



INTERNSHIPS 2025

HOW TO APPLY FOR AN INTERNSHIP

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All applications must be done through our careers page

IoT – Ref 14981

Please mention the reference for the project(s) you are interested in (e.g. SEC-01, etc.)



What about work permits?

Not a problem to hire Swiss or EU citizens.

For non-UE, only if part of the EPFL academic program (Swiss law)

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NETWORK, HARDWARE AND DATA SECURITY

[\[SEC-01\] DDOS Simulator](#)

Integrated within the Kudelski IoT Advanced Research team, you will develop a prototype of a solution capable of creating a great amount of configured traffic on a network link to test DDoS mitigation systems.

- Do a quick overview of readily available DDoS simulation solutions
- Do a quick overview of readily available packet generation options
- Develop a packet generation solution capable of ultra-fast custom packet generation
- Test and compare that solution with options found in the two first points

Skills and profile:

- Strong understanding of networking, security and linked risks
- Unix C/C++/RUST development
- Bachelor's degree in engineering or equivalent
- Curious and passionate about new technology & security

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	YES

[\[SEC-02\] Leakage characterization of embedded systems](#)

During this internship, you will analyze and identify the most suitable models for the side-channel leakage of widely used microcontrollers (including STM32, ESP32, ATmega, Nordic, RP2040, and so on). The objective is to gain a better understanding of how these chipsets leak information through power consumption and electromagnetic emanations and leverage this knowledge to develop effective cryptographic countermeasures against side-channel attacks.

Skills and profile

- Embedded programming (C/C++)
- High-level programming (Python/Matlab)
- Knowledge about cryptography is a plus

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	YES	-	YES

[SEC-03] Firmware emulation, fuzzing and exploitation

Firmware emulation is a technique to run firmware code (including early bootloader stage) on a virtual environment, a.k.a., emulator. There are many open-source projects, such as FuzzWare, Hoedur, Inception, or HALucinator that attempt to do this with security testing as focus, particularly fuzzing. These tools are mainly based on Qemu, Unicorn/Capstone. The main objective is to improve the state-of-the-art in firmware emulation and fuzzing, by supporting new use cases and platforms.

Skills and profile:

- Basic understanding how MCU and SoC work (CPU and peripherals)
- C/Python/assembly code experience
- Hacking, reverse engineering, CTF experience is a plus

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	-

POST QUANTUM SECURITY

[\[PQS-01\] Quantum hardware Evaluation](#)

This subject aims to provide a state of the art of the performance, scalability and robustness of various quantum hardware platforms, such as superconducting qubits, trapped ions, and photonic systems, in executing quantum algorithms. The study will consider the standard quantum algorithms like Grover's search, Shor's factoring, and quantum machine learning algorithms. The evaluation will focus on metrics such as gate fidelity, coherence time, error rates, and scalability. The feasibility of performing side channel and fault attacks on such kind of technology will also be investigated.

Integrated within the Kudelski IoT Advanced Research team, you will:

- Acquire a high-level view on quantum technology and quantum algorithms
- Use available platforms providing access to quantum computers.
- Investigate and explore a new field of the application of known attacks such as side channel and fault attacks on quantum hardware.

Skills and profile

- Curious and passionate about security
- Quantum algorithms knowledge is a plus.
- Side channel and fault attacks

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	YES

[\[PQS-02\] Extensive range Deep Machine Learning approach based on Google model](#)

Extensive range Deep Machine Learning approach based on Google model [1] and/or a more modular approach [2] applied to PQ algorithm (CRYSTALS-Dilithium) with all its countermeasures enabled.

Develop complex model architecture for DML

[1]: Generalized Power Attacks against CryptoHardware using Long-Range Deep Learning

[2]: Hybrid homomorphic encryption resistance to side-channel attacks

Skills and profile

- Experience in Machine Learning
- High-level programming (Python/Matlab)
- Knowledge about cryptography is a plus

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	YES

[PQS-03] Falcon Crypto Evaluation

Advances in quantum computers put at risk classical asymmetric cryptography such as RSA and ECC. Several algorithms are proposed by new FIPS standards and NIST competition. Falcon ([Falcon \(falcon-sign.info\)](#)) also called FN-DSA is one of them.

This algorithm will be deployed in embedded devices subject to constraint performances and physical attacks such as side channel and fault attacks. Accelerating and ensuring this implementation will be key for IoT devices and System on Chip (SoC).

