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DIPLOMA PROJECT AT CONTINENTAL

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CONTENTS

INSTANCE IMPORTER FOR INTERNAL PHP DATABASE

PROJECT DESCRIPTION

Build an importer that creates from one instance of technical database to another internal database;
Based on internal CIM R210-19-00452;
End project should have an automatic script that creates internal instance, with all relevant data, when inputted with the external URL.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers student;
› Specific technical knowledge: PHP; HTML; WebCrawler; opt Selenium.

TESTS

› HTML

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

PERSONAL ADAS DRIVER PROFILE

PROJECT DESCRIPTION

Create concept study simulation for personalization of ADAS system by driver stile;
Based on Learning Driving Styles for Autonomous Vehicles from Demonstration documentation;
End project should have a simulation in mathlab with a conditional function of ADAS by a driver profile parameter compared to regular function in same driving scenario.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers, Mechatronics, Electronics & Telecommunications
› Specific technical knowledge;
› Specific technical knowledge: Mathlab

TESTS

› C++
› Java
› Matlab

H/DAY

8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

REMOTE SETUP VIA IP

PROJECT DESCRIPTION

Setup a remote test bench by connecting the following via IP:

1. Lauterbach Debugger;
2. Vector VN (used for rest bus simulation);
3. MTS (dedicated computer for runtime analysis and debug);
4. Power Supply (create script to turn on/off the power supply remotely).

This will be repeated for all our customer projects.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computer Science (or anything else related to electronics)

TESTS

› ANSI C
› Microcontrollers
› C

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

AERO VISION

PROJECT DESCRIPTION

The purpose of this project is to create a scalable visualization framework that unifies multiple projects belonging to the Advanced Engineering Romania (AERO) team. This is a Research and Development team focused on Assisted and Autonomous Driving subjects. The framework needs to accept inputs from C++ and Python projects and must function on both Windows and Ubuntu. It will need update and display information in real time in the form of vehicles, trajectories on HD maps, different grapes, present sensor information and so on. Preferably it will be written using Qt.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computer Science;
› Specific technical knowledge: Qt, C++, Python, experience designing graphical user interfaces.

TESTS

› ANSI C
› Microcontrollers
› C++
› C#
› Java
› Matlab
› Labview
› Hardware and Mechanics

H/DAY

4/6

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

NEURAL DEBUGGER

PROJECT DESCRIPTION

The purpose of this project is to create a debugging and visualizaion framework that can work with different neural network projects belonging to the Advanced Engineering Romania (AERO) team. This is a Research and Development team focused on Assisted and Autonomous Driving subjects. It needs to be configurable to acquire data from all kinds of neural network projects and present it in meaningful ways in order to facilitate error correction and increase prediction accuracy and performance. It will include features such as heatmaps, graphs, edge and miss classified cases, low level information and other relevant techniques. The project needs to be scalable. It also needs to function with both TensorFlow and PyTorch.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computer Science;
› Specific technical knowledge: Python, Deep Learning, Tensorflow, Py-Torch

TESTS

› Python

H/DAY

4/6

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

FEATURE DETECTION WITH PERSPECTIVE INVARIANCE

PROJECT DESCRIPTION

The purpose of the thesis would be to develop and implement an algorithm which is able to extract unique structure features from a video stream. These features need to be identifiable in subsequent video recordings of the same physical location. This means that an object, for example a rock, needs to produce the same feature identifier even if it is recorded multiple times from slightly different perspectives (captured from different locations and influenced by a car's roll, pitch and yaw).

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computer Science; Electronics & Telecommunication;
› Specific technical knowledge: Programming knowledge, computer vision, image processing, OpenCV

TESTS

› C++
› Python

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

LOCALIZATION ANOMALY DETECTION

PROJECT DESCRIPTION

The ADAS BU currently has a high precision localization solution developed which is being continuously updated. Therefore, a lot of testing is being done. The scope of the diploma thesis is to develop a tool which automatically detects anomalies in the functioning of the localization algorithm based on the output of the module.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computer Science; Electronics & Telecommunication;
› Specific technical knowledge: Programming knowledge, machine learning knowledge.

TESTS

› C++
› Python

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

LOCALIZATION ANOMALY DETECTION

PROJECT DESCRIPTION

The ADAS BU currently has a high precision localization solution developed which is being continuously updated. Therefore, a lot of testing is being done. The scope of the diploma thesis is to develop a tool which automatically detects anomalies in the functioning of the localization algorithm based on the output of the module.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computer Science; Electronics & Telecommunication;
› Specific technical knowledge: Programming knowledge, machine learning knowledge.

TESTS

› Python

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

IMPLEMENTING 3D OBJECT DETECTION WITH HINTS FROM RADAR INFORMATION

PROJECT DESCRIPTION

The project aims to do 3D object detection using camera and RADAR information. The student must take a state of the art model for 2D object detection using hints given by RADAR information, adapt it to work in 3D, and then test it on publicly available benchmarks.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills.

