (DVB-T and DVB-T2) based on different Renesas Electronics chipsets.



7. Software for Researching of Solar Panels

Period: February 2009 – May 2009

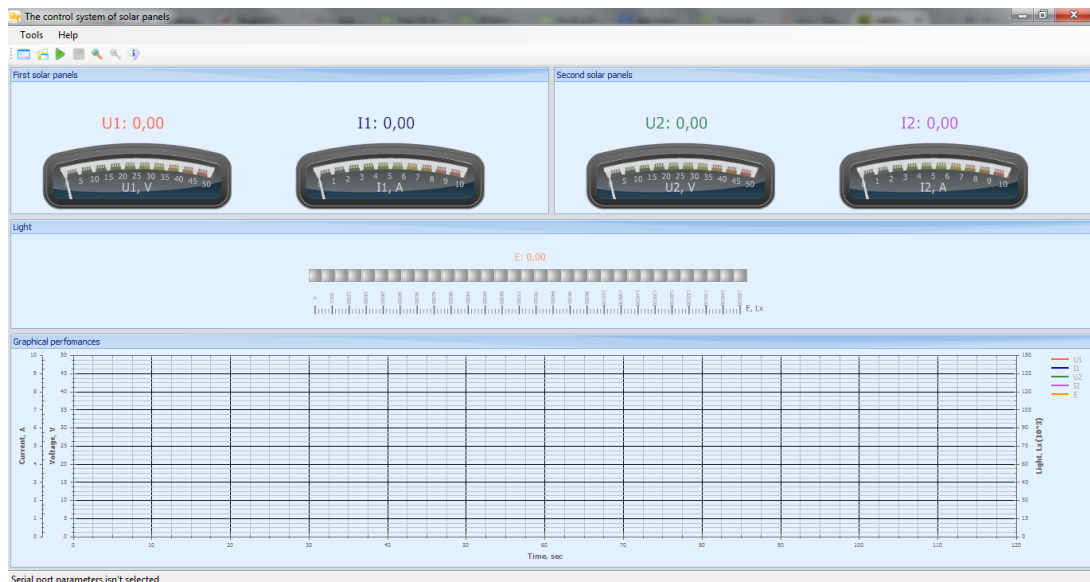
Category: Research and Development Project

Company: Bauman Moscow State Technical University

Technology: C#, Windows Forms, InteropServices (Excel), Visual Studio, InstallShield

Description:

An application for researching the level of insolation and efficiency solar panels was developed and tested. The app was written in C#. It controls an output current of solar panels and a voltage of panels from sensors through a serial port. The data is saved in an Excel file, where is calculated the hourly capacity and are built some graphs. The project was developed within the Visual Studio IDE. The necessary calculations for the real efficiency estimation of solar panels were implemented.



8. System of Confidentiality Protection and Data Integrity

Period: January 2008 – November 2008

Category: Application Programming, Architecture Design, Database Development, Installer Development, Testing

Company: Perimetrix, Moscow, Russia

Technology: C++, C#, STL, WinAPI, MFC, UML, SQLite, Visual Studio, WinDbg, SVN, InstallShield, Active Directory, Scrum

Description:

Participated in Perimetrix SafeSpace Data Loss Prevention System developer team. I took an active part in a Perimetrix SafeEdge subsystem development. It is a real-time monitoring system for all documents leaving the corporate network perimeter which automatically filters and classifies outgoing documents. This product ensures a protection of data in motion. I developed a client driver, a test utility, static and dynamic class diagrams, GUI, an installer, unit tests and database structure. I also performed testing product modules. I implemented software in C++ and C#. The project was developed within the Visual Studio IDE. Our team used the Scrum software development methodology.



9. Test-System for a Computing Complex

Period: March 2007 – January 2008

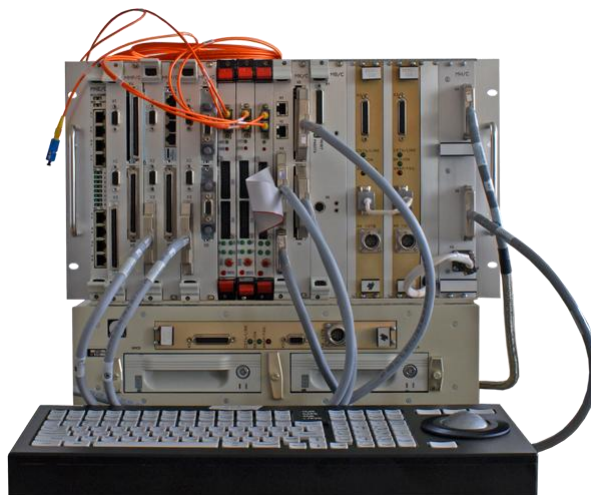
Category: Test-System Development

Company: MCST, Moscow, Russia

Technology: C, Shell script, Linux, CVS

Description:

Worked within a team responsible for software development and testing of a computing complex. Developed and modified tests for main devices this system using C language and Shell script. Installed and configured Linux operating system. I also developed a system for an automation of assemblage and installation Linux kernels using Shell script.



10. Publications

1. Hardware and software development of unified module of management and indication panel for digital set-top-box, 2010.
2. The practical aspects of hardware and software development of unified front panel module for digital set-top-boxes, 2012.
3. Smart TV applications development experience, 2012.
4. Operational selection of telemetry data in TV images, 2013.
5. Recognition of character information in TV images using binary templates, 2014.
6. A recognition system of character information in TV images, 2014.
7. Correlation algorithm of character information recognition in TV images, 2014.

11. Accomplishments

- 1st prize in Temryuk City Junior Physics Olympiad, Krasnodar Region, Russia, 2000
- 2st prize in Temryuk District Junior Physics Olympiad, Krasnodar Region, Russia, 2000
- 3st prize in Slavyansk-na-Kubani Area Junior Physics Olympiad, Krasnodar Region, Russia, 2000
- 1st prize in Temryuk District Junior Physics Olympiad, Krasnodar Region, Russia, 2002
- 3st prize in Programming & Research Contest of Young Specialists, Moscow Scientific Research Television Institute, Moscow, Russia, 2014