DeCAIR:
Developing Curricula for Artificial Intelligence and Robotics

Report on Collaboration with Industry and Community Workshop

Activity Information

Work Package	WP11 – Collaboration with Industry and Community
Task	11.1
Activity Coordinator	Clovis Francis
Participating Partners	All
Objective(s)	Promote Industry-academia collaboration
Due Date	April 10th

Table of Contents

1- Introduction

Among the activities of Work Package "Collaborating with industry and community", the DeCAIR team in Lebanon organized a one-day workshop on Wednesday March 2nd 2022. The main purpose of the workshop as stated in the project's proposal build and consolidate links with the community and industry. The workshop was held in hybrid mode at Beirut Arab University in Beirut and a total of 100 people participated physically and virtually.

The workshop was inaugurated by the Dean of Students Affairs at BAU, Prof. Sobhi Abou Chahine followed by a brief introduction to the project DeCAIR by the project coordinator Prof. Gheith Abandah, who stressed on the important outcomes of this workshop. Then The WP11 leader, Prof. Clovis Francis from LU presented the goals of this workshop and recalled the details of the workshop's agenda as shown in Table 1.

Time	Content
15:00	Welcome
15:00-15:20	Gheith Abandah, Project Coordinator: DeCAIR overview Aref Alsoufi, National Erasmus Plus Officer in Lebanon: EU funded projects impact in HEI
15:20-16:20	Session I: Academia- Industry Collaboration Best Practices
	- Ziad Shammas, Head of IRALEB Executive Committee - Ibrahim Mallat, Zeenni's Trading Agency (ZTA) - Manal Jalloul, Co-founder of AI Lab, University Ambassador, NVIDIA - Jad Wehbe, ITEC Industrial Technologies
Break 20 mn	
16:40-17:00	Session 2: Curricula Enhancement (LU, BAU)
	- Sobhi Abou Chahine, Dean of student's affaire, BAU - Clovis Francis, Professor at the Lebanese University - Q&A
17:00-17:30	Session 3: Round table: Towards a sustainable Academia- Industry Collaboration
	- Ramy Mir, Automation Advisor, British Petroleum - Mohamad Khalil, Director of AZM research Center - Q/A
17:30-17:35	Industry survey: https://forms.gle/jFNLDTgFE55AfWR58 Instructors survey: https://forms.gle/ZrQj9yuBMMg5SQxg9 Workshop evaluation: https://forms.gle/4QNUhC7wphSGqBmQ7
17:35-17:40	Closing discussion and recommendations

Figure 1. Workshop Program.

2- Workshop Presentations content

2.1- Introductory session:

2.1.1- Gheith Abandah, Project Coordinator: DeCAIR overview: Iyad Jaafar from UJ, presented on behalf of the coordination team the main goals and objectives of the project and presented what is achieved within the different Work packages 14 months after the project start.

2.1.2- Aref Alsoufi, National Erasmus Plus Officer in Lebanon: EU funded projects impact in HEI: Mrs Yasmine Al Gharib, on behalf of the National Erasmus Plus Office in Beirut presented the different calls within the Erasmus Plus. Mrs El Gharib stressed on the importance of EU funded projects in the modernization of the Higher Educational System in Lebanon and proved this with numbers and figures.

2.2- Session I: Academia- Industry Collaboration Best Practices

2.2.1- Ziad Shammas, Head of IRALEB Executive Committee

IRALEB, formerly LIRA program, has pioneering role in promoting industry academia collaboration over 25 years. IRALEB supports specific projects from Industry that will be developed in universities. IRALEB provides support to engineering projects in the different fields: Mechanical and Mechatronics • Electrical and Electronics • Civil Engineering • Information and Communication Technology • Chemical and Pharmaceutical • Agro-Food Industry • Packing and Packaging • Materials and Nanotechnology. A new track in Artificial intelligence is going to be introduced this year.

2.2.2- Ibrahim Mallat, Zeenni's Trading Agency (ZTA):

Festo Authorized and Certified Training Center (FACT) aims at bridging the gap between Universities graduates and job marked demand. Mr Mallat pointed out the lack of communications between the public and private sectors and the absence of specialized training centers. FACT provides training for a better employability, productivity, maintenance and automation.

2.2.3- Manal Jalloul, Co-founder of AI Lab, University Ambassador, NVIDIA

AI Lab, Digital Hub and Solutions provides training in the field of Artificial Intelligence to promote AI techniques in the different socio economical sectors. AI Lab provides training workshops for academics and students in the different universities in Lebanon and abroad.

