IoTrain

Master of Engineering in Internet of Things

About the project

According to the survey of World Economic Forum, IoT aims to train one of the top technological drivers of change for the future of jobs, employment, skills and workforce strategy in the 4th Industrial Revolution. Forbes considers big data, data analytics, embedded smart sensors, remote monitoring systems, and machine learning as top 5 engineering skills in 2020. In order to prepare the society for such an enormous diversity, modernizing Higher Education (HE) towards integrating IoT skills for engineers is an extreme need. Consequently, providing a series of educational training that improves competitiveness and employability of engineers by 2025 is a must to address. The technological revolution happening by IoT as well as associated skills and expertise gaps by 2020 are not limited to Europe, but also influencing developing countries. As evidence, the middle-east and Africa is expected to invest USD 14.3 Billion on IoT by 2020 to keep up with the fast pace of development in this regard. The main goal of the IoTRAIN project is to achieve the modernization and internationalization of higher education in Iran, taking into account the huge changes introduced by Internet technologies in society and business, and to design, develop and enact teaching, peer-production and continuous improvement processes. IoTRAIN is particularly designed to target the growing demand of professional IoT skills by enhancing the IoT-related trainings in Iranian HE institutions (HEI). In this regard, IoTRAIN covers a careful analysis of existing and future technological gaps in IoT and provides required trainings towards improving competitiveness of future Iranian engineers. IoTRAIN delivers an IoT competence model consisting of the state-of-the-art skills in IoT at the European and international standard levels. The provided model adopts up-to-date training materials of the European partners of the project and provides necessary high-level training with the aim of improving competitiveness of future Iranian. Furthermore, IoTRAIN delivers a Digital Engineering competence model consisting of the state-of-the-art skills in digitalization for engineers and experts following European and international standards.

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Disclaimer

All publications shall include the following statement to indicate that foreground was generated with the assistance of financial support from the European Union:

An internal review process is established to perform a quality assessment of project deliverables prior to submission to the EC. The internal review process by the Quality Committee (QC) is used to improve the overall quality of the work/meetings/events and to ensure that results are useful for achieving the overall project results. Output from these technical reviews will be documented in a formal report including acceptance or non-positive recommendations from the reviewing team. Also, for the events such as hackathons and meetings, the reviewer is responsible to carefully supervise the quality and planning of the events and their venue/online platform. As a general rule, each project partner shall review his own results before transmitting them to someone else. The Deliverable Leader will be the first instance to perform a quality control of deliverables. Further, all project deliverables will undergo a quality control of the Deliverable Reviewers (QC). The process can be seen in figure below that defines a detailed internal review process for project deliverables including the reviewers of the deliverables, the stages at which a review will take place and providing advice to reviewers for an effective review process.

Purpose of the document

This document aims to provide a sort of requirement analysis on already existing modules and required modules for having a complete IoT curriculum.

Work Package 2
(Course Development)

The course syllabus preparation within the new Master of Engineering in Internet of Things represents the foundational work in design of the program structure and course materials development. The activity has bridged the work carried out in the IoTrain project between WP1 – Preparation and WP2 – Development work packages. Deliverables D1.4 „IoT Trainings Gap Identification Report" and D1.5 „Course Development Plan."

The consortium meetings in Bucharest (May 2022) and Siegen (August 2022) provided ample opportunities for hands-on collaboration between the project partners and led to an acceleration of the course syllabi finalization.

The contents of each course syllabus covers the following main categories: general course information, course description and goals, learning outcomes and competencies that the course develops, teaching-learning methods, evaluation methods, text books and content resources and recommended laboratory equipment, software and tools.

The final list of courses includes 23 courses that are grouped into technical topics, as follows:

- software Engineering (SWENG): IoT Applications and Mobile Programming, Web of Things and Semantic Web, Advanced Software Engineering in IoT – 3 courses;

- System and Network Security (SNSEC): Security and Privacy in IoT, Hardware Security of Embedded Systems – 2 courses;

- Communication Systems (COMM): IoT Communication Technologies – Theory, IoT Communication Technologies – Lab – 2 courses;

- IoT Platforms and Architectures (IOTA): Dependable and Fault Tolerant Systems, Energy Efficient Computing Architectures for IoT – 2 courses;