Integrated within the Kudelski IoT Advanced Research team, you will:

- Acquire a high-level view on quantum safe algorithms and operations in polynomial rings.
- Understand the need for optimized and secure implementation.
- Investigate existing solutions
- Implement one of the most promising techniques and validate the implementation in the laboratory.

Skills and profile

- Implementation in C or Assembly in RISC-V
- Quantum resistant cryptography (or PQC) knowledge is a plus.
- Side channel and fault attacks on cryptography
- Curious and passionate about cryptography and security

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	YES

[PQS-04] Post Quantum Algorithm in a white box crypto approach

Explore if new Post quantum algorithms such CRYSTALS-Kyber, CRYSTALS-Dilithium can be implemented in a white box approach.

The main objective is to be able to resist, a few days at least to a DCA (Differential computation Analysis). Among other tasks you will have to:

- Select the tools for DCA measurement (Intel profiling tool PIN, internal MATLAB tool, true physical device)
- Develop new specific attack model

Skills and profile

- Good knowledge of x86 compilation tools and assembler/machine code
- Knowledge about cryptography is a plus
- High-level programming (Python/Matlab) is a plus

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	YES

AGRICULTURE

[AGR-01] Smart Irrigation Algorithm

Integrated within the Kudelski IoT Advanced Research team, you will work on designing, developing, and evaluating a smart irrigation algorithm. This project aims to optimize water usage in agricultural fields by leveraging soil moisture sensors, weather forecast data, and potentially Machine Learning techniques.

- **Test Setup Design:** You will have the freedom to choose a test setup for the project. This could involve working in an agricultural field, a greenhouse, or any other controlled environment. You will deploy soil moisture sensors and collect relevant data from the test site.
- **Algorithm Development:** Using the data collected from the sensors and weather forecasts, you will design a smart irrigation algorithm that minimizes water usage while ensuring optimal plant health. The algorithm should dynamically adjust irrigation levels based on moisture data and forecasted weather conditions.
- **Data Collection & Analysis:** Gather and manage data from soil moisture sensors, weather APIs, and any additional relevant data sources. You will analyze this data to identify patterns that can be leveraged to optimize irrigation strategies.
- **Efficiency Assessment:** Evaluate the algorithm performance by assessing water consumption, plant growth, and soil health compared to traditional irrigation methods. You will quantify the water savings achieved by the solution.
- **Machine Learning Integration:** In the second phase of the project, you may explore the use of machine learning techniques to further enhance the algorithm by predicting irrigation needs based on historical data and advanced weather patterns.
- **Report and Documentation:** Prepare documentation of the development process, results, and the effectiveness of the algorithm. Present your findings to the team and make recommendations for further improvements.

Skills and profile

- Currently pursuing a degree in Computer Science, Agricultural Engineering, Environmental Science, or a related field.
- Proficiency in programming languages like Python, R, Java, or C/C++.
- Experience with frameworks such as TensorFlow, PyTorch, or Keras.
- Skills in handling and analyzing time series data.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	-

[\[AGR-02\] CO2 Sensing for sustainability](#)

This project aims to explore innovative methods for measuring CO2 levels in agricultural fields.

The project's goal is to explore effective techniques for CO2 monitoring and to provide farmers with actionable insights to improve sustainability in farming practices. This research-driven project will contribute towards reducing greenhouse gas emissions in agriculture, a key challenge for climate-smart agriculture.

- **Research & Development:** Explore and evaluate various CO2 sensing technologies, including sensors and remote sensing systems, to assess their applicability in monitoring CO2 emissions in agricultural fields.
- **Field Data Collection:** Assist in designing and implementing experiments for CO2 data collection in selected agriculture areas. This may involve both lab-based work and field visits.
- **Data Analysis:** Process and analyze CO2 data to identify trends and provide insights into carbon footprints of different farming practices.
- **Technology Evaluation:** Research and recommend appropriate CO2 sensors, tools, or platforms that are cost-effective, efficient, and scalable for use in agriculture.
- **Recommendations for Farmers:** Collaborate with the project team to develop recommendations and strategies for farmers to optimize farming practices based on CO2 emission data.

Skills and profile

- Basic knowledge of data collection and analysis methods.
- Passion for sustainable agriculture, climate change mitigation, and environmental protection.
- Familiarity with CO2 sensing technologies or environmental monitoring systems is a plus
- Experience with software for data analysis (e.g., Python, R, Excel) is a plus.