2.2.4- Jad Wehbe, ITEC Industrial Technologies

Collaboration with academia is a key concept adopted by ITEC to develop several applications: Parallel robot (Delta Robot that is adequate for pick and place applications), wind turbines and Software development with Analytics capabilities (AI). All of those applications now has crossed the first prototype and working on the ready to market versions of each.

2.3 Session 2: Curricula Enhancement

2.3.1- Sobhi Abou Chahine, Dean of student's affaire, BAU

The BE and MS programs in computer engineering at BAU will be updated by DeCAIR. 14 Courses at the BE and Master levels are to be updated by DeCAIR.

2.3.1- Clovis Francis, Professor at the Lebanese University

The Master of Robotics and Intelligent systems is a running at the Lebanese University as a double degree program in collaboration with the University of Technology of Compiegne, France. 6 courses of this master program will be updated by DeCAIR. Three courses of the Electrical and Mechanical engineering programs will be also updated by DeCAIR.

2.4- Session 3: Round table: Towards a sustainable Academia- Industry Collaboration

2.4.1- Ramy Mir, Automation Advisor, British Petroleum

Ramy Mir presented the complex upstream plant of British Petroleum with real data coming from the well. He showed the complex plant monitoring tools to avoid unpredictable accidents. He pointed out the role of AI techniques in preventive maintenance, monitoring, diagnosis and well efficiency enhancement.

2.4.2- Mohamad Khalil, Director of AZM research Center

Prof. Mohamad Khalil, presented the research activities conducted at AZM center in the field of biomedical engineering and its applications. He stressed on the role of AI and machine learning techniques in preterm birth detection, eye tracking, brain activities, exoskeleton actuators operation. The main socio economic partners that AZM center collaborates with are hospitals, Medical Doctors, Physicians,…

2.4.3- Alaa Daher, Assistant Professor, BAU

In line with what has been presented by Mohamad Khalil, Alaa Daher (BAU) presented nine applications implemented at BAU that are using and implementing AI techniques. This demonstrates the wide variety of collaboration fields with industry.

2.5- Session 4: Closing discussion and recommendations:

The workshop ended at 18:10 p.m.

Sobhi Abou Chahine (BAU) presented a summary for recommendations to promote the academia industry collaboration:

- Communicating with stakeholders with all potential AI projects for funding
- Identifying research projects to be interest for industrials as well as academia
- Providing Internship for students on different levels
- conducting common research projects between institutions
- Inviting AI industry experts to participate in teaching and to organize seminars and workshops
- Signing MOUs between universities and industry to provide a framework for the industry academia collaboration and to identify centers of interest for both.

The workshop concluded by distributing an electronic survey to participants to collect feedback about different aspects related to academia-industry collaboration. The results of the survey are presented in the following section.

3- Survey Results

A total of 16 responses were collected for the survey: 7 from industrials and all were from Lebanon; 9 from academia from Lebanon and Jordan.

3.1- Industry surveys results:

The respondents are from different industrial field as can be shown in figure 1

Field

7 responses

INDUSTRIES

Faculty of engineering

Automation and Control

AUTOMATION

Packaging

Automation

AI
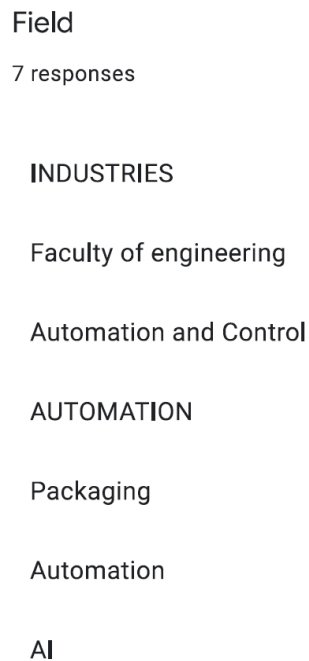
Figure1: Different industrial fields of the respondents.

71% of the industrials that responded to this survey are extensively using AI techniques as can be shown in figure 2. Different AI fields used by the respondents are listed in figure 3.

To what extend you use AI techniques in your institution?

