AUTOMOTIVE

1. Title: Software Failure Modes and Effects Analysis (SW FMEA).
2. Main scope: FuSa & Cybersecurity.
3. Description: In this thesis, the goal is to identify potential software malfunctions that can affect system security, evaluate the severity of these malfunctions and propose corrective actions to mitigate the associated risks.

AUTOMOTIVE

1. Title: Development of machine learning algorithms for detecting attacks on vehicular communications networks.
2. Main scope: FuSa & Cybersecurity.
3. Description: This thesis focuses on the development of machine learning algorithms for the detection of cyber-attacks on on-board car systems. The aim is to quickly identify any anomalies or suspicious behaviour in order to prevent attacks and protect the vehicle and its occupants.

AUTOMOTIVE

1. Title: Design and performance evaluation of security countermeasures for the DoIP protocol.
2. Main scope: FuSa & Cybersecurity.
3. Description: Description of activities foreseen in the internship: In this thesis, the objective is to design security countermeasures to mitigate the identified vulnerabilities. This could include implementing secure authentication and authorization, implementing encryption mechanisms, and implementing intrusion detection techniques. Once the security countermeasures have been implemented, it may be interesting to evaluate the performance of these countermeasures. This could include analyzing the latency and bandwidth needed to implement security countermeasures and analyzing the overall performance impact of the DoIP protocol.

AUTOMOTIVE

1. Title: Explores and develops advanced modeling and control strategies in Matlab&Simulink to populate the application layer of the Kineton battery management system.
2. Main scope: Automotive Battery Management System.
3. Description: The battery pack is a crucial component in every electric vehicle and its proper functioning is essential for ensuring the safety and longevity of the vehicle. To achieve this, a reliable Battery Management System (BMS) is necessary. The BMS is an electronic controller that monitors and manages the various functions of a battery pack, including the balancing or equalization process. Kineton is developing in its laboratory a functional BMS with advanced control algorithm developed by mean of the model-based paradigm. Our current focus is on the battery pack State of charge (SoC) and State of health (SoH) estimation, active cell balancing, fast charging and impedance-based cell modeling.

AUTOMOTIVE

1. Title: Explores and develops advanced modeling and control strategies in Matlab&Simulink to explore their benefits for an OnBoard Charger (OBC) application.
2. Main scope: Automotive OnBoard Charger.
3. Description: This master thesis proposal focuses on the application of the Model Predictive Control (MPC) to an OnBoard Charger (OBC) for electric vehicles. The OBC is responsible for charging the vehicle's battery pack, and ensuring that the charging process is safe, efficient, and fast. The aim of this thesis is to design and implement a MPC-based control system for the OBC to optimize its charging performance. The MPC approach involves modeling the OBC system dynamics, predicting future states, and selecting control actions to optimize a chosen performance criterion. The MPC algorithm is implemented and tested on a process-in-the-loop (PIL) setup, using realistic models of the battery pack and OBC.

AUTOMOTIVE

1. Title: Explores and develops advanced model strategies in Matlab & Simulink to create a digital business case simulation for a CityApp.
2. Main scope: Financial Engineering.
3. Description: Our life is business driven and every company needs to find the right strategy for successful investments, means doing decisions for or against new projects and initiatives. The base for this GO or NOGO decision is a sustainable business case analysis.
A business case contains extensive evaluation about the possible market, competitor landscape and pricing, technical requirements, customer expectations, creation of USPs (Unique selling points), evaluation of the best technical solution, an implementation plan and finally an analysis if the financial company goals will be met.
Having all this mind the creation of such business plan gets quite complicated and as well the mathematical simulations which are behind this.
Kineton wants to use in the future Matlab & Simulink for to developing a business model for digital revenue stream driven products. This model must include growth of cities and agriculture, touristic people stream, mega trends, nudge phycologist and finally big data of all kinds of inputs for creating a scalable business model.

INNOVATION LAB (R&D)

1. Title: Design and development of algorithms for contextual understanding of the environment (Perception System).
2. Main scope: Proposed architectures for driver assistance systems (ADAS) and/or autonomous driving include a perception module dedicated to estimating contextual conditions such as the status of other agents (pedestrians and vehicles), horizontal and vertical road markings, and road surface conditions. Such information is usually inferred through the use of machine learning (e.g., computer vision) and sensor fusion algorithms using on-board sensors (cameras, lidar, radar) as input.
3. Description: The thesis activity, having identified a particular application domain, will consist of the study, design, development and testing/validation of perception and sensor fusion algorithms useful for contextual understanding

of the environment, providing in output information to be used later as inputs for path planning and control algorithms for autonomous vehicles.

