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Near Field Communication (NFC) between smartphone/tablet and handheld device

Description:

Near Field Communication (NFC) enabled devices are becoming more and more widespread. Recent smartphones and tablets have a build-in active powered read, which allows communicating with peers (also active powered NFC devices) or passive NFC tags. The communication, over short range, can be used to exchange information or trigger actions on the smartphone or tablet.

Within handheld conferencing equipment, NFC tags could be build-in which would enable exchange of information with a smartphone or tablet. The purpose could be to read out status from the tag build in the handheld device or configuration of this handheld device.

One of our future products would be a build in NFC tag, connected to an embedded processor. The goal of the thesis would be to perform a study on the NFC specification and possibilities after which an implementation of NFC communication between smartphone/tablet on the one hand and NFC tag with embedded controller on the other hand can be done.



Televic Company/Department:

Televic Conference offers the most recent technologies for discussion systems, applications for simultaneous translation and electronic voting systems.

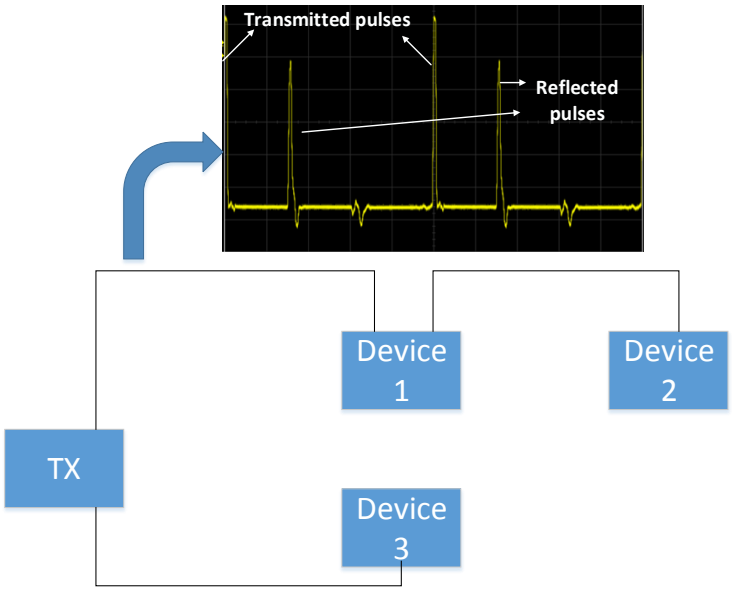
Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
MSc.	ICT	Research: 10% Implem.: 70% Experim.: 20%	School/ Televic site/field	Software / embedded Software	**1**

Delay line compensation algorithm (based on Time-domain reflectometry)

Description:

Time domain reflectometry is a technique which is commonly used to detect and determine the position of cable faults. It is based on a change of impedance value, which gives rise to reflections when a pulse is being transmitted. The time and magnitude of this reflected pulse determines the position of the impedance change and the possible fault.
In teleconferencing systems, the delay introduced due to long cable lengths towards different transmitting devices, needs to be compensated to enable a synchronuous reception. In current systems this delay line compensation value is manually set in all transmitting devices based on the cable lengths. This method is time consuming, not flexible and error prone. These cable lengths could be measured and communicated to the transmitting devices automatically. For this purpose the devices would specifically be wrongly terminated.
The work of the thesis would include a study of the TDR principle, definition of the protocol for measurement of the cable length segments as well as implementation of the protocol inside an FPGA.



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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
MSc.	electronics	Research: 20% Implem.: 70% Experim.: 10%	School/ Televic site/field	Hardware	**1**

Pluggable web-based signage for conference purposes

Description:

In a conference environment, customization of software is very important. Televic Conference regularly gets requests from clients who want to have different behavior, functionality or look-and-feel of the software that is provided.
This is the main reason why this thesis aims for the research into and development of a plug-able web-based Signage component. Signage is defined as any way to distribute data to participants of a conference; this can be using large screens in the room, their own devices, … The data itself can consist of speaker names, video streams, voting results, …

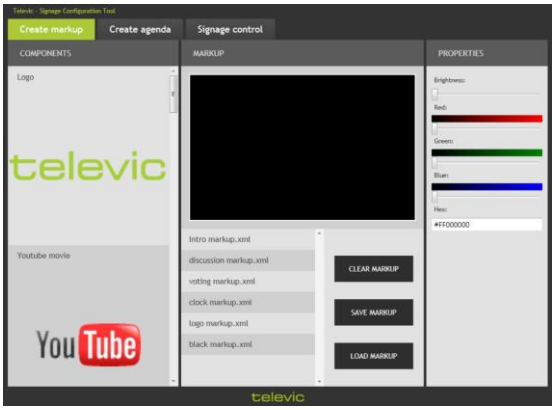
Advantages of this approach:

- The client (usually the conference "owner" and operator) can create his own view of existing components using drag&drop functionality.
- Web-browser are available on a lot of platforms (PC, tablet, phone, ..), so this does not limit the places where this solution can be used.

From a technical point of view, these are the main topics and challenges:

- Investigate how a modular (drag&drop) layout of a web page can be achieved. This includes a configuration and an operating part.
- A web-service (REST/JSON) will provide the data for a number of sample plugins.

See below for a possible resulting view of the result of dragging&dropping various components on a canvas.



