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FAAI:
The Future is in Applied Artificial Intelligence
Erasmus+ project 2022-1-PL01-KA220-HED-000088359

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Research 6: Questionnaire for employers: Specifying graduate competencies in applied AI:

the state-of-the-art analysis for WP2

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Date
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Summary: FAAI is an ERASMUS+ project that aims to evaluate existing AI systems and tools and develop common EU competencies for skill-building systems that use AI capabilities in the SME sector. The project aims to increase the quality and relevance of students' and graduates' knowledge and skills in AI/ML-specific topics based on skills needed in the labor market. This survey was conducted in the context of the FAAI project to assess the needs of employers in graduate competencies in Artificial Intelligence, Machine Learning, and Data Science in general. The survey aimed to research the needs and expectations of employers and companies for the purpose of training specialists in the field of Applied AI. A total of 38 companies filled in the survey representing a good starting point for examination and analysis of their needs related to applied AI. The survey consisted of 31 questions, including questions on general competencies needed, the type of machine learning problems solved, and the AI libraries used in companies. The survey also included questions on soft skills required, additional competencies needed, employer satisfaction with the level of preparation of Master's studies' graduates in the area of AI, and views towards raising the qualification of current employees of organizations by letting them study AI at a master's level.

Keywords: Artificial Intelligence, Data Science, Graduate competences, Employer requirements

1. Introduction

FAAI: The Future is in Applied Artificial Intelligence is an ERASMUS+ project (2022-1-PL01-KA220-HED-000088359) that focuses on the possibilities of using Artificial Intelligence (AI) systems to solve problems in management, industry, engineering, administration, and education. In this context, the project's goals are to help higher education institutions (HEIs) keep up with the rapid development and application of AI in emerging industries. The project aims to achieve this through evaluations of existing AI systems and tools, comparative studies, and user experience analysis, as well as assessing the economic, social, and cultural impacts of AI.

The project aims to develop common EU competencies for skill-building systems that use AI capabilities in the SME sector. This will meet the labor market's needs for addressing skills shortages and gaps in all sectors. Simultaneously, the project aims to improve the relevance of providing training on the application of AI in SMEs, addressing the needs of the cyber market in the economy. FAAI envisages developing a new curriculum related to the use of AI and ML to improve the quality of management of modern digital ecosystems. This way, students can enhance their knowledge by using AI/ML tools and sharing aspects of data and knowledge management skills training, thus improving accessibility for all. The project's main priority is to increase the quality and relevance of students' and graduates' knowledge and skills, supporting HEIs to: a) identify urgent technological challenges and the needs of highly qualified staff; b) train highly qualified students and graduates in AI/ML-specific topics based on skills needed in the labor market; c) promote open links between universities and industry, increase the relevance of higher education by supporting new internship programs, links between student universities and industry, the market, and industry premises.

This survey was conducted in the context of the FAAI project and aimed to assess the needs of employers in graduate competencies in Artificial Intelligence, Machine Learning, and Data Science in general. The project aims to join universities and companies to provide innovative solutions in developing AI experts. The questions in this study were designed to research the needs and expectations of employers and companies for the purpose of training specialists in the field of Applied AI. The survey was performed online using Admin Project survey tools. The data was collected by employers and organizations that work or plan to engage in applied AI and Data Science domains. The survey was conducted from October 1, 2022, to March 31, 2023. To obtain a wide range of information, the survey offered multiple question fields with additional open field options to mitigate the effect of narrowed answer suggestions. The survey contained both open and closed questions. To make the process of data collection unbiased, no additional recommendations were added. No events were reported during that time that could influence the results. The organizations were selected based on their products and solutions portfolio and engagement in the applied AI field. The survey data was presented in quantified form and statistically analyzed where appropriate. The open description and free text answers were presented and analyzed without modification.

2. Collection and analysis of data

The data was acquired by five partner institutions scientists who contacted and invited companies, mainly SMEs, to fill the survey and express their requirements regarding student and graduate competences in applied AI and Data Science. In this a total of 38 companies filled in the survey representing a god starting point for examination and analysis of their need related to applied AI.

Th survey consists of 31 questions and sections in this report corresponds to the sections of the survey:

1. General information about companies
2. AI Job Research
3. Additional competences
4. Current state of local market
5. Project involvement and information

3. Results

3.1. The name of the company

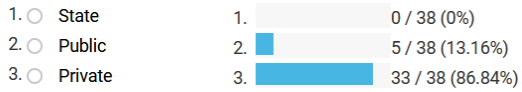
3.2 Contact person e-mail

The first two questions of the survey ask for the name of the company (organization) and the e-mail address of the person that filled in the survey. It is worth noting that five markets of the project participants' countries were analysed and most of the companies reside at these markets, although some of them have also branches in Europe and USA. The company names and contact e-mails are given below.