- Computer Networks and Protocols (CNET): Advanced Distributed Computing for IoT, IoT protocols and Platforms – 2 courses;

- Intelligent and Data-Driven Systems (IDDS): Machine Learning and Deep Learning for IoT, Big Data Management – 2 courses;

- Cyber-physical and Industrial Systems (CPIS): Development of Embedded Systems using FPGAs, Advanced Embedded and Real-Time Systems, Industrial IoT – 3 courses;

- Applications of IoT (AIOT): Smart Systems and Applications, Virtual Reality and Metaverse – 2 courses;

- Management (MGM): Entrepreneurship and Professional Practice, Innovation and Technology Management – 2 courses;
- Project/Internship, Seminar and Thesis (PRJ): Internship, Seminar, Thesis – 3 courses.

Main challenges encountered within this activity have been related by informing the local and national accreditation process, with relevant European (Bologna process) regulations. Each partner country university has been provided with the flexibility to accommodate specific accreditation requirements by adjusting the number of units, teaching load and the breakdown of the hours' schedule according to their particular needs. This was performed while keeping an overall unitary structure of the IoTRAIN master program.

The technical contents of the course syllabi are a key reference, on a chapter-by-chapter basis, in the course materials development process that will lead to the quality finalization of D2.2 Final version of courses" deliverable which will be tested during the initial summer schools that are planned in the project, in Iran and Iraq respectively.

IoT winter school in Ahvaz
January 21st - 28th, 2023
Meeting Location: Shahid Chamran University of Ahvaz, Ahvaz, IRAN

With the accreditation of the Master of Engineering in IoT program in Iran and Iraq by the IoTrain project partners, the participants in the IoT winter school in Ahvaz will become familiar with the new program and its various courses, and get hands-on experience with some IoT technologies and products in practical workshops.

The Winter School in Ahvaz, as part of the IoTrain project (D2.4) was organized by Shahid Chamran University of Ahvaz from January 28 to 31, 2023. The school held on SCU campus in Ahvaz, attracted nearly 50 participants from industry and academia, and included a variety of activities such as project report, keynote speeches, discussion of course contents, industry demos, hands-on workshop, and industrial plant visit. The meeting was held in the Faculty of Letters and Humanities building.

In the opening ceremony, the university and local officials talked about the importance of IoT and smartification in economy and education. Then Dr. Rashti from SCU presented a report on the IoTrain project and the winter school program. His talk was followed by a keynote speech on IoT and Digital Economy by Dr. Lotfi from Iran's Science and Technology vice presidency.

The presentation and discussion of IoT program courses and their content started on the same day. Professors from Iranian partner universities involved in preparation and review of the course content (i.e., SCU, USB, IAU and IBS) presented and discussed the slides prepared for the courses. Beside course content discussions, two local IoT startup companies presented technical details of their products, providing some practical hints on product development to IoT enthusiasts among the school participants.

After the course content and startup presentations, the group visited a PLC-controlled industrial plant designed and manufactured by SCU professors and engineers. At the plant, the school participants became familiar with the smartification methods of the AI-based PLC control software.

The last day of the school was dedicated to a hands-on IoT workshop, where the participants, mostly students, were guided to create a complete IoT solution on

Arduino-based boxes built by the SCU team. The workshop was conducted by the SCU-based WiniApp group and included experiments with hardware, IoT platform setup, data acquisition and programming.

At the end of the winter school, an equipment tendering meeting was held by the PMB from Iranian partners. In this meeting, the board members discussed potential roadmaps to the proposed joint-tendering method led by IBS.

