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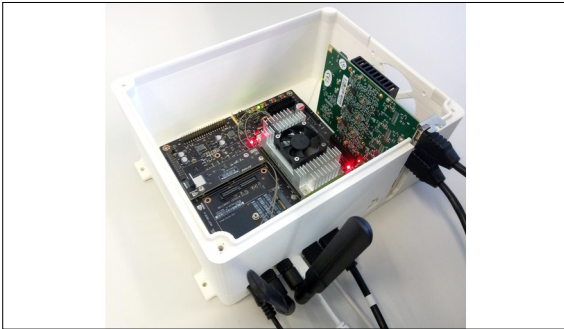


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Examiner	Prof. Reto Bonderer
Subject Area	Embedded Software Engineering

Embedded Media Server

Combining multiple media sources to a single media interface



Exemplary use of the hardware

Introduction: Combining multiple HD video streams in real-time needs a fair amount of speed and processing power. Previous studies at HSR have shown that this is possible on an embedded system. A basic implementation to output multiple HDMI channels already exists. The question is, how much more can be done on an embedded system and where is its functional limit.

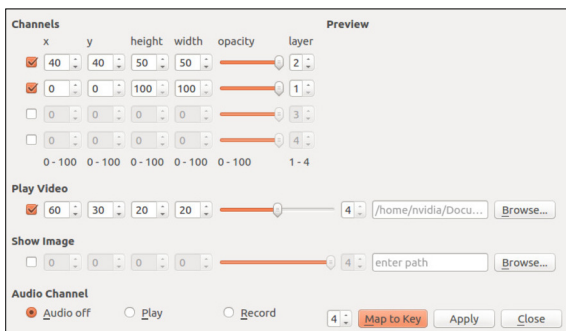
Within the scope of this assignment a key requirement is to fit the hardware into a small case - an embedded system. Furthermore the current software has to be improved and expanded. It has to be as customizable and expandable as possible.

Procedure / Result: The previous studies yielded a strong recommendation of what hardware should be used and possible options for the software. Therefore the Magewell Pro Capture Quad Capture Card was selected as an input device and a Jetson TX2 for the computing unit.

To have the utmost control and keep it highly customizable, the software was programmed very low level. This meant accessing the Capture Card directly with the suitable SDK and GPU programming through OpenGL for the Output. This also allows for optimizing the software for performance.

Finally the software was designed to allow the user to change settings at will. Also making it possible to use a single interface for future expansions and plugins.

Solution: The resulting system is functional and meets all demands. Up to four input channels can be captured and displayed as user wishes. Including split screen, picture in picture, individual opacity and more. All of this also applies for internal videos and images. Audio coming from an external channel can be played or recorded. To conveniently configure the output settings, a GUI was implemented which allows the user to apply new settings or map them to a key.



GUI settings for the following output



Output of picture in picture and transparent internal video