Company name	Contact person e-mail address
netFactor.pl Łukasz Więcław	wieclaw@netfactor.pl
CyberProgres	us.edu.tk@gmail.com
WAPI COMPUTERS	biuro@wapicomp.pl
DXC Technology	lucas.furas@gmail.com
Amplitudo	julija.damjanovic@amplitudo.me
Uniwersytet Ekonomiczny w Katowicach	jan.kozak@ue.katowice.pl
BIXBIT	stevan.sandi@bixbit.me
Code3Profit LLC	bratislav.predic@code3profit.com
Nignite	ivan@nignite.com
UHURA Solutions	bojan.tesic@uhurasolutions.com
Fazi Company	lazar.ljubenovic@fazi.rs
IBM Bulgaria	violeta.karanacheva-tsvetanova@ibm.com
Rekord SI	azielinska@rekord.com.pl
ICE MT	sasha.kosobutsky@ice.com
SoftwareONE	Iliya.iliev@softwareone.com
Precisely	sebastian.kaminski@precisely.com
Naissus Technologies	danilo.markovic@naissus.tech
Łukasiewicz Research Network – Institute of Innovative Technologies EMAG	dariusz.felka@emag.lukasiewicz.gov.pl
Da Vinci Studio	wbachta@davinci-studio.eu
Johnson Electric d.o.o.	nikola.blagojevic@johnsonelectric.com
Virtuona	olivera.tosic@virtuonasoft.com
Diffine	igor@diffine.com
info@brainit.sk	info@brainit.sk
NTT DATA Business Solutions	info-solutions-sk@nttdata.com
OPIUM.	ahoj@opiumsystems.sk
Maciej Loch IT Monster	maciej@skyier.com
Quadrix Soft	milos@quadrixsoft.com
NIRI 4NL ltd.	markos@niri-ic.com
Aardwark s. r. o.	info@aardwark.com
swiss re Sk	swissre@sk
multitude IT labs Bratislava	lasse.makela@multitude.com
Schaeffler Slovensko	schaefflerskalica@schaeffler.com
softec	softec@softec.sk
Adastra, s.r.o.	jobsk@adastragrp.com
SYRMIA	Nikola.Veljkovic@syrmia.com
Way Soft DOO	m.jankovic@way.rs
innSono d.o.o.	dejan.ciric@innsono.com
DualSOFT	marko.k@dualsoft.net

3.3 The type of organization

The next question indicates the type of organization that filled in the questionnaire.



Data description:
The data represents the types of organizations that participated in the survey. Respondents were asked to indicate whether their organization is a state, public, or private organization. The data consists of 38 responses.

Discussion of Results:

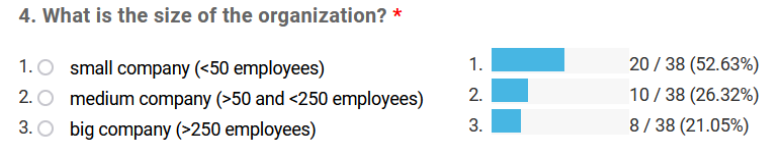
The majority of the respondents (86.84%) indicated that they are from a private organization, while only 13.16% of respondents indicated that they are from a public organization. No respondents indicated that they are from a state organization.

Main Conclusions:

- The vast majority of organizations that work in AI and Data Science field are private organizations.
- There is a very low presence of state organizations in the AI and Data Science field, according to the survey results.

3.4 The size of organization - staff number

The question asks for the size of the company measured by the staff number.



Data description:
The data represents the responses of 38 companies working in the AI and Data Science field regarding the size of their organization based on the number of employees. The respondents were given three options to choose from: small company (<50 employees), medium company (>50 and <250 employees), and big company (>250 employees).

Discussion of Results:
More than half of the respondents (52.63%) identified their companies as small, which means they have less than 50 employees. 26.32% of the respondents

identified their companies as medium, which means they have between 50 and 250 employees. Only 21.05% of the respondents identified their companies as big, which means they have more than 250 employees.

Main Conclusions:

- The majority of the companies that participated in the survey are small, with less than 50 employees.
- Medium-sized companies make up the second largest group of respondents, with about a quarter of the companies falling into this category.
- The smallest group of respondents are big companies with more than 250 employees.

3.5 What segment of IT of the industry do you work in?

This question aims to find the segment of IT industry in which these organizations mainly work, among offered IT industry domains.

Data description:
The question asked companies to specify the segment of the IT industry they work in, and the responses were categorized into nine options. The total number of responses was 38.

Discussion of Results:
The majority of respondents (36.84%) work in the IT service segment, followed by other product startups (15.79%) and other categories (15.79%). IT outsourcing, sale of computer technics, and hybrid software development and IT outsourcing were also represented, but to a lesser extent. Offshore programming, IT outstaffing, and the games technologies segment had the lowest responses with 5.26% each. No respondents reported working in the local IT labor market or in the sale of computer technics. Some of the companies are product startups and work in other domains, such as IT in administrative activities and MES, hybrid: software development & IT outsourcing, research and technology (IT area), IT services, IT financing, and research and education.

Main Conclusions:

- The IT service segment is the most represented among the respondents, indicating that many companies in the AI and Data Science field provide services to other companies rather than develop products.
- The other product startup segment is also relatively high, indicating a significant number of startups working in AI and Data Science.
- The lack of responses in the local IT labor market and sale of computer technics segments could suggest a gap in the market for companies working in these areas.
- The other categories reported by respondents were diverse, highlighting the broad scope of the IT industry and the varied roles that AI and Data Science companies play within it.

3.6 The main fields of activities of organization

The question aims to collect the main direction(-s) of business and IT development activities of the organizations, allowing multiple choices of the domains.

Data description:
Most of the companies declare that their primary business activities are in Manufacturing and development, 18 of them (47,37%), Design - 15 (39,47%), Consulting - 17 (44,74%), Customer Service – 16 (42,11%) and Research - 15 (39,47%) domains. The main domains of their applications and solutions lay in Education, Public Services, Sales, Marketing, Finance, Security, Healthcare, Transportation and others.

Discussion:
The main directions of the organizations answering this question are in manufacturing, design, development and consulting which shows their interest in

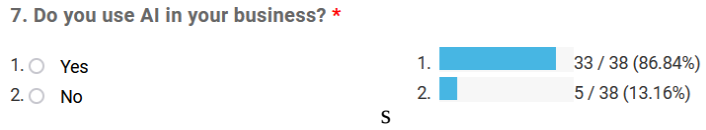
improving their business toward application of AI and DS based products and services in range of domains, from education via sales and marketing, toward healthcare and transport.