Master Thesis POSSIBLE	Software Dev. YES	Hardware Dev. -	Machine Learning -	Security -
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[AGR-03] Weather Trends Impacts on Crops and Yield

This project aims to analyze historical and real-time weather data to assess the effects on crop growth and yield, ultimately providing farmers with actionable recommendations to improve their farming strategies and adapt to climate variability.

- **Data Collection & Analysis:** Collect, organize, and analyze historical weather data (temperature, precipitation, humidity, etc.) and crop yield records for various regions. Use this data to identify trends and correlations between weather conditions and agricultural output.
- **Model Development:** Assist in developing models that predict crop yield based on weather patterns and forecasted climate conditions.
- **Research & Literature Review:** Conduct a comprehensive review of current research and technologies related to the impacts of weather trends on crop productivity.
- **Farmer Recommendations:** Work with the team to translate research findings into practical recommendations for farmers. This includes advice on planting schedules, irrigation, crop selection, and other strategies to mitigate the impact of adverse weather conditions.
- **Climate Risk Assessment:** Contribute to the development of risk assessments for farmers, helping them identify vulnerabilities to changing weather conditions and plan for climate resilience.

Skills and profile

- Familiarity with weather data analysis, climate models, or crop simulation models.
- Experience with data analysis tools and software (e.g., Python, R, GIS, Excel).
- Basic understanding of agricultural practices and crop growth cycles is a plus.
- Ability to conduct literature reviews, analyze datasets, and interpret results effectively.
- Interest in the intersection of climate, agriculture, and sustainability, with a focus on improving farming outcomes in the face of climate change.

Master Thesis POSSIBLE	Software Dev. -	Hardware Dev. -	Machine Learning YES	Security -
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[\[AGR-04\] Satellite Imagery interpretation and usage](#)

Integrated within the Kudelski IoT Advanced Research team, you will work on satellite imagery interpretation and analysis for agricultural applications. This internship provides hands-on experience in leveraging satellite data for optimizing agricultural practices, monitoring crop health, estimating crop yield, and enhancing sustainability.

Key responsibilities

- Gather satellite and field data, perform statistical analysis, and derive insights that can help in predicting crop yields, monitoring soil moisture, modelling soil organic carbon, ...
- Define and refine algorithms for processing satellite imagery, including calculating vegetation indices like NDVI, and identifying key trends in crop health and soil conditions.
- Contribute to integrating machine learning models that predict agricultural outcomes, such as yield potential or soil carbon content, based on satellite data patterns.
- Implement data processing pipelines and satellite data analysis and observation tools, optimizing workflows to ensure timely and accurate results.
- Document methodologies, results, and key insights in detailed reports.

Skills and profile

- Currently pursuing a degree in Computer Science, Agricultural Engineering, Environmental Science, or a related field.
- Proficiency in programming languages like Python, R, Java, or C/C++.
- Experience with frameworks such as TensorFlow, PyTorch, or Keras.
- Skills in handling and analyzing time series data.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	-

[\[AGR-05\] Beehive temperature monitoring](#)

We are looking for a motivated and creative IoT Development Intern to join our team and develop a prototype for hive temperature monitoring. This is a unique opportunity to work on a project that combines the fields of IoT, environmental science, and sustainable agriculture.

You will be working on developing a prototype device that can be inserted into a beehive to monitor and record temperature data during winter. The goal is to help beekeepers maintain optimal conditions for hive survival by using data-driven insights.

- Design and prototype an IoT device capable of accurately monitoring and transmitting temperature data from within a beehive.
- Collaborate with engineers and environmental scientists to define technical requirements, including sensor selection, data transmission methods, and energy efficiency.
- Work on low-power solutions suitable for extended use in cold weather conditions.
- Develop a system for real-time data collection, cloud storage, and visualization through a web or mobile application.
- Conduct tests to ensure reliable sensor accuracy, data integrity, and device durability in various weather conditions.
- Document the development process, troubleshooting steps, and outcomes to guide future iterations.