INNOVATION LAB (R&D)

1. Title: Design and development of infotelematic systems for mobility management.
2. Main scope: Modern vehicular architectures tend to include, in addition to advanced infotainment systems, a telematics module that provides connectivity to the vehicle. We increasingly speak of infotelematics systems, referring to the union of the subsystems mentioned above. The functionality offered by this innovative module allows cloud platforms to be considered as part of the nodes belonging to the vehicular data network. Thanks to these new infrastructures and technologies, it will be possible to develop mobility management applications, aiming at improving road safety, reducing traffic and thus emissions.
3. Description: The thesis activity will consist of the study and design of architectures for the implementation of mobility management services as well as the implementation of innovative services and applications for infotelematics systems.

INNOVATION LAB (R&D)

1. Title: Development of algorithms for implicit personalization of human machine interface (HMI) based on a driver-vehicle-environment model.
2. Main scope: A new generation vehicles are equipped with devices capable of conveying information to the driver through multimodal human-machine interfaces, examples of which are the Infotainment system, the Cluster and ADAS systems that provide alerts to the driver in potentially dangerous situations (e.g., FCW - Forward Collision Warning). In this context, the need arises to manage the multitude of stimuli (visual, aural and even vibro-tactile) to which the driver and occupants of the passenger compartment may be subjected. Stimuli and their communication channels can be managed by static rules whose parameters can be set directly by the user; we speak in this case of explicit customization. Alternatively, algorithms can be designed that, based on the context (driver-vehicle-environment), are able to determine the best mode of presentation and at the same time prioritize the multitude of

stimuli to be provided to the driver. Such management should aim at maximizing the safety of the occupants of the passenger compartment and minimizing the boring experience the user may have. This is referred to in the literature as implicit personalization.

3. Description: The thesis activity will consist of the study, design and related development of implicit personalization algorithms for next-generation connected vehicles.

INNOVATION LAB (R&D)

1. Title: Design and implementation of path planning and vehicle motion control algorithms by exploiting information from heterogeneous sources (on-board sensors, smart infrastructure, other vehicles).

2. Main scope: According to the Society of Automotive Engineers, Driver Assistance Systems (ADAS)are classified into 6 categories, where as the level of vehicle autonomy increases. Ultimately, ADAS level 5 refers to vehicles capable of driving completely autonomously, without any intervention from the occupants of the passenger compartment. Commercialization of a vehicle with level 5 ADAS capabilities is expected by 2050. Currently, vehicles on the market offer ADAS systems that do not exceed level 3, for which a human driver is expected to be ready to take control of the vehicle at any time in the event of an emergency or failure of the autonomous driving system. ADAS development efforts to date have focused on the design and development of control and artificial intelligence algorithms capable of implementing driver assistance systems based solely on on-board sensors and actuators. The evolution of ADAS systems beyond the third level will require, in the near future, a change of viewpoint, broadening the study from the vehicle agent to an infrastructure forming a digital ecosystem to which autonomous vehicles will belong.

3. Description: The thesis activity will consist of the study, design and development of path planning or vehicle control algorithms that take advantage of information from both on-board sensors and other vehicles or the infrastructure to which the vehicle belongs. The activity will include performing testing and validation in simulated environments and, where applicable, in real scenarios on an experimental infrastructure-laboratory.

INNOVATION LAB (R&D)

1. Title: Modeling, motion planning and control of an autonomous rubber boat.
2. Main scope: Controls for nautical applications.
3. Description: In this thesis, our objective is to develop assistive boat parking systems that can possibly autonomously navigate in a harbor and complete a parking task. So, you will need to develop model-based motion planning and control algorithm for an autonomous rigid inflatable boat. In order to achieve such objective, the following tasks must be accomplished: Modeling and simulation; Low-level motion control; Motion Planning.

AEROSPACE

1. Title: Implementation of a radar system for identification and tracking of space debris by using GNSS bistatic architecture.
2. Main scope: Detection and tracking of space debris.
3. Description: Since many years space debris is the focal point of discussion about space aspects due to its critical impact for future space mission and a concrete risk for the operative ones. Kineton offers the possibility to study and develop possible innovative solutions for space debris, implementing thanks to different programming languages (e.g, Matlab, Python, C++) SW modules for complex scenario simulations, feasibility studies or practical missions usage.