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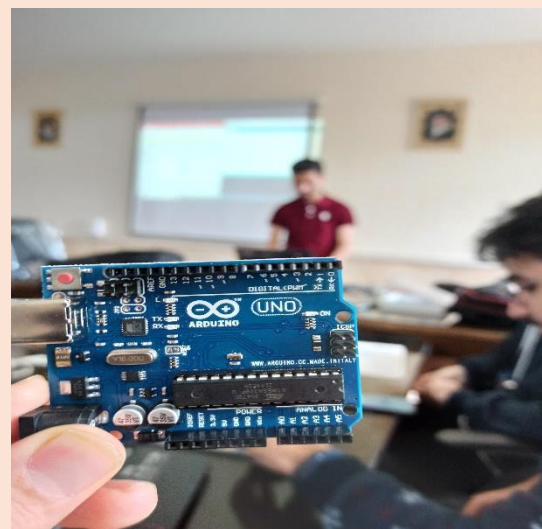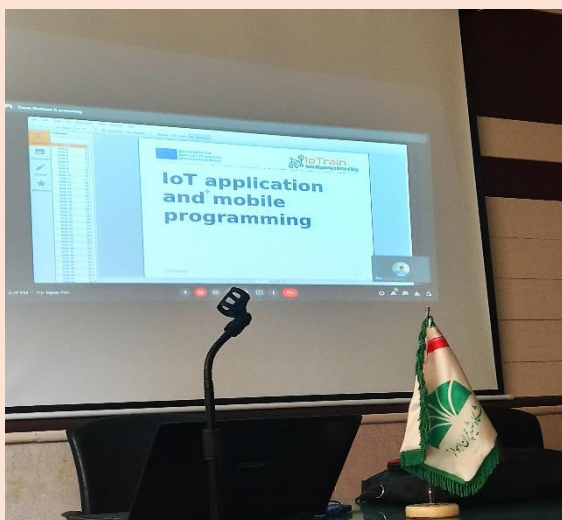
Work Package 3
(Quality Control and Monitoring)

WP3 in IoTrain project is dedicated to quality control and monitoring the project's progress towards providing high quality training materials in the domain of Internet of Things (IoT) as well as properly equipping the Iranian and Iraqi Higher Education (HE) staffs. The University of Manchester is the WP3 leader and all project partners have been involved in the quality and progress reporting and monitoring.

We have monitored the project progress and have done the questionnaires about quality of self-assessment, reviewer assessment, public session, and consortium meeting assessment. According to the monitoring, the project has achieved the following progresses and reaches the following status despite various difficulties:

- WP1 has been completed. This is an important milestone and paves the way for the smooth start for WP2. D1.1 – D1.5 have been well completed. The reviewer assessment questionnaire about D1.5 shows it gets the highest score (i.e., score 5) in terms of its overall quality, objective clarity, main key topics, technical quality, social aspect, educational objective, and innovative design. The average quality score is 4.73.

- WP2 is in smooth progress. After discussion and course selection, syllabuses have been designed and teaching slides are under preparation.

- WP 3 has made the necessary progressed. The deliverable of quality control and monitoring plan (D3.1) has been completed. Minutes of meeting of 1st quality monitoring meeting (D3.2) is completed, and D3.3 is also completed.

- WP 4 has progressed well overall. In the reviewer assessment questionnaire, all criteria have score 4 or 5 (5 is best). The average score considering both quality of deliverable and report quality is 4.73.

- WP 6 has been managed very well overall and the monthly meetings are well organized and recoded. D6.1 – D6.4 has well completed. Various difficulties have been overcome, and the project now has come to the shape and progressed smoothly. The average quality score is 4.87, which means the overall quality of WP6 is satisfying.

The 1st Management and Project Progress Meeting (Iran Meeting) has been organized and completed. The meeting was held successfully in Iran between 18 -20 Dec 2021 face to face. According to the questionaries', 87.4% positive or strong positive feedback is obtained. The IoT Public Session – Seminar in IoT during the meeting was also very well organised with 88.5% positive or strong positive feedback based on the assessment questionaries. One of the most important outcomes from the Iran meeting is that the great importance of accreditation has well recognized and great effort toward accreditation currently under the way.

The 1st Project Annual Quality Monitoring Meeting (Romania Meeting) has been organised and completed. The meeting was held successfully in Romania from 15th to18th May 2022 face to face along with the Course Development Hackathon. 95% is positive or strong positive feedback based on the assessment questionaries, in which 66% is strong positive, 29% is positive, and 5% is neutral.

The main risks and challenges which need more efforts and addressed are as follows:

- The project has progressed behind the schedules due to various difficulties (in particular the delay for Iraq partners to join the project). This has been one of the main issues with the project, but we have been made up the lost time recently.

- For the social objective, the measures for involving vulnerable groups in the project activities are inadequate. In addition, the gender equity issues are not clearly integrated in the project plans. Therefore, more efforts and considerations are needed.

- Further to the social objective, comparing with EU and UK, the regional difference and financial affordability in Iran and Iraq are much serious issues faced by many Master students and so leads a large group of disadvantaged participants. Therefore, serous efforts and considerations are needed.