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

IMPLEMENTING A 3D OBJECT DETECTION PRE-LABELING TOOL FOR AUTONOMOUS DRIVING

PROJECT DESCRIPTION

The project aims to do a pre-labeling tool for 3D object detection. The student must take a state of the art model for 3D object detection, run it on Continental datasets, and create a tool that outputs the results of the 3D object detection.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills.

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

IMPLEMENTING A 3D OBJECT DETECTOR IN THE CARLA AUTONOMOUS DRIVING SIMULATOR

PROJECT DESCRIPTION

The project aims to integrate a 3D object detector in the CARLA simulator. The student must take a state of the art trained model for 3D object detection and adapt it to run in the CARLA simulator, specifically for inference.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills.

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

IMPLEMENTING AUGMENTATION OF LIDAR POINT CLOUDS FOR AUTONOMOUS DRIVING

PROJECT DESCRIPTION

The project aims to do augmentation of LIDAR point clouds for autonomous driving. The student must take a state of the art model for point cloud augmentation, implement it, and then test it on publicly available benchmarks.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills.

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

IMPLEMENTING MONOCULAR DEPTH ESTIMATION FOR AUTONOMOUS DRIVING

PROJECT DESCRIPTION

The project aims to do depth estimation using a single camera image. The student must take a state of the art model for monocular depth estimation, implement it, and then test it on publicly available benchmarks.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills.

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

IMPLEMENTING SEMANTIC SEGMENTATION ON LIDAR POINT CLOUDS FOR AUTONOMOUS DRIVING

PROJECT DESCRIPTION

The project aims to do semantic segmentation on LIDAR point clouds for autonomous driving. The student must take a state of the art model for semantic segmentation on point clouds, implement it, and then test it on publicly available benchmarks.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills..

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

IMPLEMENTING TRACKING ON LIDAR POINT CLOUDS FOR AUTONOMOUS DRIVING

PROJECT DESCRIPTION

The project aims to do tracking on LIDAR point clouds for autonomous driving. The student must take a state of the art model for point cloud tracking, implement it, and then test it on publicly available benchmarks.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Basic Python and basic Machine Learning/Deep Learning skills.

TESTS

› Python

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

PREVIEW

PROJECT DESCRIPTION

The scope of Preview is to detect the irregularities in the road. This will help to adjust the suspension in real time to increase the comfort of the passengers.
The algorithm needs to be based on image processing and/or Structure from Motion. The camera is placed behind the interior rearview mirror.

TECHNICAL KNOWLEDGE

› Faculty: Electronics and Telecommunication, Automation and Computers, Informatics.
› Specific technical knowledge: C/C++ or any other programming language that is OOP; Machine learning, Image processing, Computer vision is a plus

TESTS

› C
› C++
› Matlab

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

ROAD SURFACE CONDITIONS DETECTION

PROJECT DESCRIPTION

In the field of ADAS a challenging situation is to adapt the speed, maneuver of the car based on the type of surface it drives on.
There is a need to distinguish if the road is wet, dry, snow, ice etc. Not only if the road is fully covered by such conditions but also if there are patches on the road with the mentioned conditions. The scope is to avoid the patches or slow down the car, not to brake the tire when it is over the patches.
The algorithm needs to be implemented using machine learning and/or computer vision. The camera is placed behind the interior rearview mirror of the car.

TECHNICAL KNOWLEDGE

› Faculty: Electronics and Telecommunication, Automation and Computers, Informatics.
› Specific technical knowledge: C/C++ or any other programming language that is OOP; Machine learning, Image processing, Computer vision is a plus.

TESTS

› C
› C++
› Matlab

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

CARLA SELF-DRIVING PLUGIN

PROJECT DESCRIPTION

This project aims to have a path planner for Carla simulator (http://carla.org/).
The student must create a plugin in which we can give a set of destination points (x, y, z coordinates) to create a specific route (eq: driving for 7 minutes straight, make a close loop, enter and exist a roundabout, etc.) using the maps given by Carla.
There exists a plugin in which you can give the start and the endpoint of the route. The student can use it to develop the new plugin.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers;
› Specific technical knowledge: Python

TESTS

› Python

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

AUTOMATED PROTOCOL BUFFER DATA GENERATOR

PROJECT DESCRIPTION

Protocol buffers are Google's language-neutral, platform-neutral, extensible mechanism for serializing structured data. Protocol buffers are used for storing and interchanging all kinds of structured information and are extremely used in our automotive projects.
The objective of this project is to generate .proto files from a C++ data structure. These proto files are a small logical record of information, containing a series of name-value pairs.

Input:

File with C++ data structure (other programming languages can be added)

Output:

Proto file. After the proto file is generated, the protocol buffer compiler will generate data access classes for this structure.