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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
MSc.	IT, ICT	Research: 25% Implem.: 50% Experim.: 25%	Televic site	Software	**1**

Conference redundancy on multiple levels

Description:

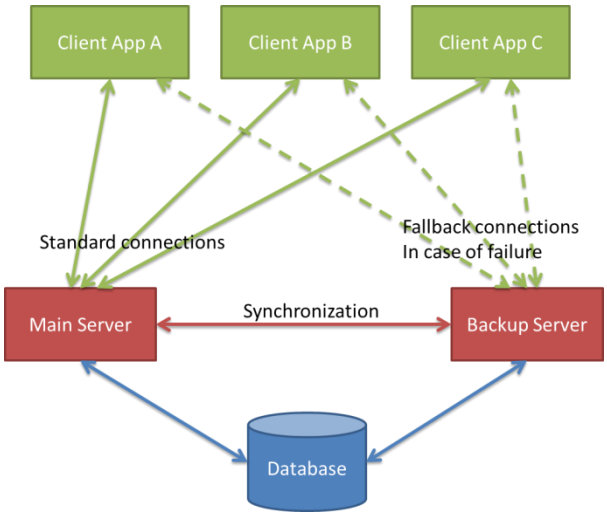
In the world of conference, it is absolutely necessary that no hardware or software errors result in the interruption of the conference. Televic Conference therefor currently has redundancy on the following levels:

- Gooseneck microphones can be replaced during a meeting
- Microphone units are hot-swappable and can be replaced without problems
- Cabling between the microphones
- …

However, on a higher level we are also looking to improve the reliability of the software system managing the conference software. This means that, in case of hardware (PC) or software failure (application crash), no data is lost and the conference processes are seamlessly continued by another instance of the software system. One very important example of this is that, during a voting session, no votes can be lost because of hardware or software malfunctioning.

The conference management software system uses a classic client/server architecture:

- Client applications provide functionality to the users using .Net desktop applications.
- The server application provides connectivity to the conference hardware system and a database containing all necessary data (delegates, agendas, …)



We want to investigate the feasibility of providing multiple server applications running in parallel. Requirements of performance and hot-swappability do not allow us to use virtual machines. Challenges to be looked into are:

- Running multiple parallel server processes with the same internal structure/data (using the same underlying database)/...
  Initially this will be on the same computer, but – to make sure we are protected against PC crashes – it is definitely necessary to use different PCs as well.
- Messaging between these server processes/machines
- Seamless transition of the client applications from one server to another in case of failure
- How to quickly detect the failure of the server process or a crash of its PC
- …

Research into existing solutions, as well as experimentation and implementation will be important aspects of this thesis.

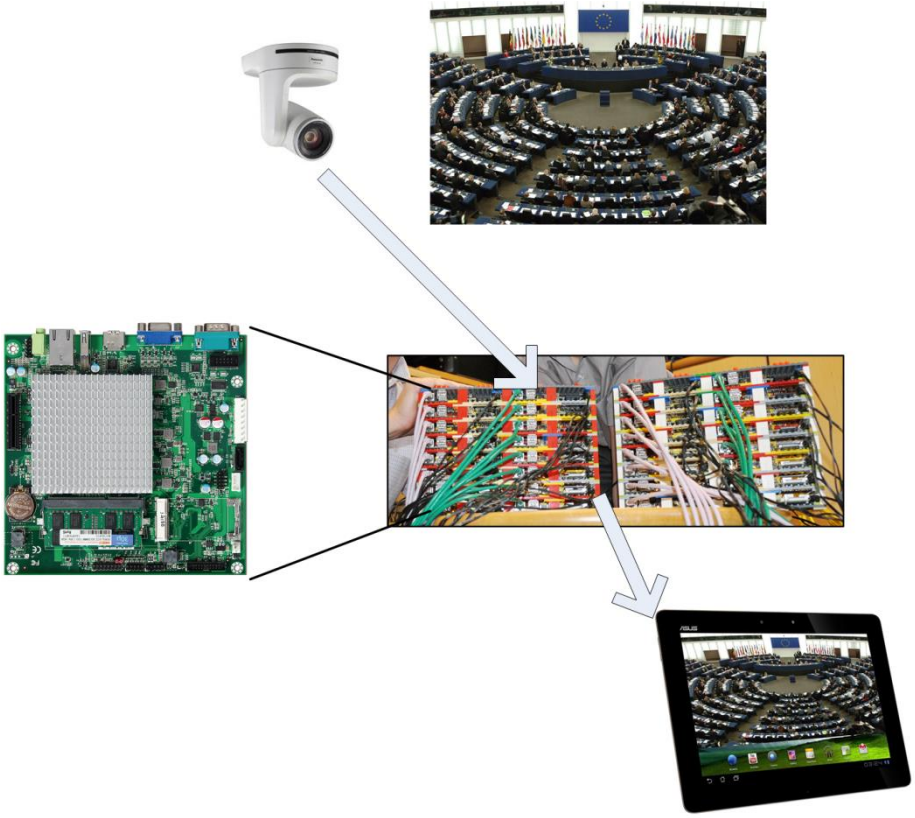
Televic Company/Department:					
Televic Conference offers the most recent technologies for discussion systems, applications for simultaneous translation and electronic voting systems.					
Nature of the work					
Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Bach/MSc.	IT, ICT	Research: 35% Implem.: 35% Experim.: 30%	Televic site	Software	**1**

Lowcost multirate video transcoder with parallel hardware acceleration

Description:

People want to use their own mobile device for assisting for instance to a conference.
One of the key topics is video with an as short as possible delay and as good as possible quality. The purpose of this project is a study and an implementation of this challenge. The content of the project is

1. to investigate the possibilities to provide multiple quality versions of the same video stream using low cost hardware modules and
2. to implement this project for the IOS system with a as short as possible delay using the Intel Bay Trail hardware.