Main conclusions:

- Manufacturing/development is the most common field of activity for companies in the AI and Data Science field.
- Consulting and research are also popular fields.
- Customer service and design are other areas of interest.
- Many companies have multiple fields of activity, indicating diverse business interests.

3.7 The usage of AI in business activities?

The question aims to find out whether organizations use AI in their business activities.



Data description:
Among 38 organizations, 33 (86.64%) use AI, while the rest 5 (13.16%) do not use AI in their business activities, while intend to do so.

Discussion:
More than half of the organizations have used AI in their business, products and services, and participation in this survey clearly expresses their interest to improve their business toward AI and DS – related domains, activities and solutions.

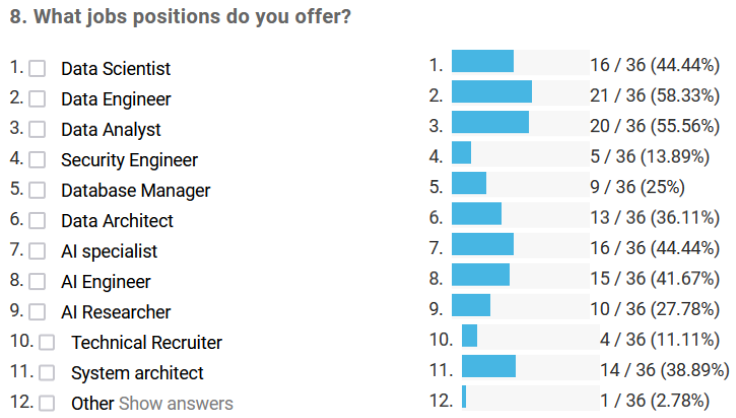
Main conclusions:

- Most companies use AI in their business.
- The high percentage of companies using AI indicates its importance and relevance in various industries and businesses.

AI Job Research

3.8 AI-related job positions

Thes section starts with the question which examines AI, Machine learning (ML) and Data Science (DS) job positions offered at IT companies. It is worth noting that five markets of project participants' countries were analysed. The results are presented below.



Data description:
The dataset includes job positions in the fields of Data Science, Machine Learning (ML), and Artificial Intelligence (AI) offered by different companies. The dataset contains a total of 12 job positions, including "Other."

Discussion:
Out of the 12 job positions, Data Engineer had the highest percentage of job offerings (58.33%), followed by Data Analyst (55.56%) and Data Scientist (44.44%). The other job positions had a lower percentage of job offerings. Technical Recruiter had the lowest percentage of job offerings (11.11%), followed by Security Engineer (13.89%) and Database Manager (25%).

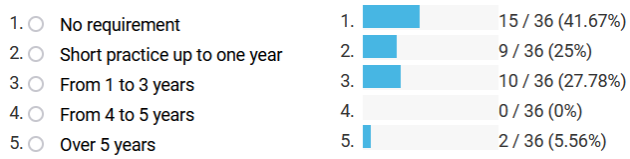
Main conclusions:

- Data Engineer, Data Analyst, and Data Scientist are the most commonly offered job positions in the fields of Data Science, Machine Learning (ML), and Artificial Intelligence (AI).
- Technical Recruiter, Security Engineer, and Database Manager are the least commonly offered job positions in the fields of Data Science, Machine Learning (ML), and Artificial Intelligence (AI).
- Companies in these fields are more focused on positions related to data than AI, ML, or security.

- The job market in these fields is growing, with many job opportunities available for professionals with skills and experience in data-related positions.

3.9 Does an experience in AI field is required?

The question aims to find out whether experience in AI field is required for jobs offered. The results are presented below:



Data description:
The dataset includes job positions in the fields of Data Science, Machine Learning (ML), and Artificial Intelligence (AI) offered by different companies. The dataset contains information on the required experience level for the job positions, ranging from no requirement to over 5 years of experience.

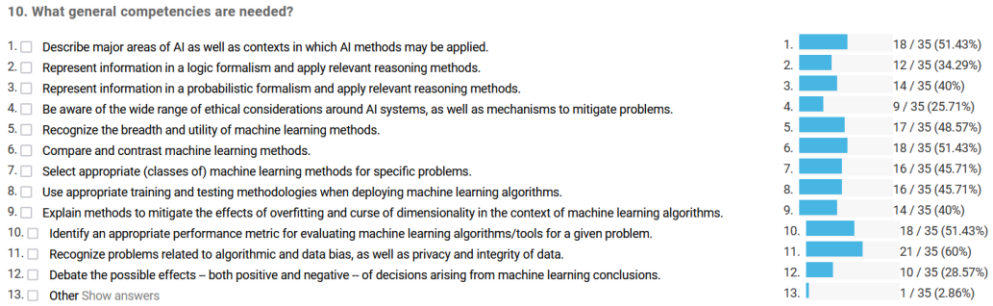
Discussion:
Out of the 36 job positions, 41.67% did not require any experience in AI. The majority of job positions required experience ranging from short practice up to one year (25%) to from 1 to 3 years (27.78%). None of the job positions required experience from 4 to 5 years, and only 5.56% of job positions required experience over 5 years.

Main conclusions:

- Many job positions in the fields of Data Science, Machine Learning (ML), and Artificial Intelligence (AI) do not require experience in AI.
- The majority of job positions require a lower level of experience, ranging from short practice up to one year to from 1 to 3 years.
- Job seekers who have a lower level of experience in AI still have a chance to find job opportunities in these fields.
- Companies are willing to provide training and development opportunities for new employees who are willing to learn and grow in the field of AI.
- However, having more than 5 years of experience in AI can provide a competitive advantage for job seekers who are looking for high-level job positions in these fields.