Algorithm:

1. Small interface which uploads the input structure and returns the output .proto file
2.Algorithm that converts the input structure in .proto file format (using protobuf format - https://developers.google.com/protocol-buffers/docs/proto).

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers;
› Specific technical knowledge: C++, structured data, proto language, text processing.

TESTS

› C++

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Master

OBJECT RECOGNITION FUNCTIONS DEVELOPMENT

PROJECT DESCRIPTION

Create together with the Industrial Engineering group in TSR an object recognition function for camera (2D) and Collaborative Robot with intention of recognizing electronic PCB assembly's in pick and place projects in our plant.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers;
› Specific technical knowledge: Programming skills, Electrical skills.

TESTS

› C++
› C#
› Matlab
› Labview
› Hardware
› Mechanics

H/DAY

6

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

IOS APPLICATION FOR TICKETING HANDLING IN PLANT TSR

PROJECT DESCRIPTION

Create together with the Industrial Engineering group in TSR an IOS (iPhone SW) application to allow access to graphs and database ticketing in Plant TSR.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Compure Science;
› Specific technical knowledge: Programming skills.

TESTS

› ANSI C
› C++
› Java

H/DAY

6

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

POSITION SENSORLESS STRATEGY CONTROL FOR ULTRA HIGH SPEED ELECTRICAL COMPRESSOR

PROJECT DESCRIPTION

Electrically driven compressor supplements conventional turbocharging systems, to improve boost pressure and transient engine response at low engine speeds.
This electrically assisted charging system uses a flow compressor driven by an electric motor placed as a component before or after the turbocharger.
The control strategy can be implemented based on a position sensor or without it.
The Thesis Diploma consists in a Sensorless strategy control implementation for the high speed compressor and the analysis of the test results performed on dedicated test bench.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers, Electrical and Power Engineering;
› Specific technical knowledge: Electrical Drives Control, Matlab/Simulik, Ansi C, Microcontrollers.

TESTS

› ANSI C
› Microcontrollers
› Mathlab

H/DAY

4/6

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

LICENSE MANAGEMENT TOOL

PROJECT DESCRIPTION

The application must be able to manage all the existing and new licenses.
The main features that the tool should provide are:

- Provide information about the status of the licenses – expired/in use, responsible;
- Provide information about the expiring dates of the licenses;
- Send automatically mails to the license responsible;
- Send emails to the suppliers;
- Provide a friendly user interface;
- Provide access based on approval;
- S.o.

TECHNICAL KNOWLEDGE

› Faculty: Electronics and Telecommunication, Automation and Computers, Informatics;
› Specific technical knowledge: Computer Architectures, Linux/POSIX Operating Systems, Programming languages.

TESTS

› ANSI C
› Microcontrollers
› C++
› C#
› Java
› Matlab
› Labview
› Hardware
› Mechanics

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

DESIGN, MODELING AND ANALYSIS OF THE SYSTEM BEHAVIOR IN CASE OF UNEXPECTED INFORMATION RECEIVED VIA CAN COMMUNICATION

PROJECT DESCRIPTION

Unexpected information via CAN communication influence the car steering;
Design and modeling in Matlab:
- an ABS model for acquisition of vehicle speed signals from each vehicle wheel;
- a graphical vehicle steering model;
- Communication between Matlab and CANoe;
- Analysis of the Wrong CAN messages and the influences of them in e.g. the car steering.

TECHNICAL KNOWLEDGE

› Faculty: Electronics, Telecommunications and Information Technologies;
› Specific technical knowledge: Matlab, CAN bus communication.

TESTS

› Microcontrollers
› Matlab
› Hardware
› Mechanics

H/DAY

6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

AUTOMATED TEST BOX VALIDATION

PROJECT DESCRIPTION

The student must design and develop from scratch a complete automated test environment for validating a test box used by our testing team in our projects;
The project has 2 parts:

-a HW part: choose the correct test equipment for validation and design the harnesses to connect to the test box

- a SW part: create a test tool in LabVIEW which controls/stimulates the test box and checks if it is in the required parameters to validate its functionality. This action will be automated, and a report with the results will be generated.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers, Electronics and Telecommunication, Electrical Engineering;
› Specific technical knowledge: Labview.

TESTS

› Labview

H/DAY

4/6

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

END OF LINE TESTING – TEST GENERATION TOOL

PROJECT DESCRIPTION

The goal is to create a tool capable of generating standard tests for a series of software components that are designed to interact with an user via commands over CAN / SPI / Ethernet;
There are already available some tools that can interact with the software components. What is missing is to automatically create testing scenarios for these tools to use, based on the specification of the embedded software components;
The testing itself is done on cluster instruments, in a special testing mode called End of Line, where this special software is downloaded on the instrument cluster and then can perform tests: GPIO / ADC / PWM / display / stepper motors, etc;
The programming language for such a tool is free to choose.