7 responses

Legend:
- High
- Average
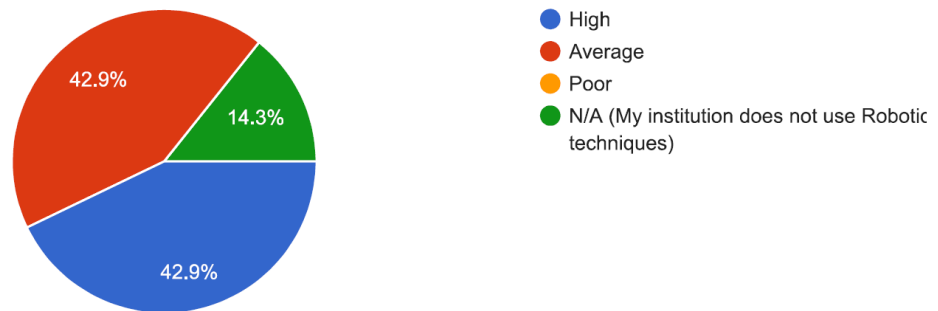- Poor
- N/A (My institution does not use AI techniques)

28.6%

71.4%
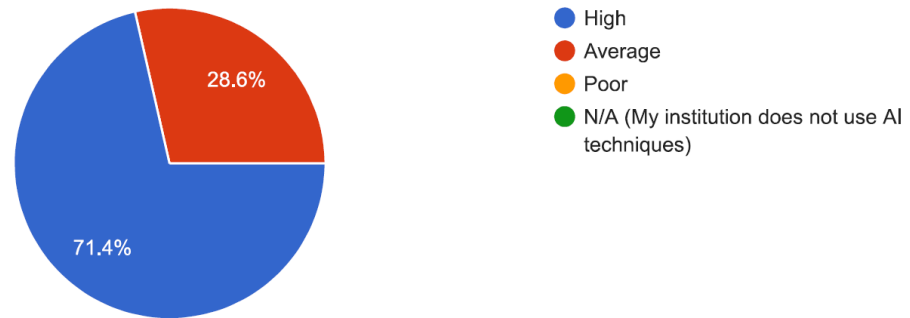
Figure 2: Extend of use of AI techniques by the respondents.

Please describe the AI techniques you use. (If the question is not relevant to you, please answer N/A)

7 responses

PLC CONTROL - ROBOTIC - INDUSTRIAL AUTOMATION

Reinforcement learning, ensemble learning, extreme learning machine

enhancing sensors accuracy and precision

DATA ANALYTICS

managing and planning of orders

Increase well efficiency by data analysis and collection

Provide solutions to academia and Industry in AI

Figure3: Different fields of AI used by the respondents.

43% of the industrials that responded to this survey are extensively using robotics techniques as can be shown in figure 4. Different robotics fields used by the respondents are listed in figure 5.

To what extend you use Robotics techniques in your institution?

7 responses

Legend:
- High (blue)
- Average (red)
- Poor (orange)
- N/A (My institution does not use Robotic techniques) (green)

42.9% (Average)
14.3% (N/A)
42.9% (High)

Figure 4: Extend of use of robotics techniques by the respondents.

Please describe the Robotics techniques you use. (If the question is not relevant to you, please answer N/A)

7 responses

INDUSTRIAL AND MOBILE ROBOT

NA

Automation of industrial process, packaging

DELTA ROBOTS, Arm robots

N/A

Process automation is dominant

Control and automation of processes

Figure5: Different fields of robotics used by the respondents.

- 71% of the respondents think that collaboration with academia will bring benefit to their institutions as could be seen in figure 6. The different forms and fields of collaboration are shown in figure 7 and 8 respectively.

Do you think that collaboration with academia will bring benefit to your
institution?
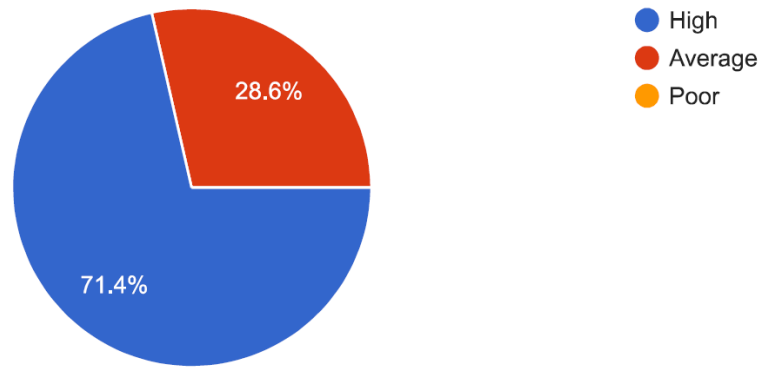
7 responses

Figure 6: relevance of industry-academia collaboration.