The improvements to address the above issues have been planned and are being implemented.

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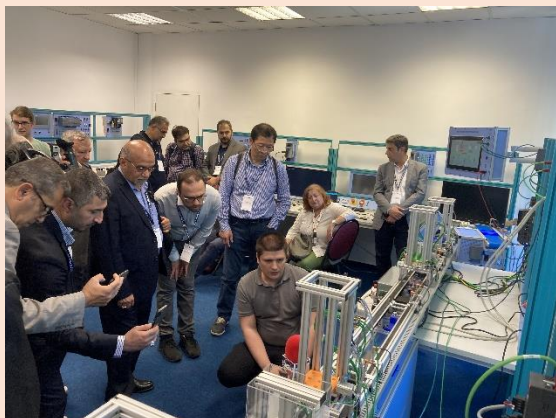
Work Package 4
(Dissemination)

1- Dissemination policy and plan :

Manage Dissemination Environment by gathering partner's information about website, social media and etc. for dissemination news and project progress.

Planning Strategy for Project Awareness at Partners society: disseminate and share project introduction at partner's social media by mention, tag and other tools of linkedin and Instagram as main social network.

Creating Assessment for Dissemination Targets by connecting partners to our project's social media and create social cooperation for awareness of students, teachers and who interested in IoT subject.

2- Project Website (www.iotrain.eu):

Project website (which managed by wasit university) disseminate project information and newsletter across Instagram account and LinkedIn Project page. We apply distributed methods of dissemination for website by localized top view of project targets inside partner's websites.

Each partners must have IoTrain Project Webpage inside its websites, which has clear and direct link to main website (www.iotrain.eu), could have links to each parts of Project work packages.

3- Entrepreneurship and dissemination workshop:

Entrepreneurship workshop will have held on July 2023 at Institute for Advanced Studies in Basic Sciences, Zanjan, Iran.

4- Dissemination Expansion for Social Media Targets:

Growth Social Media audience at Instagram by plural tags, mentions, viral marketing and etc.

Enter LinkedIn environment by create company page for project and disseminate all events on, with some kind of dissemination tools such as poster, brochure and etc.

Create local IoTrain website on each partner's pages (Part2), expand awareness and recognition of IoTrain Brand through people who concern about it.

5- Planning for Upcoming Deliverables:

Create teamwork environment between partners to improve project progress continuously
Networking with or Connect to IoT-based Business corporates to create/hold contracts for Project's future to collaborate with each other.

Work Package 5
(Sustainability and Exploitation)

1. Summary of the Kick-off Meeting (KOM):

From 14.12.2020 to 16.12.2020, the Erasmus+ IoTRAIN project KOM was held online using Zoom. Partners introduced themselves and their responsibilities during the first day of the KOM. Mr. Luigi Saia and Mr. Andrea Murzi, Project Officers (PO) from the European Commission, also participated in the meeting and discussed some important points.

WP1 (preparation), WP2 (development), and WP6 (management) discussed their capacity-building strategies, IoTrain curricula planning and development, and management and coordination of the project on the 2nd day of the KOM. Discussions regarding WP3 (quality plan), WP4 (dissemination), and WP5 (exploitation and sustainability) were held on the third day of the KOM. The quality control and monitoring plan, the dissemination plan, and the exploitation and sustainability plan were presented on this day.

Following the KOM, several preparation points were discussed, including the project domain, the social media accounts on Instagram and LinkedIn, logo, and frequency of the monthly meetings (every third Monday from 11:00 CET to 13:00 CET). There were also some planned actions, such as launching the project website, developing the project management handbook, and reporting on deliverables in the early months.

2. Monthly Meetings:

Meetings held monthly or whenever necessary, aligned with major milestones in the project. Organizing and chairing PMB meetings is the responsibility of the coordinator. Each third Monday of each month, PMB Telcos took place from 11:00 CET to 13:00 CET.

3. Erasmus and IoTrain Consortium Meeting:

A 5:00 pm meeting was announced for the first IoT Master's Degree Development Project at the Pardisan Hotel in Mashhad on Friday, December 17, 2021. On the first day of the session, more than 60% of the members attended the introductory session and discussed the pre-implementation plans after the hotel admission process was completed.