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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
MSc.	IT, ICT, electronics	Research: 33% Implem.: 34% Experim.: 33%	School/ Televic site/field	Software /embedded software	**1**

Development of dedicated audio device for Digital Language Lab (Raspberry PI)

Description:

The Avidanet Live Language Lab is a modern and flexible digital language lab solution which enables multimedia lessons and activities: audio and video can be streamed, students can communicate with each other in conference groups, etc… The teacher manages the class by means of a central program, called TCC.

The purpose of this internship is to develop an affordable end-user audio device that eliminates the need for a PC for each student. This will drastically reduce the cost (both purchase and maintenance) for a language lab, and will increase its reliability. The number of functionalities compared to a normal language lab will be reduced and the focus will be on audio activities such as pairing, phone conversation, listening and interpreting exercises.

The idea is to use a small, low-cost ARM device that can be controlled by the central teacher application (TCC). The device is connected to a headset and has a wired LAN connection providing the inbound and outbound audio streams. A local audio recording can be made and played back on the device itself. The user will be able to interact with the device by means of a small panel with easy to operate push buttons: play/pause/vol+/vol-.

The first part of the assignment is to investigate the most suitable ARM based device: raspberry pi, rikomagic … Then an application will need to be developed that will communicate with TCC (control channel over TCP/IP) and will be able to encode and decode audio streams. Either the existing Televic PCM-like audio format can be used or perhaps a library such as gstreamer.

Televic Company/Department:

Televic Education, located in Marke (Kortrijk), is part of the Televic group and develops e-learning applications, both online (Edumatic) and offline (AvidaNet). We are a small group, so as a thesis student you will get close guidance and support. Our connections to the universities are very broad, so academic support is not a problem.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
MSc.	IT, ICT, electronics	Research: 25% Implem.: 45% Experim.: 30%	School/ Televic site	Software/hardware /embedded	1/2

Colour Correction automation

Description:

Televic Rail is a leading supplier of passenger information systems in the railway business. Our product portfolio contains different types of displays. In some of these displays, 2 different types of LCD screens are combined. As they have different characteristics, they are bound to display different colours upon being sent the same colour code (e.g. #FFFFFF might give a bluish white on one screen, a greenish white on the other) and display them with a different intensity. To cancel this effect, the characteristics of both screens are measured and the colour values sent to each screen are adjusted so they both appear the same.



The purpose of this master thesis is to optimize the current algorithms and implement an efficient automated process for colour correction.

The first step is a study and optimisation of the current algorithms used to measure the screen characteristics and calculate the parameter files (used to recalculate the output).

The next step is an implementation of a configurable stand-alone python program, that reads the characteristics of the screens, calculates the necessary corrections and outputs the parameter files for storage in the display.

The last step is to integrate automated reporting of parameter files for traceability in a maintenance database.

Of course, this master thesis will be supported by a proof-of-concept on a real display.

Televic Company/Department:

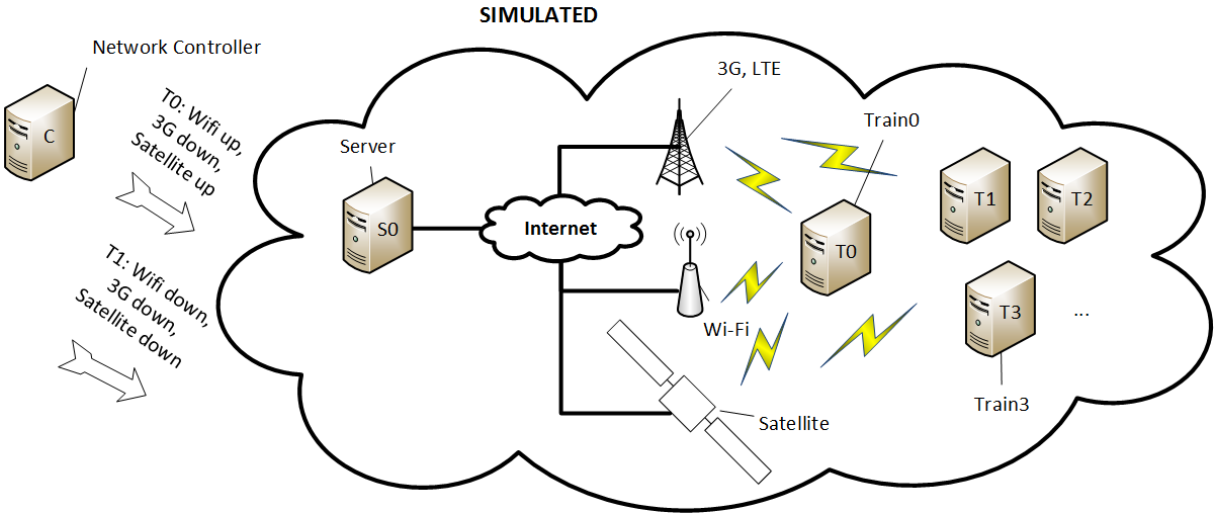
Televic Rail is a leading supplier in Europe, China and India of passenger information systems and control systems in trains and trams.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	ICT, electronics	Research: 30% Implem.: 50% Experim.: 20%	Televic site	Software	1

Dynamic control of a simulated railway network

Televic Rail builds digital signage TFT screens to be installed on board trains to give passengers valuable information about their journey. To update the train applications, one (or more) network connections are needed between the train network and the server. Besides sending passenger information data from the server (S0) to the trains (T0, T1, T2, T3, …), the network is also used by the train to send real-time data to the server.



The train has an unreliable wireless interconnection with the server by e.g. data connections via commercial Telco operator (3G, LTE), free Wi-Fi connections in large train stations and sometimes satellite connections.