Specify the level of collaboration: Copy
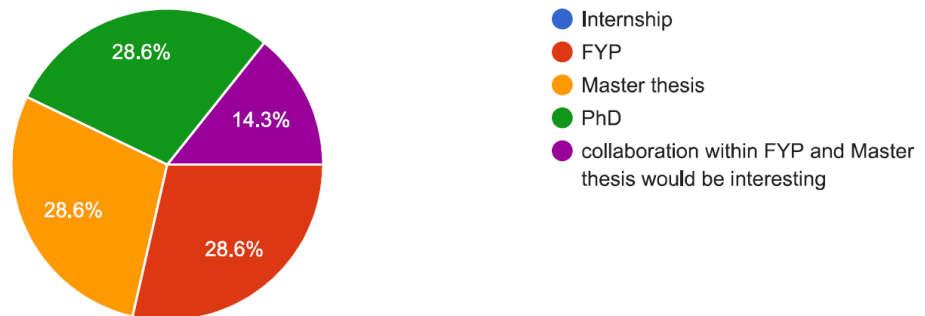
7 responses

Figure 7: Different contexts of collaboration perceived by the industrials.

Please specify the field of collaboration. (If the question is not relevant to you, please answer N/A)

7 responses

TRAINING COURSES AND FINAL PROJECTS SUPPORT

Computer vision with machine learning

Automation of industrial Plant

N/A

developing solutions for punctual applications

Data science, Big Data

Development of new algorithms in AI

Figure 8: Different fields of collaboration perceived by the industrials.