Saturday, December 18, 2021 commenced with breakfast at 8:00 am at the Pardisan Hotel in Mashhad for participants. At 10:00 am, all attendees arrived at Islamic Azad University Quchan Branch after breakfast, traveling by VIP bus from Mashhad to Quchan, 135 km away. In the conference room (the venue for the first meeting), attendees were greeted by the chairman, deputies, and other colleagues.

In the opening remarks, Quranic verses were recited, and the national anthem of the Islamic Republic of Iran was played. While welcoming the participants, Dr. Ali Behravan gave an overview of the IoT project and the work that has been done to date in this regard at the beginning of the meeting. During the continuation of the meeting, Dr. Ali Behravan presented the materials prepared for the meeting with the present guests and other virtual attendees.

During the third meeting, the attendees were directed to Dr. Javanbakht's meeting hall following prayers and snacks made from the traditional food of Quchan city. While welcoming the participants, Dr. Ehsan Pouladi Borj, president of the Islamic Azad University-Quchan Branch, spoke about internet of things and why Iranian universities, especially the Islamic Azad University-Quchan Branch, should begin educating their students about this field. A short speech was then given by Dr. Moradi, president of the Islamic Azad

University-Mashhad Branch and head of the Islamic Azad University-Khorasan Razavi. Following this, Dr. Asghari, vice president of Dr. Boroujerdi, International Affairs and Non-Iranian Students Affairs of the Islamic Azad University-Quchan Branch, briefly spoke and highlighted some of the important points related to this event. Continuing the meeting, Dr. Iman Lotfi presented a PowerPoint file and examined the Internet of Things through a virtual panel discussion, followed by a question-and-answer period. Mr. Sanjari (a farmer in Quchan) spoke about agriculture and its connection to the Internet of Things as the second keynote speaker. A portion of his speech discussed the need to use the Internet of Things in agriculture to reduce the costs associated with the lack of careful handling by human agents, as well as the wide impact that the Internet of Things can have. A question and answer session followed the presentation, where he and other attendees answered questions from the audience. After the meeting concluded, the audience completed a questionnaire including a Qualitative and Leading Assessment Questionnaire-General Meetings and Meetings.

The guests visited the Islamic Azad University-Quchan Branch's research facilities including specialized laboratories, laboratories equipped with the latest equipment, welfare and sports facilities and other capabilities. For the dinner party program, the guests gathered in a traditional restaurant located inside one of Quchan city's summer houses, which reflects the etiquette and hospitality of Quchan city. The guests were transported to the Pardisan Hotel and Mashhad following dinner.

In the Attar Hall of the Pardisan Hotel, the second day of the specialized meeting began at 8:30 am on December 10, 2021. This meeting focused on the development of IoT activities that have been undertaken so far and will be undertaken in the future. In the second meeting, the topic of what is required to launch the field of Internet of

Things was dealt with by Dr. Behravan and the dear guests included Prof. Xiaojun Zheng, Dr. Mahdi Bohlouli, Dr. Grigore Stamatescu and Dr. Roman Obermaisser virtually. The meeting for lunch ended at 12:15 pm.

After a quick lunch, the first meeting of the second day began at 13:30 pm and immediately focused on dissemination, exploration, sustainability, and management. Virtual audience members and guests also contributed to the discussion and exchange of the project. It was 16:30 pm when the meetings of this day ended. According to the scheduled schedule, the morning programs of the third day of the meeting started at 8:30 am in the Attar Hall of the Pardisan Hotel with the presence of the guests. Participants discussed several topics in this relationship, including how to do WP1 program including D1.1, D1.2, D1.4, D1.5 as well as WP2 program including D2.1. The meeting ended at 10:45 in this section.

After discussing the WP3 and WP4 programs including D3.1, D3.2, D4.1, D4.2, D4.4, and D4.5, the second session began at 11:00 a.m. on the third day and concluded at 12:30 p.m. Participants completed survey forms and then the forms were collected. The meeting was officially closed at 14:00 pm, when the location and time of the next meeting were announced. In the aftermath of the meeting, the participants took souvenir photos with each other, and last but not least, the Islamabad University-Quchan Branch president presented gifts to all the guests.