The goal of this thesis is to simulate a large railway network of a server and different trains. Every train (e.g. Train0 in the figure) has multiple simulated network connections with different properties (Packet loss, bandwidth up- and downlink, …). A Network Controller application should interact with the simulated network to change the network properties dynamically. Depending on the current status of the network connections of the train, the train has to make intelligent decisions about which network connection it will use. In a station for example it will be better to use free Wi-Fi instead of a costly satellite connection. The smart network manager application will be implemented by the student and tested in a simulated network.

Televic Company/Department:

Televic Rail is a leading supplier in Europe, China and India of passenger information systems and control systems in trains and trams.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Bach/MSc.	IT, ICT	Research: 10% Implem.: 50% Experim.: 40%	School/ Televic site/field	Software in JAVA	**1**

Design of a multimedia extension board for a display processor platform

Description:

In our current digital signage solution for train applications, we are using TFT screens to display passenger information, commercials, emergency messages, etc … Every screen is controlled by an embedded processor board. This platform could also be used in other multimedia devices such as seat entertainment devices or man machine interfaces (MMI). To support this, the platform should be extended with some new features such as touch interface, audio, USB, …

The purpose of this master thesis is to design a multimedia extension board for the display processor platform. Next to the hardware design, some drivers will need to be added to the LINUX kernel in order to successfully integrate the new features in the current design. Finally a proof of concept demonstrator should be made which uses the new technology in one or more existing Televic Rail products.



Televic Company/Department:

Televic Rail is a leading supplier in Europe, China and India of passenger information systems and control systems in trains and trams.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	electronics,	Research: 15% Implem.: 70% Experim.: 15%	Televic site	Software/hardware	**1**

Noise reduction and build in test for microphones onboard rail vehicles

Description:

In the Voice Communication System of Televic, microphones are used for public announcements from the driver, for passenger – driver communication in the case of an emergency and for intercom between crew members. On board a rail vehicle, a lot of noise is present from different sources e.g. engine, wind, wheels, …. The quality of the speech signal, which is captured via microphones, is deteriorated by those noises. The quality of the audio communication can also be deteriorated due to a failure of the microphone.





During this thesis, we would like to investigate and evaluate beam forming and different noise reduction techniques (based on digital signal processing) to increase the signal to noise ratio of the resulting speech signal (desired speech signal vs. noise). In addition, a study and evaluation of possible Build In Tests (BIT) will be performed to monitor the important characteristics of the microphone over its life-time.

A proof of concept shall be worked out in hardware and VHDL based on the selected technique(s). The proof of concept shall make use of integrated circuit and MEMS microphones. Finally a validation in a controlled environment (acoustic chamber) will be performed.

Televic Company/Department:

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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	electronics	Research: 30% Implem.: 40% Experim.: 30%	Televic site	Hardware / VHDL	**1**

Design of a RS485 communication channel monitor and adapter

Description:

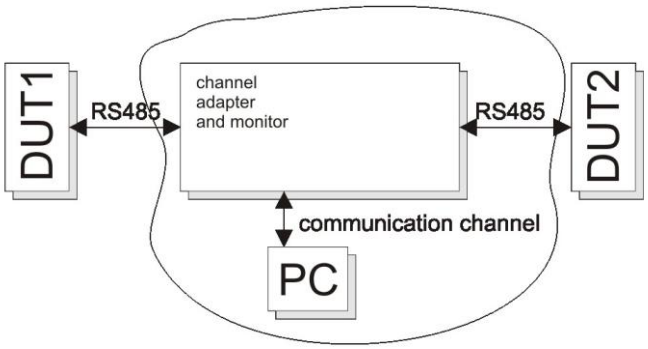
In order to test the robustness of the software drivers and applications and evaluate the dependency on signal integrity, new systems (DUT1 communication to DUT2 in two directions) will be tested using a channel adapter and monitor.

The first goal of this master thesis is to research the features that should be implemented in the channel adaptor and monitor to cover the different disturbances that can be present in the design and the train environment and how this can be covered by specific tests (jitter/packet loss/spikes/etc…).

The next phase is to implement the hardware, firmware and software. The test tool should be configurable by means of a USB interface. The PC Software will enable the features and select the protocol-ID, to be able to issue errors depending on protocol properties. Via the USB interface, the test tool should also be able to log the data on the channel.

Finally, validation tests will be performed to verify the correct functioning of the test tool.

The test tool will be used to test if the software reacts correctly to errors that are introduced in the channel and will be installed on board a train to log a complete journey for field debugging purposes.



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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	electronics	Research: 20% Implem.: 50% Experim.: 30%	Televic site	embedded (with all aspects : HW, SW, VHDL)	**1**

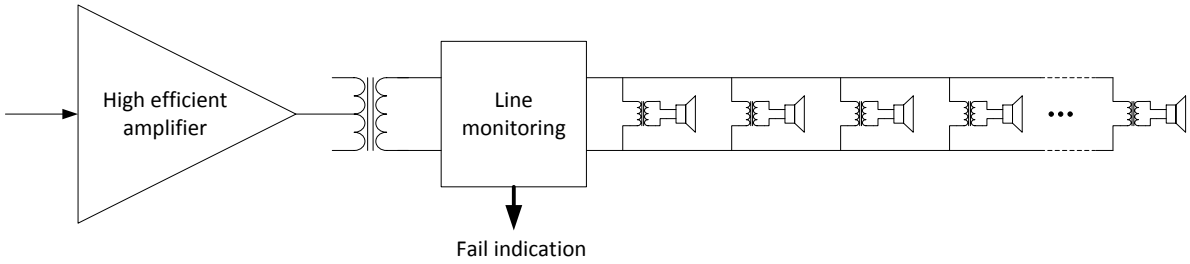
high efficient audio amplifier with self-diagnostics

Description:

During a public address (PA functionality), the driver of the train makes use of the Voice Communication System of Televic to broadcast audio information on board the train which can contain critical information for the passengers.