3.10 What general competencies are needed?

The question aims to find out what general competencies are needed in AI and DS related jobs. The results are presented below:



Data description:
The dataset includes general competencies needed in Artificial Intelligence (AI) and Data Science (DS) related jobs. The dataset contains information on various competencies such as knowledge of major areas of AI, ethical considerations around AI systems, machine learning methods, and performance metrics.

Discussion:
The results indicate that recognizing problems related to algorithmic and data bias as well as privacy and integrity of data was the competency that had the highest percentage (60%). The competency with the lowest percentage was "Other" (2.86%), which means that there were few competencies that did not fall into the provided categories.

Other high-percentage competencies were describing major areas of AI as well as contexts in which AI methods may be applied (51.43%), recognizing the breadth and utility of machine learning methods (48.57%), and identifying an appropriate performance metric for evaluating machine learning algorithms/tools for a given problem (51.43%).

On the other hand, competencies such as representing information in a logic formalism and applying relevant reasoning methods (34.29%), representing information in a probabilistic formalism, and applying relevant reasoning methods (40%), and debating the possible effects of decisions arising from machine learning conclusions (28.57%) had lower percentages.

Main conclusions:

- Recognizing problems related to algorithmic and data bias as well as privacy and integrity of data is the most important competency needed for AI and DS-related jobs.
- Describing major areas of AI as well as contexts in which AI methods may be applied, identifying an appropriate performance metric for evaluating machine learning algorithms/tools for a given problem, and recognizing the breadth and utility of machine learning methods are also important competencies needed for AI and DS-related jobs.

- Some competencies, such as representing information in a logic or probabilistic formalism and applying relevant reasoning methods and debating the possible effects of decisions arising from machine learning conclusions, had lower percentages.
- Companies may need to focus on providing training and development opportunities for job seekers who have weaker competencies in these areas to enhance their skills and abilities.

3.11 What dispositions are needed for employees?

The question asks what employees' abilities are needed for AI and DS jobs. Th list of abilities and skills are listed and the first number beside an ability indicates that the ability all AI and Data Science graduates should have mastered, while the second number denotes an item that most AI and Data Science graduates would be expected to have mastered. The results are below.

	T1	T2
Astute to, and respectful of, the fact that AI is not a new field, but rather one with a long and rich history.	23/38 (60.5%)	15/38 (39.5%)
Respectful of the benefits and limitations of logic-based representations of knowledge.	25/38 (65.8%)	13/38 (34.2%)
Attentive to the rich history behind formal logic and logic-based algorithms, in order to draw upon them for specific applications.	17/38 (44.7%)	21/38 (55.3%)
Respectful of the benefits and limitations of probability-based representations of knowledge and methods for performing inference over them.	18/38 (47.4%)	20/38 (52.6%)
Respectful in understanding that there may be multiple acceptable solutions in a state space, as well as multiple ways to find them. Using judgement to evaluate different solutions or problem-solving approaches, depending on external conditions, such as the need for optimality, time constraints, etc.	17/38 (44.7%)	21/38 (55.3%)
Adaptable in utilizing the relationship between algorithm, heuristics, and optimality for designing a solution to a problem.	19/38 (50%)	19/38 (50%)
Professional use of machine learning. Appreciate that, though recently made popular, machine learning is not a recent innovation. Look for existing solutions before presuming a new invention is required.	21/38 (55.3%)	17/38 (44.7%)
Accurate and ethical use of machine learning (i.e., is not an ad-hoc set of “tricks” and that it should be used responsibly.)	19/38 (50%)	19/38 (50%)
Strong commitment to applying machine learning as part of a process toward a goal for a client. doing machine learning” is not, in the general case, a simple process of applying a machine learning program to a conveniently-formatted data set.	23/38 (60.5%)	15/38 (39.5%)

Thoroughness when comparing learned models. There are several dimensions along which learned models may be compared, ranging from empirical loss minimization to model size and complexity to human interpretability.		
Ethically present results that are fair and honest comparisons considering all aspects of model comparison (quality, efficiency, interpretability, etc.).	16/38 (42.1%)	22/38 (57.9%)
Thorough and astute algorithm selection and evaluation. Know that these choices have implications for and must be made with important stakeholders -- i.e., those for whom models are being developed.	21/38 (55.3%)	17/38 (44.7%)
Apply accurate and ethical evaluation approaches for models in which we can have high confidence.	17/38 (44.7%)	21/38 (55.3%)
Thorough and astute algorithm selection and evaluation. Appreciate the importance of algorithm choice and evaluation metric on the quality of a learned model. Know that these choices have implications for and must be made with important stakeholders -- i.e., those for whom models are being developed. [See ML - Supervised Learning]	20/38 (52.6%)	18/38 (47.4%)
Appreciate the importance of applying accurate and ethical principled evaluation approaches for models in which we can have high confidence.	18/38 (47.4%)	20/38 (52.6%)
Attention to dealing in unsupervised learning which offers useful techniques for data exploration, understanding, summarization, and visualization.	18/38 (47.4%)	20/38 (52.6%)
Attention to detail in that unsupervised learning which can be a useful pre-processing step to improve the quality or efficiency of supervised learning algorithms.	18/38 (47.4%)	20/38 (52.6%)
Attention to detail regarding challenges (e.g., time inhomogeneity, data sparsity) present in ML models generally may be more salient in specific contexts.	20/38 (52.6%)	18/38 (47.4%)
Professionalism in machine-learned modeling, understanding the potential negative implications of using a machine-learned model that is difficult or impossible to interpret or explain.	24/38 (63.2%)	14/38 (36.8%)
Responsible use of deep learning, since there are many problems for which the power of deep learning is more than what is necessary.	23/38 (60.5%)	15/38 (39.5%)
Collaborative and ethical commitment to the social and political concerns around deepfakes.	19/38 (50%)	19/38 (50%)

Data description:
he data shows the percentage of respondents who selected each ability or skill that they believe is needed for AI and data science jobs. The abilities are ranked with two numbers; the first number indicates the percentage of respondents who believe all AI

and data science graduates should have mastered the ability, and the second number denotes the percentage of respondents who believe most graduates would be expected to have mastered it.