4. SCU dissemination activities:

In this section, you will find news and project information as well as sustainability efforts undertaken by SCU. Aside from the various reports below, SCU is actively participating in IoT-related collaborations with various industries in the province, including oil, petrochemicals, steel and

agricultural industries. The collaborations include student internships, research projects, and dissemination of IoTrain project results.

On Wednesday, December 21st, SCU hosted a presentation and discussion panel to discuss how IoT plays a significant role in the digital economy. An industry discussion panel was held following the presentations with participation from members of the Smartification and IoT Workgroup (including Dr Alavi and Dr Rashti from SCU), as well as representatives of local industries (including gas, post, petrochemicals, etc...). SCU, its professors, and IoT graduates were invited to participate in this panel, which focused on identifying opportunities and needs for IoT and smartification projects in the province.

SCU's Dr Rashti presented IoT, the IoTrain project, and its outcomes as part of the Khouzestan province's research week on Wednesday, December 21st. Dr Rashti elaborated on the activities and achievements of the IoTrain project after introducing various IoT technologies.

An IoT and Smartification Workgroup is forming in Khoutzestan. AI and IoT-based development collaboration across the province has begun following SCU's accreditation of its IoT master's program. Through IoT and AI-powered smartification efforts, this initiative aims to enhance efficiency and quality of life. The main objective of the workgroup, headed by the province's head of ICT and SCU, is to spread the use of IoT across several market sectors. There have been numerous meetings and discussions over the past few weeks before the meeting, with the latest on December 13th at Ahvaz's Directorate of ICT affairs. During Provincial Research Week on December 21st, Dr Rashti presented the findings of the IoTrain project and participated in a discussion panel with representatives from various industries and market sectors.

A master's degree program in Industrial IoT is being offered by Shahid Chamran University for the first time following its participation in the IoTrain project. During a visit to Faraz, a university-based startup working on oil and gas products, the class and professor (Dr. Naderan) toured their PLC-based industrial automation system on December 3rd, 2022. As a result of the IoTrain project, the Master of Engineering in IoT, which is the main objective, has been successfully accredited by the ministry (MSRT) to Shahid Chamran University of Ahvaz, and the university will begin accepting students next year through a nationwide entrance exam.

With Dr. Mohammad Javad Rashti, Prof MehraIiZadeh and Dr. Naderi, the National Steel Industrial Group (INSIG) held a series of seminars on November 8, 2021, to introduce this large steel manufacturing group to the project as well as the IoT and IIoT applications in the steel industry. To sustain the IoT educational activities initiated in the IoTrain project, SCU intends to establish a joint Industry 4.0 research center with the local steel industry.

The SCU and ACECR, IoTrain partners from SCU (Dr. Naderi and Dr. Lotfi) presented the importance of IoT to industrial production, especially in petrochemical industries, one of Iran's most active producers. The first seminar on IoT applications in petrochemical industries was attended by Naderi and Lotfi, who presented the IoTrain and the new master's program to industrial participants. Iran's largest petrochemical center, Mahshahr (Khuzestan Province), hosted the seminar (where the National Petrochemical Company is headquartered). SCU's IoT development center, which is a partner of Iran's IoT development center, organized the June 22 seminar.

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5. IAU dissemination activities:

After the Siegen event on October 2022, the report of activities and programs have been carried out by the IAU (Islamic Azad University-Quchan branch) team in relation to the Internet of Things (IOTRAIN) project, as follows:

- Holding several negotiation meetings with representatives of industrial units and experts of the Jahad Agriculture and Natural Resources Departments and dairy companies.

- Holding a scientific workshop on electronics and its application in medical engineering for computer engineering and medical engineering students.

- Holding an English conversation training course for undergraduate and graduate students in computer engineering and medical engineering.

- Holding several interview sessions with undergraduate and graduate students in order to select the student team for the Ahvaz school event.

- Publish advertisements for the first round of tenders for the purchase of equipment related to the Internet of Things laboratory in Khorasan and Farhikhtegan newspapers.

- Holding the first round of tenders for the purchase, installation and commissioning of the Internet of Things laboratory at the Islamic Azad University, Quchan branch.

- Preparing and presenting a draft memorandum of cooperation with the representatives of the Sumer University.

- Translation and preparation of syllabus, headings and courses of the Master of engineering in Internet of Things in the Persian language and sending it to the central organization of Islamic Azad University for approval.