To broadcast an understandable audio message, the broadcast level should be above the ambient noise present in each vehicle. As this ambient noise can be very high when the train is driving at maximum speed, a high amount of power is consumed to drive the loudspeaker to the correct level. There is a cost related to this power consumption. The first part of this internship comprises a study of suitable class-D amplifiers and techniques for lowering consumption but keeping the audio fidelity.

To have a uniform distribution of the audio within the vehicle, a lot of loudspeakers are present in the saloon area. Manual checking of the loudspeakers is very time-consuming for the maintenance crew. Automatic fault finding is a must for reducing the maintenance cost. The second part of this internship comprises a study of loudspeaker branch monitoring techniques which can automatically detect anomalies within the loudspeakers. In addition, intelligibility measurement techniques will be studied, so other failures related to the amplifier and/or the loudspeaker branch can also be detected. These techniques shall be evaluated toward real-time usability and implementation complexity.



The best suited techniques for both mentioned problems shall be selected and validated via a proof of concept.

Televic Company/Department:

Televic Rail is a leading supplier in Europe, China and India of passenger information systems and control systems in trains and trams.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	electronics	Research: 40% Implem.: 30% Experim.: 30%	Televic site	hardware	**1**

Study and implementation of an internal FPGA bus protocol

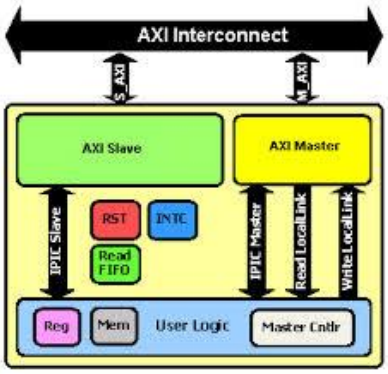
Description:

The purpose of this master thesis is to evaluate the performance and usability of different bus protocols inside a VHDL design (eg. AXI4, Wishbone, etc).

A first part of the thesis consists out of studying existing bus protocols used in SoC designs. This is followed by an evaluation and selection of applicable protocols that are usable in our passenger information systems.

A second part of the thesis will be implementing the selected topologies in an actual VHDL design that currently makes use of shared registers/memory as a communication interface between modules. During this implementation, parameters as consumed logic and routing density within the compiled output will be monitor.

Finally, based on the experiences and parameters obtained from the previous parts, the optimal bus protocol will be defined and implemented for which standard, light weight, re-usable and easy to integrate modules can be created that fit the need of current and future VHDL design. This will be supported by a PoC on a controller board for passenger information systems.





Televic Company/Department:

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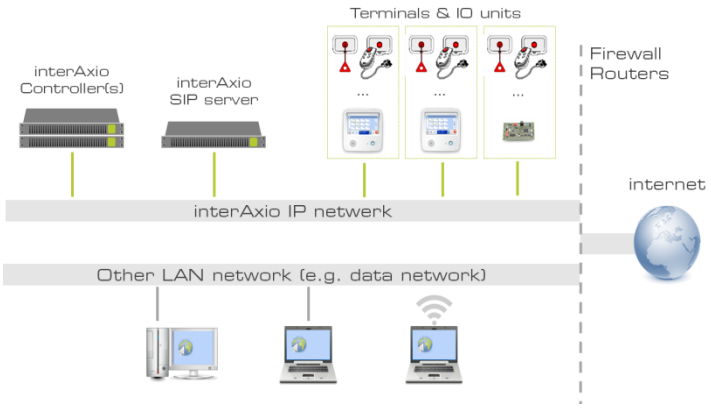
Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	ICT, electronics	Research: 30% Implem.: 40% Experim.: 30%	Televic site	VHDL	**1**

Virtual validation environment for the healthcare sector

Description:

Televic Healthcare product portfolio is extended and contains complex services handling a lot of information which needs to be processed within critical timings. To assist in the creation and validation of these services a virtual environment is needed that supports scalability, diversity in operating systems and development environments, relevant networking aspects, etc. This environment will not only enable more well-founded decisions in the development process, but is also at the core of the validation chain of new product development.



You will build up knowledge about different embedded and non-embedded platforms and development environments. You will implement a validation environment for a generic simulation test environment enabling distributed software and hardware for healthcare applications. This will result in a demonstrator which supports on-the-fly creation of virtual machines simulating complete nurse call environments.

More concrete, we would like you to

- Study the implementation of the current Linux based and RTOS based embedded devices
- Create a simulated environment for our current Linux based and RTOS embedded devices
- Set up a full tool chain to support on-the-fly creation of virtual machines
- Compare the Embedded Windows CE operating system with Embedded Linux
- Study the use of Mono and .Net CF on our devices with the current .net C# codebase

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Numb of students*
MSc. Master Bachelor	IT, ICT	Research: 40% Implem.: 40% Experim.: 20%	School/ University - Televic site-field	(embedded) software	1-2

Improving audio speaker quality for elderly persons

Description:



Televic Healthcare offers market leading communication solutions for hospitals, elderly homes and service flats. These solutions consist in sending alarm calls by a patient/resident, but also by setting up an intercom conversation between nurse and resident via a terminal built-in in the wall. This conversation is important for the nurse/caregiver to estimate better the problem or needs of the resident. In order to improve the quality of this communication between caregivers and elderly, we are exploring new audio quality metrics and audio enhancement techniques to perceive the elderly voice.

We would foresee 3 steps :

Step 1:
Evaluation of the existing audio techniques and typical limitations in perceiving the voice of the elderly. This also consists in measuring the influence of distance and position of the built-in terminal.