- Assesment and relevance of the courses offered by the different programs updated and introduced by DeCAIR from the industrials point of view are presented in figures 9,10,11 and12
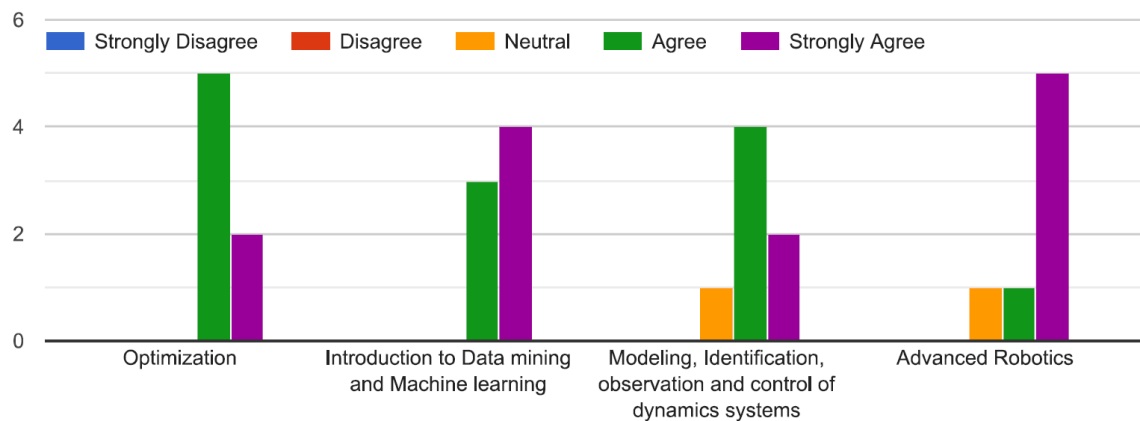
Figure 9: assessment of master courses updated by DeCAIR at LU
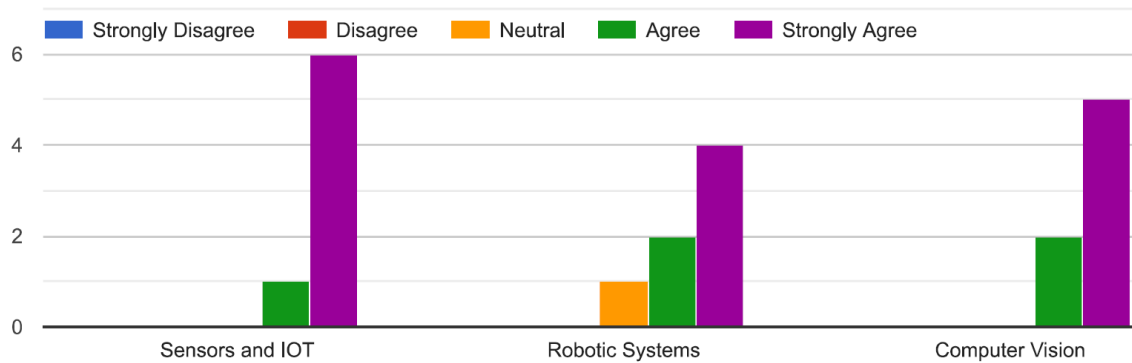
Figure 10: assessment of BE courses updated by DeCAIR at LU
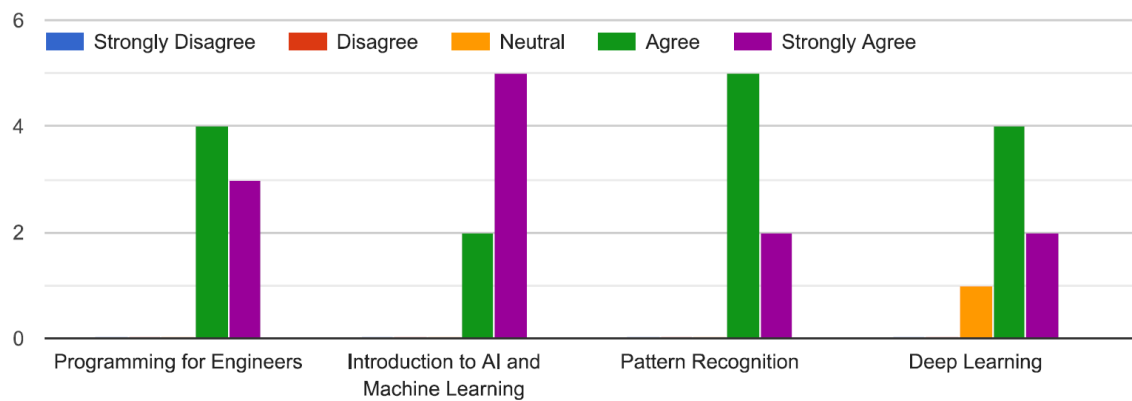
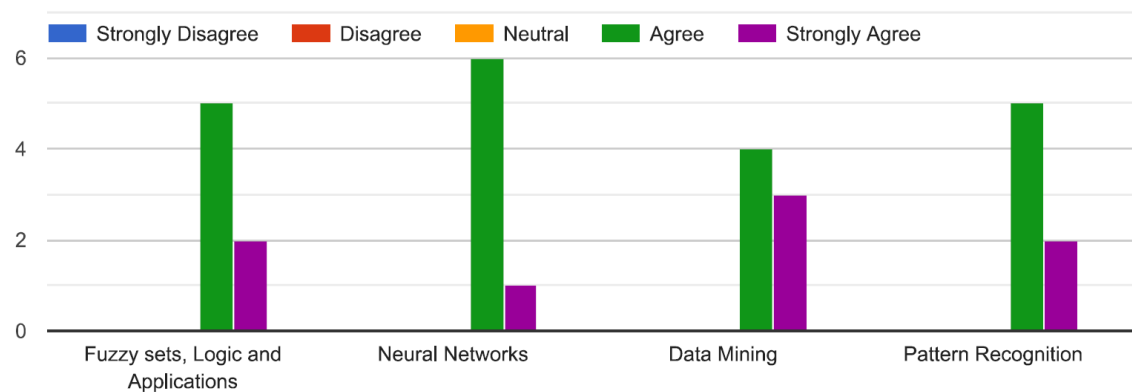Figure 11: assessment of BE courses updated by DeCAIR at BAU

Figure 12: assessment of master courses updated by DeCAIR at BAU

10

- The industrials listed a set of courses that they consider of great importance for their field of operation and not offered by the master and BE programs as stated in figure 13.

Specify any course that is not offered and you consider as relevant for your institution.

7 responses

MOLD PRODUCTION

NA

Embedded systems control

N/A

-

Industry 4.0

Implementation of AI algorithms in a real time environment

Figure13: Relevant courses and not offered from the POV of industrials

- 71% of the industrials are ready to deliver courses and seminars within the updated programs as shown in figure 14.