TECHNICAL KNOWLEDGE

› Specific technical knowledge: C – the embedded functions are written in C; Java / C++ / C# - what the tool can be written in.

TESTS

› C
› C++
› Java

H/DAY

6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor

RAAD

PROJECT DESCRIPTION

Th project target is to explore the usage of RADARS for in cabin (inside car) applications.
There are several evaluation kits available (from TI/Infineon) that have the capability to produce signals that result in 'Human Detection' inside the cabin.
The student colleague shall support to:

-Prepare and execute test results;

-Use the feedback to improve the existing signal processing and Occupant Detection Algoritms.

TECHNICAL KNOWLEDGE

› Faculty: Electronics, Telecommunications and Information Technologies, Automation and Computers;
› Specific technical knowledge: MatLab, and C. Understanding of Electronics (RADAR) is a plus..

TESTS

› C
› C++
› Matlab

H/DAY

4

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Master

ALGO TOOLS ON MOBILE PHONES

PROJECT DESCRIPTION

In Algorithm team we develop tools which are able to simulate the algorithm behavior during a crash test;
The tools are run on PC platforms and we want to port these programs to be able to run them on mobile platforms;
n this way the calibration engineer can check the calibration performance from everywhere.

TECHNICAL KNOWLEDGE

› Specific technical knowledge: Android, IOS.

TESTS

› ANSI C
› Microcontrollers
› C++
› C#
› Matlab
› Hardware

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

COMPUTER STEREO VISION – DISTANCE ESTIMATION

PROJECT DESCRIPTION

Use two cameras;
Estimate distance to objects and extract object features (size, shape, etc) using Computer Stereo Vision.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers or Informatics;
› Specific technical knowledge: Machine Learning, Computer Vision, Python/C++.

TESTS

› Python
› C++

H/DAY

4/6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Bachelor/Master

PARALLEL COMPUTING IN HPC CLUSTER BASED ON HETEROGENEOUS NODES

PROJECT DESCRIPTION

This project aims to investigate and highlight the pits and falls of "parallel computing" using HPC clusters by designing and developing a "parallel computing" cluster based on several heterogeneous, computing nodes;
The goal is to have a scalable architecture, providing parallel computing capabilities, based on a configurable number of heterogeneous nodes - will support both 32 bits (e.g. RPI2) and 64bits (e.g. RPI3) nodes;
Expectation at the end of the project, is to have a strongly documented theoretical background of parallel computing in high performance computing (state-of-the-art in the field), a working Raspberry PI based parallel computing cluster and the corresponding user manual explaining the used development framework. Benchmarking applications design, configuration and deployment shall be described in a way that they can be replicated on different set-ups.

TECHNICAL KNOWLEDGE

› Faculty: Electronics and Telecommunication, Automation and Computers, Informatics;
› Specific technical knowledge: Computer Architectures, Linux/POSIX Operating Systems, Programming languages.

TESTS

› ANSI C
› Microcontrollers
› Java
› C++

H/DAY

6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Master

HIGHLY AVAILABLE SERVICES ON COMPUTING CLUSTER WITH HETEROGENEOUS NOD

PROJECT DESCRIPTION

This project aims to investigate and highlight the pits and falls of “highly available services” based on HPC clusters with heterogeneous nodes;
The goal is to design and develop a scalable HPC cluster architecture, providing highly available services. It shall be based on a configurable number of heterogeneous nodes - will support both 32 bits (e.g. RPI2) and 64bits (e.g. RPI3) nodes;
Expectation at the end of the project, is to have a strongly documented theoretical background on “high availability” in high performance computing (state-of-the-art in the field), a working Raspberry PI based high availability cluster, a user manual explaining how to configure and deploy “highly available services” and benchmarks on the proposed set-up;
The metrics used in this project and the corresponding figures shall be documented in a way that they can be replicated on a different set-up.

TECHNICAL KNOWLEDGE

› Faculty: Automation and Computers or Informatics;
› Specific technical knowledge: Machine Learning, Computer Vision, Python/C++.

TESTS

› ANSI C
› Microcontrollers
› Java
› C++

H/DAY

6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Master

LOAD BALANCING COMPUTING CLUSTER WITH HETEROGENEOUS NODES

PROJECT DESCRIPTION

This project aims to investigate and highlight the pits and falls of “load balancing” in HPC clusters by designing and developing a “load balancing” cluster based on several, heterogeneous, computing nodes;
The goal is to have a scalable architecture, providing load balancing services, based on a configurable number of heterogeneous nodes - will support both
x

TESTS

› ANSI C
› Microcontrollers
› Java
› C++

H/DAY

6/8

DIPLOMA PROJECT TYPE (MASTER OR BACHELOR)

Master

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