Step 2:
Determine an improved target setting for the audio quality of an elderly room and apply new techniques (knowledge available at Televic site) in order to achieve this target.

Stage 3:
Select the best technique (= best cost/benefit) and work out validation test in real-life setting at existing care home setting of Televic.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Numb of students*
Master	Electronics , Audio	Research: 30% Implem.: 30% Experim.: 40%	Televic site	Hardware design	1

Design of low power portable feedback methods for nurse call

Description:



Televic Healthcare offers communication solutions for hospitals, elderly homes and service flats, tailored to the need and use to a specific application. A typical problem consists of providing feedback to the patient/resident on the status of a call for help, issued by that patient/resident by a remote device.



In a caregiving environment, not all people are capable of properly reading, hearing, and feeling. Also people are not always capable of watching/reading from a monitor device. Therefor a dedicated and well balanced feedback system should be provided.

We would foresee 3 steps :

Step 1 :
List and evaluate the existing techniques that could serve the purpose: LED's, display (zero power), buzzer, vibrations, … These need to be evaluated on cost, energy, space, feedback possibilities, side-effects on people, …

Step 2 :
Based on the selection out of step 1, some proposals should be further worked out. Here a full design flow needs to be followed.

Stage 3 :
The selected design needs to be further validated in a real-life setting.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Numb of students*
Bachelor or Master	Electronics , Industrial Design	Research: 40% Implem.: 40% Experim.: 20%	Televic site/field	Hardware design	**1**

Game or social application on nurse call system for residents to interact

Description:



The Televic communication systems in the hospitals typically give the required safety and security to both patient and caregiver by offering help at the push of a button. Additionally a lot of multimedia and other supportive services are already provided as well. Therefor the handset at the disposal of the residents/patients already contains a touchscreen to give access to these services.

Another very important aspect in the healing process is the social contact and the fun element. Therefor we would like to investigate the possibilities to offer an interactive tool or game that enables social contact or some additional competition or other motivating aspects.

We would foresee 3 steps :

Step 1 :
Investigate the different aspects on user level (solo, group, storage, fun, interaction …) and implementation side (SIP messages, web-based, server/client, hardware constraints such as memory and speed). Scan for existing possibilities to understand the technical solutions available and commonly used in this area (open source, social media, dedicated service…).

Step 2 :
Build an experimental environment to get a better understanding on the different aspects investigated in step 1. Use this to converge to limited list of possibilities with pro's and con's.

Stage 3 :
Work out one preferred game/social application and validate it in a real-life setting with network.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Numb of students*
Bachelor or Master	IT/ICT	Research: 40% Implem.: 40% Experim.: 20%	Televic site/field	Software design	**1**

The Gummy Ball Call

Description:



Televic Healthcare makes communication systems for care giving environments from hospitals to service flats. One of the main functions is to reassure the safety and security of the patients/residents by offering a system that can call for help whenever needed. In the simplest form this happens by pushing a button, but there are maybe better and more useful ways to do this.

The idea here is to make a gummy ball based on the well-known stress ball that can be used to launch a nurse call. This gummy ball sends a signal to our room terminal, using ultrasound frequencies. So when this gummy ball is hit, smashed, thrown away, falling, a nurse call should be launched.

This proposal contains different parts:

Part 1: Study the technique of ultrasound and experiment with the materials to generate ultrasound signals.

Part 2: Use or modify an existing ultrasound receiver to capture the signal. The receiver should be capable to distinguish different frequencies for different applications.

Part 3: Compose the system to make a proof of concept on launching a nurse call to the system by squeezing the gummy ball.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions

Nature of the work:

Level	Specialty	Type of work	Location	Type	Numb of students
MSc.	Electronics, Mechanics	Research: 40% Implem.: 30% Experim.: 30%	School/ Televic site/ field	Hardware design	1-2

User interface design on Axio App to give overview of activities/menu to patient

Description:



Televic Healthcare offers communication solutions for hospitals, elderly homes and service flats, tailored to the need and use of the specific health environment. This is a quite hectic situation were the provision of exact information is key to ensure maximal efficiency of the nurse or caregiver.Also the way how this information is presented to the nurse and/or patient is of great importance.

One of the devices that is key in the communication system is the room terminal. To fully exploit the advantages of the touch terminal, specific applications to bring information to the patient or resident would be very helpful. Therefor some interfaces are enabled so that so called 'Apps' can be made available on the room terminal for the patients.

Step 1 :
Investigate the different aspects on user level to be represented on screen together with the required information or data.

Step 2 :
Build an experimental environment to get a better understanding on the different aspects investigated in step 1. Use this to improve your concept.

Stage 3 :
Work out one preferred application and validate it in a real-life setting

Televic Company/Department:

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Nature of the work

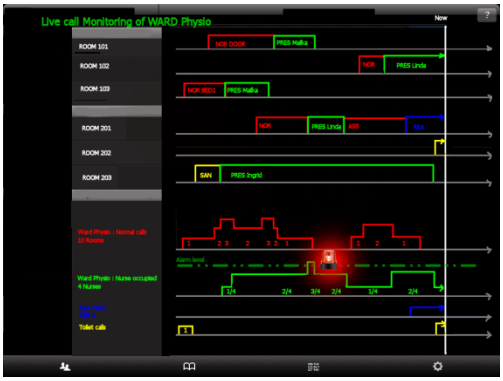
Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Numb of students*
Bachelor or Master	Usability, interaction , Web design	Research: 40% Implem.: 40% Experim.: 20%	Televic site/field	Product design	**1 or 2**

Smart real-time monitoring App

Description:

Televic Healthcare offers communication solutions for hospitals, elderly homes and service flats, tailored to the need and use of the specific health environment. In this quite hectic environment, the provision of exact information is key to ensure maximal efficiency of the nurse or caregiver.
Also the way how this information is presented to the nurse is of great importance.