Are you ready to deliver a seminar within the updated courses programs?   Copy
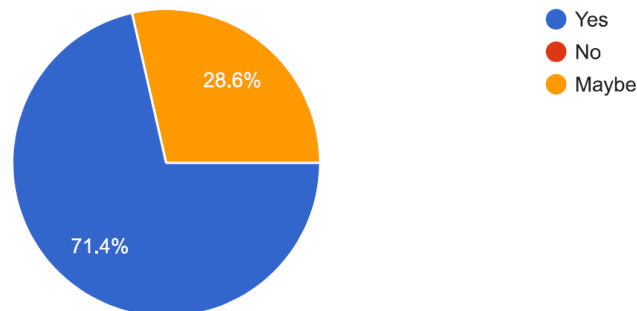
7 responses

- Yes
- No
- Maybe

28.6%

71.4%

Fugure14.

- Industrials provided a set of topics that they can deliver to the students within the updated programs as shown in figure 15.

Specify a topic that you may deliver:

7 responses

MECHATRONICS

Machine learning for communication systems

Industrial Sensors calibration and interfacing

ROBOTICS

-

Industry 4.0

AI techniques implementation in a real time environment

Figure15: List of topics that industrials can deliver to the students within the updated programs.

- 71 % of the industrialists are ready to co-supervise projects with academia faculty members at different levels as shown in figure 16.

Are you ready to co-supervise an internship, FYP, Master thesis or a Ph.D thesis in collaboration with academia?

7 responses
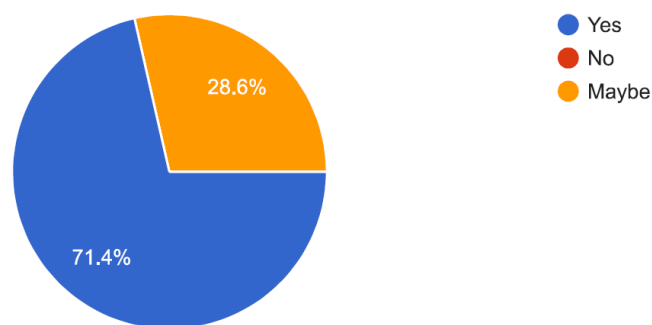
Figure 16

- Industrialists specified the sectors that will best benefit from improvements in AIR program as shown in figure 17.

Which sectors do you believe will benefit from the improvement in the AIR programs in Jordan/Lebanon?
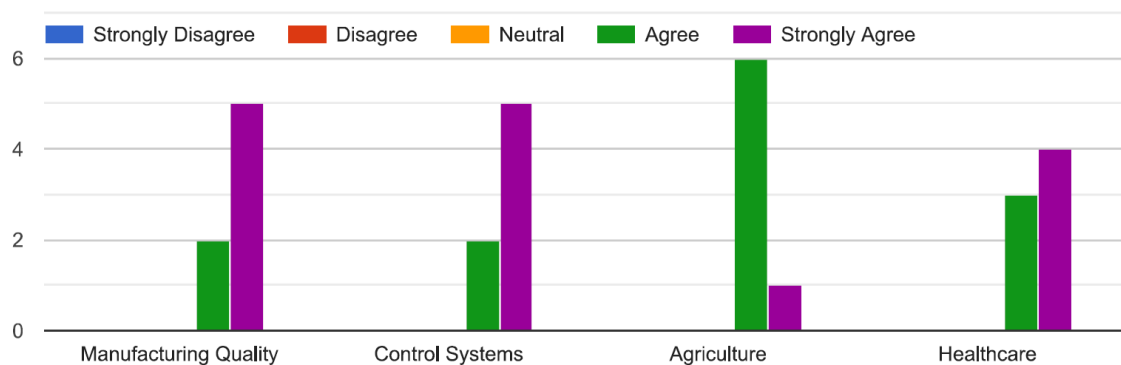
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Figure17: sectors the most affected by improvements of AIR programs.

3.2- Academia surveys results:

- 100% of the respondents highlighted an average level of collaboration with industry as
  stated in figure 18.

Collaboration with industry in your institution is?　　　　　　　　　　　Copy
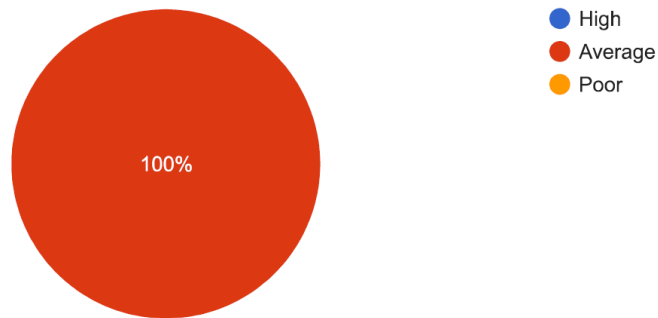
9 responses

Figure18: Level of collaboration with industry at the institutions of the respondents

-66% of the respondents were in collaboration with industry in the field of AIR as stated in
figure 19.