- Carrying out preliminary measures in order to buy tickets and book a hotel for representatives of Azad University to participate in the Ahvaz meeting.

- Participating in several webinars organized by different companies and universities with the topic of Internet of Things.

Work Package 6
(Project Management)

Course Development Hackathon and 1st Annual Project Quality Meeting
May 15th – 18th, 2022
Meeting Location: University Politehnica of Bucharest (UPB), Bucharest, Romania

The second in-person meeting and event of the IoTrain "Master of Engineering in Internet of Things" Erasmus+ project took place in hybrid format at the University Politehnica of Bucharest (UPB), in Bucharest, Romania between May 15th and May 18th, 2022.

The day of May 15th was initially reserved for the airport transfer and hotel accommodation of several participating delegations of the project partners. This offered the participants also the opportunity for a leisurely visit of several Bucharest landmarks. Direct discussions were carried out on the topic of the accreditation process status and requirements of the new master program as preparatory session for the main event program.

The first day of the meeting started with the welcoming and registration of the in-person participants at the venue location – the PRECIS Research Center building of the Faculty of Automatic Control and Computers, on the premises of the main UPB campus. With this occasion, promotional materials of both the host institution and of the IoTrain project were distributed to the participants, together with badges and the event agenda in printed format.

The event was subsequently launched in the opening session, where the local organizing team coordinator, Prof. Grigore Stamatescu, welcomed the participants to Bucharest/Romania in general and to UPB in particular and expressed wishes for a productive event towards substantial progress of the project activities.

A dedicated video and audio link allowed the connection of remote participants to attend and present during all the event sessions. The opening remarks were followed, in the same session, by two invited presentations of the host institution representatives. First, Prof. Ioana Fagarasan, vice-dean for academic affairs of the Faculty of Automatic Control and Computers, carried out a presentation on the topic of „Education and Research at the Faculty of Automatic Control and Computers".

Assoc. Prof. Maria Dascalu, vice-dean for graduate studies, ICT infrastructure and industry relations of the Faculty of Engineering in Foreign Languages, subsequently presented the study programs, research activity and international collaboration results of the faculty. The next session allowed Dr. Ali Behravan, representing the coordinator institution, the University of Siegen, a detailed overview of the current status of the project, deliverables, activities and deadlines – associated to WP6: Project Management. The meeting agenda was also discussed in detail to allow for any comments and adjustments suggested by the participants.

Throughout the meeting days, coffee breaks were offered by the host institution (UPB) while for the lunch meals an external catering company was contracted.

The program continued with updates from the side of the responsible partners of WP1: Preparation, Dr. Mohammad Javad Rashti (SCU), WP4: Dissemination and WP5: Exploitation by Dr. Mahdi Bouhlouli (Petanux), which focused on the current status of the implementation of the planned activities for each workpackage, identifying issues and challenges.

Finally, planning and organization aspects for the core WP2: Course development were discussed which were also to be continued during the second day of the meeting.

Upon finalizing the meeting sessions of the first day according to the agenda, the participants proceeded for a technical visit to the company Asti Automation, an industrial automation and technical training company from Bucharest and key partner of the host institution. The visit allowed for several activities such: presentation of the in-house research and development laboratories for smart manufacturing, robotics and automation, practical demonstrations and a company presentation covering the products and services offered, which emphasized the application of Internet of Things technology as key enabled for modern industrial solutions in key verticals such as oil & gas, food production, utilities and the automotive domain.

The first day was concluded through a social dinner at the company headquarters which allowed for informal exchanges between the meeting participants.

The second day of the meeting was focused on reviewing the course syllabi and joint development of course content through both joint and parallel technical breakout sessions. An in-depth review and dense discussions were carried out on the subject of course assignments, syllabi revisions and choice, formatting and delivery of course materials. The sessions also allowed for direct collaboration and exchange of specialized expertise between the projects partners for the assigned courses.

Adjustments to the courses and master program planning were also carried out. Dr. Hamidreza Ahmadian (USI) presented the partners with valuable input on the experience from previous Erasmus+ projects, in direct conjunction with the

project deliverables, administrative requirements and implementation of the master program.

The third day was dedicated to summarizing the meeting results and establishing the planning of the project activities until the next meeting in Siegen, Germany, during August 2022.