Skills & Qualifications:

- Currently pursuing a degree in Computer Science, Agricultural Engineering, Environmental Science, or a related field.
- Familiarity with IoT devices, sensors, and microcontroller programming (e.g., Arduino, ESP32, Raspberry Pi).
- Basic knowledge of temperature sensors and wireless communication protocols (e.g., Bluetooth, Wi-Fi, LoRa, or Zigbee).
- Experience with data logging and cloud storage systems (AWS, Firebase, or similar).
- Problem-solving skills and the ability to troubleshoot hardware and software integration issues.
- Interest in environmental sustainability, agriculture, and beekeeping is a plus.
- Strong communication skills and ability to work both independently and collaboratively in a team environment.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	YES	-	-

ASSET TRACKING

[ATR-01] Triangulation and Trilateration for Positioning Tags

This project focuses on improving the accuracy and efficiency of positioning tags (emitters) in indoor environments for locating small objects within a building. These tags emit signals, which are received by gateways (receptors) that measure the signal strength. The company has already manufactured the tags and gateways, but the goal is to enhance the positioning capabilities using triangulation and trilateration techniques. By leveraging multi-antenna systems and addressing multipath propagation effects, the project aims to reduce positioning errors and boost data reliability. With the potential for mobile gateways (e.g., a phone app acting as a gateway), this system will offer dynamic positioning solutions.

A simpler solution for positioning tags will complement the existing zoning system, which relies on supervised machine learning and carries data collection costs. This new development will lead to more efficient tracking and resource management in applications like industrial IoT or asset tracking.

Skills and profile

- **Signal Processing:** Proficiency in signal processing, especially with RF signals.
- **Mathematics:** Strong foundation in geometry and trigonometry for applying triangulation and trilateration.
- **Programming:** Experience in Python for algorithm development and data processing.
- **RF Systems Knowledge:** Familiarity with RF systems, including multipath propagation and signal attenuation.
- **Curiosity and Innovation:** A passion for exploring and improving new technologies.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	-

[\[ATR-02\] Bluetooth Diagnostics of Battery-Powered Wireless Devices](#)

RecovR is an innovative asset tracking and theft recovery solution designed for car dealers and car users. With 500,000 devices already deployed in the US, collecting data through LTE, we are at the forefront of IoT technology.

We are offering an exciting, embedded software internship within the Asset Tracking team of the Kudelski IoT Division. This project focuses on developing a solution for diagnosing device issues through a Bluetooth interface. The initial task will involve interfacing with a PC, with the potential to extend into developing a simple mobile application or web app to extract, analyze, and display debugging information.

- Analyze and propose a solution to exchange diagnostic information through the device’s Bluetooth interface in an efficient and secure manner.
- Implement a proof of concept on our device to demonstrate the feasibility of the designed solution.
- Collaborate with engineers, product managers, and other stakeholders to validate the use cases and the proposed solution.

Skills and profile:

- Proficiency in embedded development, including C programming and short-range network protocols such as Bluetooth Low Energy (BLE).
- Experience in mobile app development (e.g., Flutter, React) is a plus.
- Knowledge of Python programming.
- Familiarity with GitLab for version control and collaboration.
- Strong analytical skills, autonomy, and proficiency in object-oriented software and technical skills.
- Excellent communication skills and the ability to work effectively in a multidisciplinary team.
- A proactive mindset and a keen interest in IoT and asset tracking technologies.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	-

[ATR-03] Short-Range Local Wireless Network Development

RecovR is an innovative asset tracking and theft recovery solution designed for car dealers and car users. With 500,000 devices already deployed in the US, collecting data through LTE, we are at the forefront of IoT technology.

We are offering an exciting, embedded software internship within the Asset Tracking team of the Kudelski IoT Division. This project focuses on the study and development (Proof of Concept) of a short-range local wireless network (BLE, DECT-NR+) capable of aggregating data and reporting it via a dedicated gateway (WiFi endpoint or LTE interface) to address local connectivity issues.

- Analyze and propose a solution to create a short-range local wireless network running on our Nordic platform.
- Analyze and propose a method to exchange aggregated reports from different devices through a single gateway.
- Implement a proof of concept to demonstrate the feasibility of the proposed solution.
- Collaborate with engineers, product managers, and other stakeholders to validate the use cases and the proposed solution.

Skills and profile:

- Proficiency in embedded development, including C programming and short-range network protocols such as DECT-NR+ and BLE.
- Knowledge of Python programming.
- Familiarity with GitLab for version control and collaboration.
- Strong analytical skills, autonomy, and proficiency in object-oriented software and technical skills.
- Excellent communication skills and the ability to work effectively in a multidisciplinary team.
- A proactive mindset and a keen interest in IoT and asset tracking technologies.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	-

[ATR-04] Reliable BLE Communication Development

RecovR is an innovative asset tracking and theft recovery solution designed for car dealers and car users. With 500,000 devices already deployed in the US, collecting data through LTE, we are at the forefront of IoT technology.