Discussion:
The results show that most respondents believe it is essential for AI and data science employees to be respectful of the long and rich history behind the field, as well as the benefits and limitations of both logic-based and probability-based representations of knowledge. They should also be attentive to the history behind formal logic and logic-based algorithms and be adaptable in utilizing the relationship between algorithms, heuristics, and optimality for designing a solution to a problem.

Moreover, the respondents believe that AI and data science employees should be professional in their use of machine learning, appreciate that machine learning is not a recent innovation, and use it ethically and responsibly. They should also be committed to applying machine learning as part of a process toward a goal for a client and be thorough when comparing learned models. They should also be ethical in presenting results that are fair and honest, considering all aspects of model comparison.

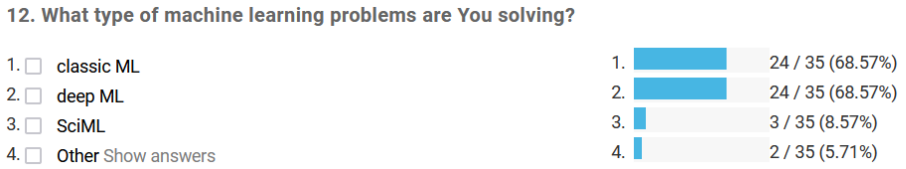
The data shows that respondents also think that algorithm selection and evaluation are crucial to the quality of learned models and should be made with important stakeholders in mind. Additionally, they believe that it is essential to apply accurate and ethical evaluation approaches for models in which we can have high confidence. They should also pay attention to detail in unsupervised learning techniques for data exploration, understanding, summarization, and visualization, as well as the challenges present in ML models that may be more salient in specific contexts.

Main conclusions:

- AI and data science employees need to be respectful of the long and rich history behind the field, as well as the benefits and limitations of both logic-based and probability-based representations of knowledge.
- They should be committed to applying machine learning as part of a process toward a goal for a client and be thorough when comparing learned models.
- Algorithm selection and evaluation are crucial to the quality of learned models and should be made with important stakeholders in mind.
- It is essential to apply accurate and ethical evaluation approaches for models in which we can have high confidence.
- Attention to detail is crucial in unsupervised learning techniques for data exploration, understanding, summarization, and visualization.

3.12 What type of machine learning problems are You solving?

The question asks what type of machine learning problems are solved in companies. The results are presented below:



Data description:
The data suggests that among the companies that participated in the survey, the majority (68.57%) are solving machine learning problems using classic ML and deep ML techniques, while a small percentage (8.57%) are using SciML methods. Additionally, a small number (5.71%) of companies reported using other types of machine learning techniques.

Discussion:
The results indicate that classic ML and deep ML techniques are widely used by companies for solving machine learning problems. This could be due to the fact that these methods are well-established and have been used for many years in various domains. On the other hand, the lower percentage of companies using SciML suggests that this is a relatively new area that is still gaining traction among businesses.

Main conclusions:

- Classic ML and deep ML techniques are widely used by companies for solving machine learning problems.
- SciML methods are used by a small percentage of companies, indicating that this is a relatively new area.
- Other types of machine learning techniques are also used by some companies, but to a lesser extent.

3.13 What models were developed (studied) within the company?

The question asks what models were developed, used and/or studied within the company. The results are presented below:

Data description:
The data shows the models that were developed, used, and/or studied within the company. A total of 34 responses were collected.

Discussion:
The most commonly developed, used, and/or studied models within the company were decision trees and MLPs, with both models being mentioned by more than half of the respondents. The next most popular models were rules, CNNs, and RNNs, mentioned by around 50% of the respondents. The models with the least mentions were GRU and U-Net, mentioned by less than 15% of the respondents.

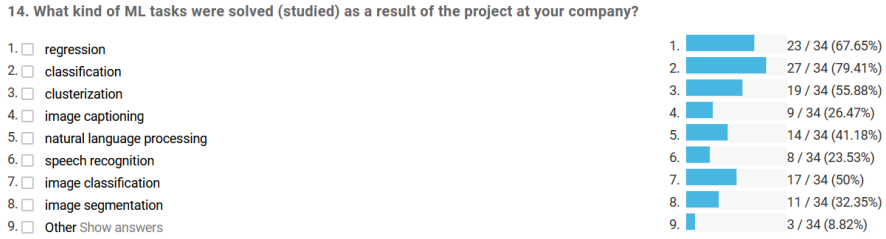
It's interesting to note that the use of neural networks is quite prevalent within the company, with MLPs being the most popular type of neural network, followed by CNNs and RNNs. Additionally, decision trees and rules were also commonly used, indicating that both traditional and deep learning models are being utilized.

Main conclusions:

- Decision trees and MLPs were the most commonly developed, used, and/or studied models within the company.
- Rules, CNNs, and RNNs were also popular models.
- MLPs were the most popular type of neural network, followed by CNNs and RNNs.
- Traditional and deep learning models are both being utilized within the company.
- GRU and U-Net were the least commonly used models.