A dedicated session was established for the Quality Monitoring Meeting, coordinated by Prof. Xiaojun Zeng (UMA). Multiple quality-related topics were approached, including the distribution and collection of quality questionnaires among the meeting participants.

The event was finalized by a review of the main achievements, working points and short-term planning. A final social event included the guided tour of the Palace of Parliament – world's second largest building by volume in the afternoon of the third day.

2nd Management and Project Progress Meeting and Staff Training and Mobility in Siegen

August 1st - 4th, 2022
Meetings Locations: Rooms AR-M0210 & AR-M0215, Campus Adolf-Reichwein-Straße (AR)
Address: Adolf-Reichwein-Straße 2, 57076 Siegen, Germany

The 2nd Management and Project Progress Meeting and Staff Training and Mobility of IoTRAIN project will take place at the University of Siegen, in Siegen, Germany, from August 1st to 4th, 2022 which is project month 21st. The workpackage leaders in this 4-day meeting firstly will overview the current status of all the project workpackages and corresponding deliverables based on the planned tasks/activities in the project description versus achievements. Further, the open points, issues, missing contributions and possible solutions will be discussed within the project consortium and the workpackage leader will consider the feedback and re-plan the remained activities if it is required. The plan for the upcoming deliverables will be presented to the partner consortium .

The next focus of this meeting which is led by the leader of workpackage 2 (development), Dr. Grigore Stamatescu from the University Politehnica Bucharest, Romania, is following up on the course content development in the course development hackathon (D2.1) from the previous consortium meeting in Bucharest, Romania, and staff training in the framework of exchanging ideas and good practices specifically on the existing course modules at each partner university and industrial side to educate and harmonize the partnerships in teaching quality.

The partners will bring their content respective to the course syllabi that were finalized in the D1.5 Course Development Plan and will discuss them by reviewing the chapters and existing slides in the sessions that each are allocated to a technical class, i.e., Computer Networks & Protocols (CNET) and Communication Systems (COMM), Software Engineering (SWENG), IoT Platforms & Architectures (IOTA), Cyber-physical and industrial Systems (CPIS), System and Network Security (SNSEC), Application of IoT (AIOT), Intelligent and Data-driven Systems (IDDS), Project/Internship, Seminar, Thesis (PRJ) and Management (MGM). By this meeting, it is expected to reach the final version of the courses (D2.2) in the next months which will then to be used at the summer schools in Iran and Iraq.

Also, the list of equipment will be finalized during this meeting which then later will be used for the tendering the technical and financial points of the project progress report will be discussed.

The coordinating team at the chair for embedded systems at the University of Siegen, including Prof. Roman Obermaisser, Dr. Ali Behravan, and Dr. Hamidreza Ahmadian, is responsible for the organization of this meeting and has

organized an industrial visit on the last day of the meeting from SUMMIT (https://www.summit-siegen.de/), SDFS Siegen (https://demofabrik-siegen.de/), PROTECH, and Innofarming.

Partners

The consortium consists of 10 partners including 4 European and 6 Iranian-Iraqi ones ranging from academia to industry. Involvement of non-academic partner, Petanux GmbH (PG), ensures harmonizing academic training with market needs and the necessary skills in the business sector and the European Industrial knowledge transfer to Iran, as a way to expand employment opportunities of students and internship programs.

Partner Country: Iran
- Shahid Chamran University of Ahvaz (SCU)
- University of Sistan and Baluchestan (USB)
- Islamic Azad University – Quchan Branch (IAU)
- Institute for Advanced Studies in Basic Sciences (IBS)

Partner Country: Iraq
- University of Wasit (UWA)
- University of Sumer (USU)

European Partners:
- University of Siegen (USI)
- University of Manchester (UMA)
- Polytechnic University of Bucharest (UPB)

The scope of the document

This document provides an overview of existing courses and modules being offered in the IoT studies worldwide. To this, we already analyzed most of well-known IoT programs and realized what is normally being offered in these programs. Afterwards and after having a concrete list of courses and modules, we analyzed which of these modules are already available in the consortium partnership and being offered by the consortium, partner and what modules need to be designed and prepared from scratch to complete our IoT curriculum. In this regard, we studies bachelor and master degrees of IoT in European, Iranian, Iraqi countries in particular and rest of the work as well.

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IoTrain aims to enhancing the IoT skills of engineers with state-of-the-art European standards and technologies.

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