The visualization of the open alarm calls is important for the nursing personnel in order to determine priority calls, to combine certain calls in nearby rooms and finally to monitor that no call has been forgotten. For instance, visualization models can be made for head nurses or hospital directors to follow current states of each ward regarding the number of active calls such that the workload of nurses and reaction times can be evaluated. See also in the example below.



Step1:
Exploration of the use case and the specific graphical interfaces possible. Also the different technologies to bring such an interface should be explored: dedicated SW, Web-based, cross-platform solutions… to investigate their pros and cons. Validate the proposal beforehand on their 'fit for use' in a real life environment.

Step2:
Select the best fitting proposal according to the different criteria, in alignment with your coaches. Fully work out the selected proposal.

Step3:
Testing of the working proposal in setting as close as possible to a real life environment and eventually update according to the additional learnings.

Televic Company/Department:

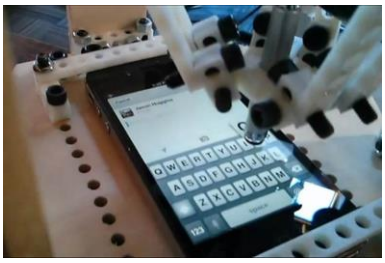
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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Numb of students*
Bachelor or Master	IT/ICT, Industrial design	Research: 40% Implem.: 40% Experim.: 20%	Televic site/field	Software design	**1**

Design of a robot to test for user input devices and cables

Description:



The purpose is to test the durability of inputs and cables. Inputs can be metal-over-cap buttons, resistive and capacitive touchscreens, physical buttons, membrane switches, rubberkeypads, …

The test equipment must be a cnc XYZ –table that can easily be programmed and have some outputs e.g. number of switch actions, resistance during switching, pressure during switching, capacitance during switching …

Different probes can be mounted depending of which switch technology.

A small user interface must be developed to easily communicate with the equipment and read-out of the results.

The equipment can also be used for stress-test e.g. bending of cables, bending of microphones flexible tubes, torsion ...

Installation must be user-friendly and will be used as sample test equipment, durability tests and go-no go in a production environment.

Televic Company/Department:

Equipment can be used in all departments.

Televic Healthcare is a leader in the development and implementation of professional communication systems in the healthcare sector.

Televic Conference offers the most recent technologies for discussion systems, applications for simultaneous translation and electronic voting systems.

Televic Rail is a leading supplier in Europe, China and India of passenger information systems and control systems in trains and trams.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Bachelor or Master	Electronics	Research: 25% Implem.: 50% Experim.: 25%	School Televic	hardware product design	**1**

Supplying applications through energy harvesting

Description:



Within healthcare communication systems, buttons are spread in the room. But in most cases, these buttons still need to be powered. This has some nasty drawbacks like cabling, the logistic aspects to replace batteries, …

Considering these aspects, it would be ideal to have devices that are self-powered. There are currently different techniques available on 'energy harvesting' but they still create a limited amount of energy. Question is now whether current state of the art would be sufficient to supply enough energy to feed this limited application.

This thesis would approach the subject in different steps:

Step 1:
Do an analysis on how much power there is required for the application, in order to transmit a message and how long this power needs to be available.

Step 2:
Investigate the different energy harvesting techniques, based on temperature, lightsource, movement, pushing, … on their pro's and con's. In order to make a real judgement of the possibilities at least some of the proposals need to be tried out in real life (electrical and mechanical experiments).

Step 3:
The most promising design should be worked out towards a physical prototype and characterized in detail with respect to the initial targeted parameter set.

Televic Company/Department:

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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Bachelor or Master	Electronics	Research: 30% Implem.: 40% Experim.: 30%	School/ Televic site	Hardware/ embedded	**1**

Development of a sensor tag coupled with your smartphone

Description:



Shifting from traditional care towards home care will be key for tomorrow's caregiving. Keeping patients at home for a longer time is not only advantageous for the patients itself but it enables another level of efficiency in "time for care" and cost optimization. In order for home care to be successful, remote monitoring systems are required. A first visible trend is the fitness trackers and smart watches that are being presented all over. Users can monitor their health statistics on their smartphone. The basic technology for such solution is Bluetooth low energy.

The purpose of this thesis is twofold:

1) Hardware/embedded development of a sensor tag
2) Software development on a mobile device to analyze and visualize the sensor data on a user friendly way

The following steps are planned:

1) Sensor assessment
   a) Scanning for useful sensors
   b) Evaluating sensors by means of existing demo boards

2) RF communication based on Bluetooth low energy
   a) Implement a method to transmit and receive sensor data using BT radios
   b) Integration radio with sensor front-end

3) Development of a smartphone app for reading out sensor data on your smartphone
   a) Development of a pc application using the existing BT module for acquiring sensor data
   b) Development of a smartphone app using the existing BT module for acquiring sensor data
   c) Visualization on a user friendly way

Televic Company/Department:

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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Bachelor or Master	Electronics IT/ICT	Research: 30% Implem.: 40% Experim.: 30%	School/ Televic site	Hardware/ embedded Software/mobile	**2**

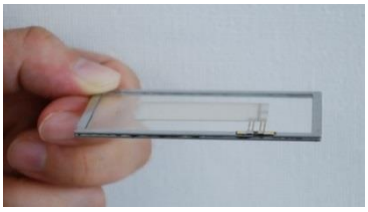
Integrated ceramic speaker in touchscreen for nurse call applications

Description:



Televic Healthcare makes communication systems for care giving environments from hospitals to service flats. One of the main functions is to reassure the safety and security of the patients/residents by offering a system that can call for help whenever needed. Therefor several dedicated devices are provided in the patient's room.