We are offering an exciting internship focused on the study and development of a mobile application capable of maintaining reliable BLE communication with a tag from our product portfolio. This connection needs to remain functional when the app is running in the foreground, background, and potentially in sleep mode.

- Analyze and integrate the in-house BLE SDK library to identify and present limitations regarding BLE link reliability.
- Propose solutions to ensure the BLE link remains active under various conditions (foreground, background, and when the app is killed).
- Implement a proof of concept to demonstrate the feasibility of the proposed solutions.
- Collaborate with engineers, product managers, and other stakeholders to validate the use cases and the proposed solutions.

Skills and profile:

- Proficiency in mobile app development for both iOS and Android platforms.
- Knowledge of BLE standards, BLE mobile stack.
- Experience with embedded software development (C-language, Nordic platforms).
- Knowledge of Python programming.
- Familiarity with GitLab for version control and collaboration.
- Strong analytical skills, autonomy, and proficiency in object-oriented software and technical skills.
- Excellent communication skills and the ability to work effectively in a multidisciplinary team.
- A proactive mindset and a keen interest in IoT and asset tracking technologies.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	-

[\[ATR-05\] Positioning logic server component for an IoT Asset Tracking Platform](#)

We are offering an exciting backend development internship within the Asset Tracking team of the Kudelski IoT Division. This project focuses on the development of a microservice component aimed at implementing a positioning logic based on data reported from asset tracking devices. The purpose of the logic is to compute a position according to criteria such as accuracy or reliability in an efficient and cost-effective way. The positioning microservice shall be deployed in an Amazon Web Service (AWS) environment.

- Analyze customer needs and design the positioning logic which fits these needs
- Implement and deploy the AWS based component within the existing services of the Asset Tracking Platform
- Define and run a test strategy to validate the positioning logic
- Collaborate with engineers, product managers, and other stakeholders to validate the use cases and proposed solution.

Skills and profile:

- Knowledge in backend development and testing languages (Java, Python, ...)
- Knowledge in AWS services (Lambda, Fargate, S3, ...).
- Knowledge in microservice deployment tools
- Basic knowledge in Machine Learning concepts is a plus
- Autonomy, Analytic and Oriented object soft and technical skills are required.
- Strong communication skills and the ability to work in a multidisciplinary team.
- A proactive mindset and a keen interest in IoT and asset tracking technologies.

Master Thesis POSSIBLE	Software Dev. YES	Hardware Dev. -	Machine Learning -	Security -
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TELECOMMUNICATION

[\[TEL-01\] Satellite Communication for IoT](#)

Integrated within the Kudelski IoT Advanced Research team, you will evaluate different IoT Satellite communication offerings, test specialized hardware and develop a test solution.

- Do a quick overview of latest available Satellite IoT options
- Evaluate EchoStar current EVK
- Evaluate Kineis KIM-2 EVK and compare with previous KIM-1
- Do an overview of STM32WL MCU and evaluate its sub-ghz Software Defined Radio
- If possible, implement EchoStar on the STM32WL SDR and compare results with EchoStar provided EVK
- If possible, implement KIM-2 on the STM32WL SDR and compare results with KIM-2 provided EVK

Skills and profile:

- Embedded C/C++ development
- Satellite / Radio / RF knowledge is a plus.
- Bachelor's degree in engineering or equivalent
- Curious and passionate about new technology

Master Thesis POSSIBLE	Software Dev. YES	Hardware Dev. -	Machine Learning -	Security YES
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PRODUCT DEVELOPMENT SUPPORT

[PDS-01] Full Stack IT Infrastructure Management Tool Development

We invite passionate Bachelor or Master level students in Computer Science to join us in developing a comprehensive management tool for our AWS-based lab environments. This internship aims to streamline infrastructure management and enhance operational efficiency.

The intern will spearhead the development of a full-stack tool comprising:

- **Backend Development:** Designing data extraction mechanisms to gather environment details from AWS.
- **UI Development:** Creating an intuitive interface to visualize and manage deployed environments, including software version details.
- **Infrastructure-as-Code Integration:** Utilizing Terraform scripts to facilitate seamless configuration changes and deployments.