3.14 What kind of ML tasks were solved (studied) as a result of the project at your company?

The question aims to find out what kind of ML tasks have been used, solved and/or studied as results of the and companies' projects and business activities. The results are presented below:



Data description:
The data shows the types of AI and ML tasks that were solved or studied as a result of a project in a company. The responses were collected through a survey with 34 participants.

Discussion:
From the data, it can be seen that the most common AI and ML tasks that were solved or studied were classification (79.41%), regression (67.65%), and image classification (50%). Natural language processing (41.18%) and clusterization (55.88%) were also popular. On the other hand, image captioning (26.47%), speech recognition (23.53%), and image segmentation (32.35%) had a lower percentage of responses.

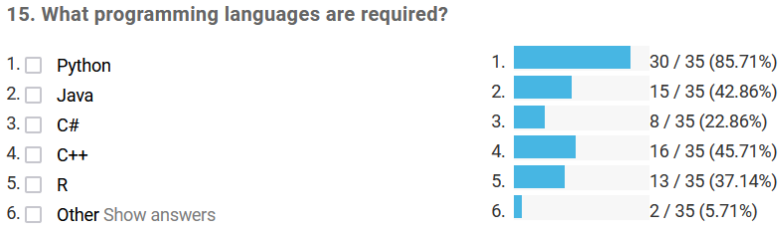
Regarding other AI and ML tasks, only a few participants mentioned optimization, data extraction, and object detection. Three participants reported that they do not solve problems related to machine learning.

Main conclusions:

- Classification and regression are the most common AI and ML tasks that were solved or studied in the company project.
- Image classification and clusterization are also popular tasks.
- Image captioning, speech recognition, and image segmentation had a lower percentage of responses.
- Few participants mentioned other AI and ML tasks, such as optimization, data extraction, and object detection.
- Some participants reported that they do not solve problems related to machine learning.

3.15 What programming languages are required?

The question asks what programming languages are required and mainly used within a company. The results are presented below:



Data description:
The data describes the programming languages required for work within companies in the field of artificial intelligence and machine learning.

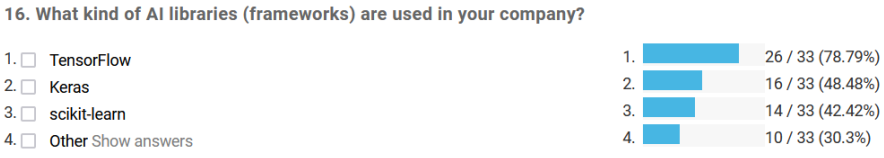
Discussion:
The results show that Python is the most commonly required programming language, with 85.71% of companies indicating a need for it. This is not surprising, given that Python has become a standard language for AI and ML development due to its simplicity, flexibility, and strong community support. The second most commonly required language is C++, with 45.71% of companies indicating a need for it. This is likely due to its efficiency and popularity in developing computer vision and image processing applications. Java, R, and C# are also commonly required languages in the field, with 42.86%, 37.14%, and 22.86% of companies indicating a need for them, respectively. Other languages such as JavaScript and Matlab are required less frequently, with only 5.71% of companies indicating a need for them.

Main conclusions:

- Python is the most commonly required programming language for AI and ML work within companies.
- C++ is also commonly required, particularly for computer vision and image processing applications.
- Java, R, and C# are also commonly required languages in the field.
- Other languages such as JavaScript and Matlab are required less frequently.

3.16 What kind of AI libraries (frameworks) are used in your company?

The question asks what kind of AI libraries and frameworks are used in a company. The results are presented below:



Data description:

The data presents the percentage of usage of AI libraries and frameworks in a company. The results are presented in terms of the percentage of usage for each framework.

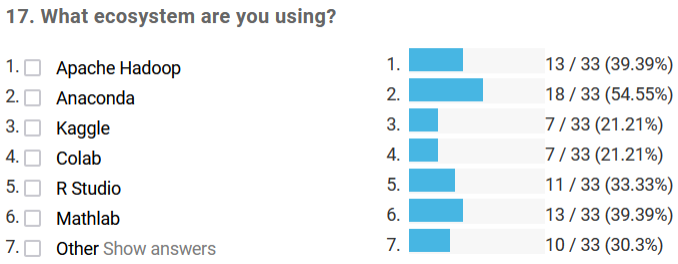
Discussion:
According to the results, the most commonly used AI framework in the company is TensorFlow, with 78.79% of respondents using it. Keras and scikit-learn are also widely used, with 48.48% and 42.42% of respondents using them, respectively. Other frameworks such as PyTorch, Apache TVM, AMD HIP, OpenAI, and Matlab toolboxes are also used, but to a lesser extent.

Main conclusions:

- TensorFlow is the most widely used AI framework in the company.
- Keras and scikit-learn are also commonly used frameworks.
- Other frameworks such as PyTorch, Apache TVM, AMD HIP, OpenAI, and Matlab toolboxes are also used, but to a lesser extent.

3.17 What ecosystem are you using?

The question asks what AI, ML and DS ecosystems are used in a company. The results are presented below:



Data description:
The data presents the usage of various AI, ML and DS ecosystems in a company. The respondents were asked to choose from a list of options which ecosystems they use, and the results were recorded as percentages.

Discussion:
According to the results, the most commonly used ecosystem in the company is Anaconda, with 54.55% of respondents indicating its usage. It is followed by Apache Hadoop (39.39%), Matlab (39.39%), R Studio (33.33%), and Other (30.3%). The least used ecosystem is Kaggle, with only 21.21% of respondents indicating its usage.

Other ecosystems mentioned in the "Other" category include Azure, PyCharm, SparkR, PySpark, AWS, DataBricks, and Google Colab.