Have you been involved in collaboration with industry in the field of AI and
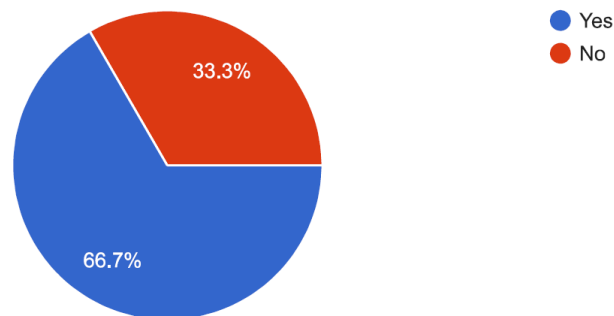Robotics?　　　　　　　　　　　Copy

9 responses

Figure19.

- 45% of the respondednts collaborated with industry within the framework of a Ph.D,
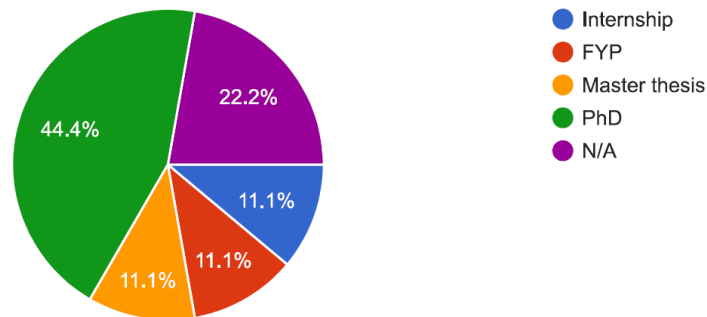 11% within internship, FYP and master thesis.

Figure 20: Level of collaboration with industry.

- Participating from academia are ready to propose technical solutions to the industry in several fields such as control, machine learning, robotics and fault detection and preventive maintenance as state din figure 21

In which fields of AIR you think be able to propose solutions for industry?   🗍 Copy
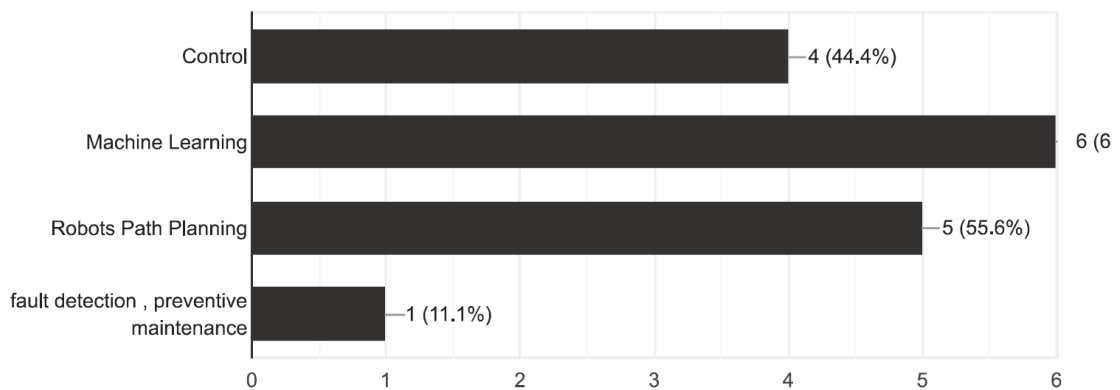
9 responses

Figure21: fields where academia can propose solutions to the industry.

- Participating from academia are suggested a list of topics that should be delivered by industrial figures such as presented in figure 22.

In your opinion, what are the topics that need to be delivered by industrials in your AIR courses?

9 responses

Design

Short presentations about AI applications and career opportunities.

Application case study examples

Trajectory generation, obstacles avoidance...

Ideas, Problem, Materials

Applications of Robots, Industry 4.0 related topics

Implementation of AI techniques. Implementation of real time control of Robots

Control, path planning

Figure22: topics that should be covered by industrial figures.