AEROSPACE

1. Title: Implementation of Flight Control Systems for UAV in urban scenarios.
2. Main scope: GNC (Guide, Navigation e Control).
3. Description: Research activities for autonomous navigation of small UAVs in urban scenario are gaining a central role thanks to the possible future applications. The internship activity is based on the acquisition of theoretical/practical competences for the research and development of innovative solutions for the aerospace sector applications in order to enable new possible usages of these technologies. Flight control strategies will be evaluated and implemented to allow autonomous navigation based on the sensed information coming from a support ground infrastructure. Model based

design approaches will be considered for the development of required SW functionalities according to the applicable aerospace sector standards.

MEDIA IT & TELCO

1. Title: Web crawling and semantic analysis to support the identification of pirate video sharing.
2. Main scope: IT/Automation - Web Crawling, Semantic crawler, Web Scraping, Machine Learning.
3. Description: The main purpose of web crawling and web scraping algorithms is to collect unstructured data within the web and manage it so that it can adapt to as many scenarios as possible. Through this thesis we want to create an algorithm able to analyze websites (starting from a blacklist, up to YouTube) use the content starting from the metadata present within the shared videos and analyze them through AI and ML techniques.

MEDIA IT & TELCO

1. Title: App traffic forecasting and dynamic scheduling of advertising campaigns.
2. Main scope: IT/Machine Learning.
3. Description: The candidate will design and create a module capable of predicting traffic peaks in relation to user behaviours such as the selection and purchase of a product.

MEDIA IT & TELCO

1. Title: Sentiment and brand analysis.
2. Main scope: Data Science, NLP, Cloud.
3. Description: sentiment analysis of social channels for user clustering in order to be able to correlate specific advertising brands.

MEDIA IT & TELCO

1. Title: Creating automatic Stories for social networks.
2. Main scope: Data Science, NLP, Cloud.
3. Description: Analysis of channel speech to create automatic summaries to be correlated with music and images and then published on popular social networks.

MEDIA IT & TELCO

1. Title: Analysis and speech extrapolation systems in the media.
2. Main scope: Data Science, NLP, Cloud.
3. Description: Analysis of the speech of the channels, to extract the main topics that are talked about and understand how the audience is related to the topics covered.

MEDIA IT & TELCO

1. Title: Metaverse and Cloud Technologies.
2. Main scope: Virtual Reality, IT, IoT, Cloud.
3. Description: Definition and implementation of solutions in order to design and create digital virtual worlds and/or digital twins. The candidate will be involved in innovative projects in which he will deal with one or more aspects related to research, design and implementation of interactions between users and objects in the virtual space. Among the technologies used are Unreal and Unity, cloud services such as Azure Digital Twin.

MEDIA IT & TELCO

1. Title: Gamification in Industries.
2. Main scope: Gamification, UX/UI, Design & Development.
3. Description: Design of user experiences and development of applications where gamification frameworks and techniques are used in order to increase user engagement, ROI and motivation. The candidate, supported by a market analysis for a specific application domain such as industry, eLearning or

tourism, will be involved in the creation of a web or mobile application using latest technologies and trends like Flutter.

MEDIA IT & TELCO

1. Title: AI for Multiplayer Video Games.
2. Main scope: Gamification.
3. Description: The candidate will deal with the design and the training of the artificial intelligence of NPCs (non-player characters), the system of dialogues and interaction with the environment and real players.

MEDIA IT & TELCO

1. Title: Phygital experience immediacy, immersion, interaction cases and examples of use.
2. Main scope: IT, Broadband, WebMarketing.
3. Description: Detailed description of the new paradigm of business and marketing the PHYGITAL applications in the field of Media IT & Telco.

MEDIA IT & TELCO

1. Title: MAP-T vs MAP-E: how to deal with the ip4 shortage.
2. Main scope: MAP protocols, Network broadband.
3. Description: Analysis of the main solutions on the Italian market, MAP-T (RFC7599) and MAP-E (RFC7597) to address the lack or excessive cost of IPv4 addresses. Advantages and disadvantages of the adopted solutions and sharing methods.

MEDIA IT & TELCO

1. Title: Blockchain applications for smart contracts.
2. Main scope: IT, Cyber Security.
3. Description: Analysis of blockchain technologies and possible applications in various fields, e.g., insurance, finance, notary, healthcare and cyber security. The candidate will have the opportunity to learn programming languages for the creation of smart contracts such as Solidity used by the Ethereum blockchain.