Main conclusions:

- Anaconda is the most commonly used ecosystem in the company, indicating the popularity of its comprehensive suite of ML tools and packages.
- Apache Hadoop and Matlab are also popular among the respondents, suggesting that the company works with large datasets and complex algorithms.
- The relatively low usage of Kaggle may indicate that the company relies less on external datasets and competitions, and instead focuses on its own internal data.
- The variety of ecosystems mentioned in the "Other" category suggests that the company is willing to experiment with new tools and platforms to meet its specific needs.

3.18 Please rate needed competences of academic/analytical employees.

The question asks companies to rate needed competences of academic/analytical employees, from 1-low to 5-high. The results are presented below:

	1-low	2	3	4	5-high
Ability to perform simulations and experiments	1/31 (3.2%)	1/31 (3.2%)	12/31 (38.7%)	8/31 (25.8%)	9/31 (29%)
Ability to verify results with statistical tools	1/31 (3.2%)	3/31 (9.7%)	11/31 (35.5%)	9/31 (29%)	7/31 (22.6%)
Ability to carry out feasibility studies on new technologies, methods, and standards that could be of use to the organizationasd	0/32 (0%)	2/32 (6.3%)	14/32 (43.8%)	12/32 (37.5%)	4/32 (12.5%)
Ability to innovate and modify methods and approaches used in the organization	0/32 (0%)	4/32 (12.5%)	14/32 (43.8%)	7/32 (21.9%)	7/32 (21.9%)
Ability to write research or technical papers on the results of work	4/32 (12.5%)	9/32 (28.1%)	10/32 (31.3%)	3/32 (9.4%)	6/32 (18.8%)
Ability to apply modern methods of psychology and pedagogy in everyday work	3/32 (9.4%)	7/32 (21.9%)	12/32 (37.5%)	4/32 (12.5%)	6/32 (18.8%)
Ability to patent inventions and technical innovations, to perform standardization of developed systems and processes	6/32 (18.8%)	8/32 (25%)	8/32 (25%)	6/32 (18.8%)	4/32 (12.5%)
Ability to ensure and manage copyright protection of software	5/32 (15.6%)	5/32 (15.6%)	10/32 (31.3%)	4/32 (12.5%)	

products and to carry out their price evaluation					

Data description:
The data presents the ratings given by companies to the needed competences of academic/analytical employees on a scale of 1 to 5 (1 being the lowest and 5 being the highest) for seven different abilities. The data is presented in terms of the number of companies that rated a specific ability with a specific score out of the total number of companies that responded to the survey (some abilities are recognized by 31 from 32 companies).

Discussion:
The data indicates that companies prioritize the ability to carry out feasibility studies on new technologies, methods, and standards as the most important competence for academic/analytical employees. The ability to innovate and modify methods and approaches used in the organization and the ability to apply modern methods of psychology and pedagogy in everyday work were also rated highly.

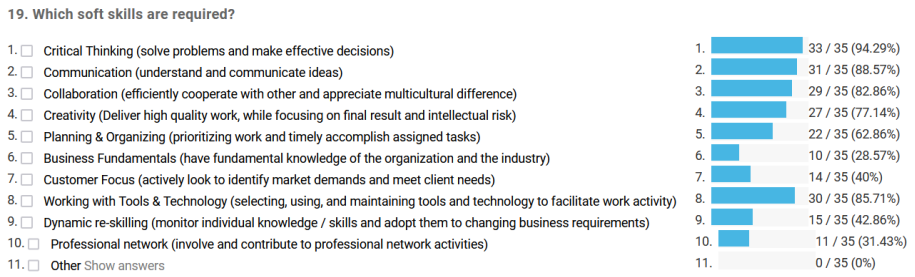
On the other hand, the ability to perform simulations and experiments, the ability to verify results with statistical tools, and the ability to ensure and manage copyright protection of software products were rated relatively lower compared to other competences.

Main conclusions:

- Companies prioritize competences related to innovation and adaptation, feasibility studies, and modern methods of psychology and pedagogy for academic/analytical employees.
- The ability to perform simulations and experiments and the ability to verify results with statistical tools were rated relatively lower by companies.
- Companies do not consider patenting inventions and technical innovations as the topmost priority for academic/analytical employees.

3.19 Which soft skills are required?

The question asks companies to rate soft skills needed from their employees. The results are presented below:



Data description:
The data presents the results of a survey that asked companies about the soft skills they consider essential for employees. The survey presented a list of 11 skills, including critical thinking, communication, collaboration, creativity, planning and organizing, business fundamentals, customer focus, working with tools and technology, dynamic re-skilling, professional network, and other. The companies were asked to indicate the importance of each skill for the employees working in AI and DS related jobs.

Discussion:
The results show that critical thinking is the most required soft skill, with 94.29% of companies listing it as a requirement. Communication and working with tools and technology are also highly valued, with 88.57% and 85.71% of companies requiring them, respectively. Planning and organizing, business fundamentals, and collaboration are moderately required, with approximately 60-80% of companies listing them as important skills. Customer focus, dynamic re-skilling, and professional networking are less frequently required, with only around 30-40% of companies listing them as requirements.

Main conclusions:

- Critical thinking, communication, and working with tools and technology are the most important soft skills required by companies
- Planning and organizing, business fundamentals, and collaboration are also highly valued by employers
- Customer focus, dynamic re-skilling, and professional networking are less frequently required
- It is important for job seekers to focus on developing and showcasing these important soft skills to improve their employability in the current job market.

Additional competences

3.20 What additional competences are needed?

The question asks what additional competences are required by companies. The results are presented below:

Data description:
The data presents the results of a survey that asked respondents about additional competencies required by companies. The survey presented a list of 21 competencies related to computer science and technology and asked the respondents to indicate whether they believe each competency is required by companies. The competences range from technical skills such as programming and data structure to more specific data-related skills such as data security and data governance. The data also includes the percentage of respondents who consider each competence necessary for companies.