This internship presents a unique opportunity to:

- Engage in end-to-end project development, from cloud infrastructure deployment to UI design.
- Gain hands-on experience with AWS services, including networking, security, and IAM.
- Explore containerization technologies and serverless development practices.
- Collaborate within a dynamic, fast-paced team environment, fostering growth and skill enhancement.

Skills and profile

- AWS or Azure cloud services
- Network security and cloud access management.
- Containerization technologies
- Web application development
- Terraform and infrastructure-as-code principles.
- Familiarity with serverless architecture is a plus.
- Currently pursuing a bachelor’s or master’s degree in computer science or a related field.
- Proficient in English, both spoken and written.
- Strong collaborative skills and ability to thrive in a diverse team environment.
- Motivated, curious, and passionate about leveraging technology to solve real-world challenges.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	-	-

[PDS-02] LLM Integration and Training for a Consumer Product Application

This internship aims to develop a user-friendly interface (mobile app and web-based) that integrates a Large Language Model (LLM) to provide quality information on consumer products, offer usage assistance, and facilitate purchase decisions. Additionally, the intern will train the selected LLM using specific product-related existing data or data gathered during the internship. The project will likely focus on one of the following product categories: Food & Beverage, Consumer Electronics, or Premium and Luxury Fashion.

- Research and select an appropriate LLM based on accuracy, adaptability, and ease of integration in collaboration with the Kudelski AI team.
- Implement the selected LLM via API in an existing mobile or web application to support real-time interaction for users seeking product-related information.
- Research and identify relevant data sources for the chosen product category.
- Curate and preprocess this data to create a dataset suitable for LLM training.
- Ensure that the data is accurate, representative, and of high quality to improve the model's responses.
- Fine-tune the selected LLM using the curated dataset to specialize in the chosen product category.
- Adjust the training process to ensure the model can provide product information, usage advice, and purchasing guidance in a clear and relevant manner.
- Implement iterative testing to improve the accuracy and relevance of the model's responses.
- Develop a user-friendly interface for mobile (Android/iOS) or web platforms where users can interact with the LLM.
- Build a back-end system module on top of the existing backend to manage user requests, handle LLM interactions, and securely store user data.
- Test the LLM's responses for relevance, accuracy, and quality, focusing on real-world usage scenarios.
- Document the entire development and model training process, including data collection, fine-tuning steps, and integration details.

Skills and profile

- Proficiency in Python, JavaScript, or TypeScript for API integration and LLM customization.
- Familiarity with HTML/CSS and frameworks like React.js for front-end development.
- Familiarity with data preprocessing, data augmentation, and dataset creation.
- Knowledge of tools for data scraping to gather product-related information.
- Familiarity with LLM APIs
- Understanding of machine learning and natural language processing (NLP) principles for fine-tuning and training models.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	-

[PDS-03] Development of Product Awareness Mobile App Using LLM Techniques

This internship project's main objective is to develop a mobile application that uses LLM techniques to enhance employee awareness. The app will provide instant access to product details, features, and capabilities, ensuring that employees are well-informed and capable of effectively communicating product information.

The intern will be responsible for the following tasks:

- 1. Research and Analysis:**
 - Conduct a thorough analysis of the company's product portfolio.
 - Identify key features and capabilities of each product.
 - Understand the requirements and expectations of employees in terms of product knowledge.
- 2. Application Development:**
 - Design and develop a user-friendly mobile application for both Android and iOS platforms.
 - Integrate LLM techniques to provide detailed and accurate product information.
 - Implement a search function to allow employees to find specific product details easily.
- 3. Testing and Deployment:**
 - Conduct thorough testing of the application to ensure functionality and user experience.
 - Deploy the application on the company's internal platforms.
 - Provide documentation and training materials to support the use of the application.

Skills and profile

- Enrolled in a master's program in computer science, Information Technology, or related fields.
- Proficiency in mobile app development for Android and iOS platforms.
- Interest and knowledge of LLM techniques and frameworks (Prompt engineering, Retrieval Augmented Generation, LLM models including GPT's, Embedding models, Langchain or Llamaindex, HuggingFace, ...).
- Good experience working with scripting languages (e.g., Shell, Python).
- Familiarity with database management and cloud services (AWS services and Microsoft Azure OpenAI Service).
- Team player, fluent in English, and ability to communicate complex LLM capabilities and limitations to non-technical stakeholders

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	-

[PDS-04] Development of Sales Prediction and Demand Forecasting Application

The primary objective of this internship project is to develop an application designed to predict sales and drive demand forecasting using advanced machine learning models. This internship provides a unique opportunity to apply theoretical knowledge to real-world business challenges, collaborate with experts in the field, and gain hands-on experience with state-of-the-art technologies.