In the most advanced solution for the patient unit, consisting of a multimedia handset with touchscreen, there is the challenge to keep the device completely sealed for dust and water. A typical problem is the required channels for the captivation and emission of sound by the microphone and the speaker. To solve the problem on the speaker side, one could consider using ceramic speakers and integrating them with the screen.



The thesis should at least cover the following aspects:

- Selection of different available solutions available on the market.
- Propose and evaluate a method to combine the speaker with the display. This can be done in cooperation with the suppliers of the display panel and/or the ceramic speaker.
- Creation of the required prototypes.
- Evaluation of the audio quality and compare with the current solution.

Televic Company/Department:

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Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Bachelor or Master	Electronics IT/ICT	Research: 30% Implem.: 35% Experim.: 35%	School/ Televic site	Hardware	**1**

Automatically measure the echo suppression performances of an audio system

Description:



Televic Healthcare offers communication solutions for hospitals, elderly homes and service flats, tailored to the need and use of a specific application.
One of the features provided by Televic Healthcare is intercom/telephony.
Indeed the two main interAxio products, the interAxio terminal and the interAxio multimedia handset, can be used to set up calls.
For that a microphone and a speaker is used on the interAxio products.
In order to not have echo (speaker loopback to microphone), an echo suppression algorithm is used.

Today the only way to test the echo suppression performances is to make a subjective human measurement. This task takes a lot of time and it is open to interpretations.

The idea is to replace the subjective human measurement by an objective and automated echo suppression measurement system.

The following steps can be foreseen:

Step 1:
List and evaluate the existing techniques that could serve the purpose.
These should be evaluated on cost and on compatibility with the interAxio product line.

Step 2:
Based on the selection out of step 1, some proposals should be further worked out. Here a full design flow needs to be followed.

Step 3:
The selected design needs to be further validated in a real-life setting.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master	Audio, Electronics, Embedded software	Research: 40% Implem.: 30% Experim.: 30%	School/ Televic site/field	Software/ hardware/ embedded software	**1**

Speech control on an embedded UI

Description:



Televic Healthcare offers communication solutions for hospitals, elderly homes and service flats, tailored to the need and use to a specific application. Next to the vital alarm function, it is of major importance also to offer functions that support the well-being and comfort of the patients.

Each bed is equipped with a multimedia handset capable of controlling lights, window blinds, TV, radio, … Patients and elderly people might have difficulties to use the touch screen or the small buttons on the handset. Therefore it would be great if they could control the handset through voice too.

This project aims to investigate and test the possibilities to do this:

1. Investigate what technologies currently exist to allow this kind of control and their performance.

2. Implement this in our current handset as a proof of concept.

3. Evaluate the performance and user friendliness.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master MSc.	IT, ICT, Electronics	Research: 33% Implem.: 33% Experim.: 33%	School/ Televic site/field	Software design (embedded)	**1**

Patient record notes through speech to text conversion

Description:



Televic Healthcare offers communication solutions for hospitals, elderly homes and service flats, tailored to the need and use to a specific application.

Each room is equipped with one of our room terminals which are used as the main access point for the nurses to the institutions central care registration application. The goal of the care registration is that all tasks the care givers need to execute on a patient can be in a list displayed on the room terminal. Once a task is executed the nurse can indicate the task has been executed. This allows structured and central management and registration of the care given to patients.

But the care registration interface is limited in fields and possibilities. In a lot of cases the care giver would like to add notes about the patients or the treatment. At this moment these commands have to be added through an on screen keyboard or through a PC in the nurse room.

The goal of this thesis would be to investigate and create a system that allows the conversion from speech to text so the notes can be added to the patient record in a more user friendly way.

The thesis can be divided into a few steps:

1. Investigate what possibilities currently exist to convert speech to text. How can these technologies be integrated into our system. Can they run on the Linux terminal itself or should it run on our central server?
2. Evaluate the performance of a few preferred technologies.
3. Integrate this speech to text conversion into our current application so it can be used for real life tests.

Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions.

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
Master MSc.	IT, ICT, Electronics	Research: 33% Implem.: 33% Experim.: 33%	School/ Televic site/field	Software design (embedded)	1

Research on zero power display's

Description:



Televic Healthcare is a leader in the development and the implementation of professional communication systems in the healthcare sector. We offer innovative solutions on all aspects like usability, design, comfort and efficiency.
So called "zero power" displays can give a visual feedback using a minimal amount of energy (they only use energy when their information is changing). This is a big advantage and still allows for innovative and trendy applications.

Investigation:

- What are the different technologies to implement 'zero power displays' (like e-ink, cholesterolic displays, …). What are the advantages of the different choices?
- What suppliers/distributers are offering these technologies and what is the support given?
- Make an overview on the advantages and disadvantages in comparison with an LCD:
  - Specifications (colour, (pixel) size, refresh time, temporal behavior …)
  - Design (standard vs. custom)
  - Robustness against environmental parameters and aging (burn-in, shock, temperature, …)
  - Electrical interface (voltage, current, power, control, …)
  - Software aspects (software driver, refreshing)
- Build a few prototypes to demonstrate the possibilities of the different technologies.



Televic Company/Department:

Televic Healthcare is leading healthcare company developing communication solutions using the latest technology evolutions

Nature of the work

Level	*Specialty*	*Type of work.*	*Location*	*Type*	*Num of students*
MSc. Master Bachelor	Electronics	Research: 20% Implem.: 40% Experim.: 40%	School/ Televic site/field	Hardware/ embedded software	**1**