The intern will be responsible for the following tasks:

- **Research & Development:** Conduct research on existing sales prediction models and identify opportunities for improvement using machine learning and reinforcement learning techniques.
- **Model Development:** Develop and train machine learning models that predict sales and forecast demand based on historical data, market trends, and other relevant factors.
- **Reinforcement Learning:** Implement reinforcement learning algorithms to dynamically adjust and optimize the model's performance based on feedback and changing market conditions.
- **Data Analysis:** Analyze large datasets to identify patterns, trends, and insights that can improve model accuracy and reliability.
- **Application Development:** Integrate the models into a user-friendly application, ensuring scalability, efficiency, and ease of use.
- **Testing & Validation:** Validate the accuracy of the models through rigorous testing and refine them based on the results.

Skills and profile

- Enrolled in a master’s program in computer science, Information Technology, or related fields.
- Proficiency in mobile app development for Android and iOS platforms.
- Interest and knowledge of Prediction and Statistical Models techniques and frameworks
- Experience with data analysis and visualization tools (e.g., Pandas, NumPy, Matplotlib)
- Good experience working with scripting languages (e.g., Shell, Python).
- Familiarity with database management and cloud services (AWS services and Microsoft Azure Service).
- Team player, fluent in English, and ability to communicate complex model capabilities and limitations to non-technical stakeholders.

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	-

[PDS-05] Autonomous LLM-Powered Testing Agent

We are offering an exciting internship focused on leveraging AI technologies to design and implement a fully autonomous test framework that interacts deeply with an LLM agent. The goal of this framework is to autonomously execute a set of test cases against a dedicated application under test (Mobile or Web UI).

During this internship, you will design and develop four main components, each interacting with the LLM agent:

- **Planning Component:** Provides a set of instructions to the LLM Agent based on the current state and the last action taken.
- **Memory Component:** Stores the history of previous actions (both long and short term) to provide the LLM with the right memory history, helping it take the best possible actions based on what has been learned by the test framework.
- **Tooling Component:** Acts as the "eyes" of the LLM by providing the possible actions that can be performed by a system at a specific point in time.
- **Action Component:** Acts as the "hands" of the LLM, analyzing the outcome of the LLM and performing the various possible actions on the system under test.

Once these components are assembled, the test framework will receive a test case as input. The Planning Component will dispatch the necessary elements to the LLM Agent. Based on these elements, the Memory and Tooling components will provide the necessary information to help the LLM take the most suitable actions. Initially, the system may fail, but it is expected to improve over time thanks to the evolution of its Memory component. After multiple iterations, the test framework should be able to autonomously run the provided test case and deliver the expected outcome. The exactitude of the outcome will be verified based on test case expectations. Ultimately, this test framework is expected to become autonomous over time, recording various action sequences to generate automated test cases.

Skills and profile:

- Proficiency in Machine Learning and Deep Learning
- Strong Python programming skills
- Bachelor's degree in engineering or equivalent
- Curiosity and passion for new technologies

Master Thesis	Software Dev.	Hardware Dev.	Machine Learning	Security
POSSIBLE	YES	-	YES	-

[PDS-06] Develop an AI-Based Test Case Migration Engine

We are offering an exciting internship within the Asset Tracking team of the Kudelski IoT Division. This project focuses on leveraging AI technologies to automate the migration of test cases for embedded devices. The project involves developing an engine that takes existing test cases as input and generates Python code to replace them. By the end of the internship, the goal is to have successfully migrated all test cases using this AI-based engine. During this internship, you will be interacting with docker, GitLab, LLM AI technologies.

- Develop and implement an AI-based engine for test case migration.
- Convert existing test cases into Python methods.
- Ensure the accuracy and efficiency of the migrated test cases.
- Collaborate with the team to integrate the new test cases into the test harness.

Skills and profile:

- Develop and implement an AI-based engine for test case migration.
- Convert existing test cases into Python methods.
- Ensure the accuracy and efficiency of the migrated test cases.
- Collaborate with the team to integrate the new test cases into the test harness.

Master Thesis POSSIBLE	Software Dev. YES	Hardware Dev. -	Machine Learning YES	Security -
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