Discussion:
Based on the results, we can see that the most important competences required by companies are the ability to select appropriate data structures (79.41%), followed by the ability to select appropriate algorithms (70.59%). Visualizing the results of AI analysis (61.76%) and the ability to implement cloud computing-based solutions (41.18%) are also important competences required by companies. On the other hand, competences such as analyzing threats to real-time applications (17.65%), developing and operating large-scale data storage (20.59%), and using a wide range of Big Data analytics platforms (23.53%) are considered less important.

Main conclusions:

- The ability to select appropriate data structures and algorithms are the most important competences required by companies.

- Visualization of AI analysis and the ability to implement cloud computing-based solutions are also important competences.
- Analyzing threats to real-time applications, developing and operating large-scale data storage, and using a wide range of Big Data analytics platforms are considered less important competences.
- Companies value employees who have strong problem-solving and analytical skills.

3.21 What additional job competencies are required?

The question asks companies that work in AI and Data Science filed to indicate what additional competences are required by companies. Answers are in free text form and the results are presented below:

- Ability to implement tasks from unit level to general/universal problem.
- Experience in practical application would be nice to have
- Software architecture
- Presentation skills is especially important to be developed, having them is crucial for customer meetings and internal meetings
- Only engineer's consciousness and adaptation to every situation.
- Optional - domain knowledge related to the audio analytics

Data description:
The data consists of responses from companies working in the AI and Data Science field regarding the additional competences required from their employees and graduates. The responses were in free text form and were collected through a survey.

Discussion of Results:
From the responses, it is clear that companies require a range of competences from their employees and graduates beyond technical skills in AI and data science. The additional competences that were identified include:

Ability to implement tasks from unit level to general/universal problem: This competence requires individuals to be able to work on tasks that range from small-scale, specific problems to larger, more complex issues that have broader implications.
Experience in practical application: While technical skills are important, companies also value employees and graduates who have practical experience in applying these skills in real-world scenarios.
Software architecture: Companies require employees who are well-versed in software architecture, which involves designing and planning the structure of software systems.
Presentation skills: Effective presentation skills are crucial for employees who interact with customers and participate in internal meetings. Companies value employees who can communicate their ideas clearly and effectively.

Engineer's consciousness and adaptation to every situation: Companies require individuals who can think critically, adapt to different situations, and approach problems with an engineering mindset.
Optional - domain knowledge related to audio analytics: Some companies may require domain-specific knowledge related to audio analytics, such as familiarity with audio processing algorithms and techniques.

Main Conclusions:

- Technical skills in AI and data science are important but not sufficient for success in this field.
- Companies value employees and graduates who have a range of additional competences, such as the ability to work on problems of different scales, practical experience, software architecture, presentation skills, critical thinking, adaptability, and domain-specific knowledge in some cases.
- Effective communication skills are essential for success in this field, particularly for employees who interact with customers and participate in internal meetings.
- The competences required by companies in the AI and Data Science field are diverse, reflecting the interdisciplinary nature of this field.

Current state of local market

3.22 What is your impressions as an employer concerning specialists, graduating with a training degree in AI?

The question asks companies that work in AI and Data Science field to indicate their impressions as an employer concerning specialists, graduating with a training degree in AI. Answers are in free text form and the results are presented below:

- There are very, very few of these specialists.
- Ability to understand business requirements and estimate practical aspects of development
- The requirements for skills related to machine learning and data science are not high. Employers do not require knowledge of the subject.
- Have good background but lack detailed understanding of specific models.
- My concern is that there is no practical use of ML experience with specialists.
- Need more practical experience, to be part of simple AI projects, even building robots or small STEM projects
- Not applicable. We don`t need AI specialists
- There is a severe gap on job market in that field. AI specialists are even more challenging to source than regular IT engineers/developers (even at Junior level).
- It's challenging and very interesting considering that new things are explored every day.
- The market of AI specialists is getting better and better.
- we don't have enough good specialists, they have great passion to work, sometimes they are focus on problem, without business view
- Knowledge of AI related fields and fields needed to work with Ai are below every standard.
- they are often theorists without much practical skills, let alone intelligent
- enough theoretical knowledge, had experience working with big data
- Very hard to find anyone on the local market. Very high salary expectations.
- So far we had no students with AI degrees. Students had only a few subjects from the AI field.
- normal
- General knowledge is at a good level. The situation is opposite regarding the domain knowledge, which is often missing point.

Data description:
The data consists of free text responses from companies working in the AI and Data Science field, where they were asked to provide their impressions as an employer concerning specialists graduating with a training degree in AI.

Discussion:
The responses suggest that there is a shortage of AI specialists in the job market. Employers have concerns that the graduates have good background knowledge but

lack practical experience, and there is no practical use of machine learning experience. The responses also indicate that AI specialists have high salary expectations, and it is difficult to find suitable candidates in the local market. Employers require AI specialists to understand business requirements and estimate practical aspects of development. Some employers also mentioned that the knowledge of AI related fields and fields needed to work with AI are below every standard. The responses suggest that it is challenging to find candidates who have the required theoretical and practical knowledge to work with AI and machine learning.
All in all, the responses given by the companies regarding the additional competences required by AI and Data Science companies are quite varied. Some companies express concern over the lack of availability of AI specialists, whereas some feel that the knowledge of AI-related fields and fields needed to work with AI are below standard. Some companies also feel that the theoretical knowledge of AI specialists is good, but they lack practical skills.

Interestingly, some companies feel that they do not need AI specialists, while others emphasize the need for practical experience, particularly in simple AI projects. Some companies also highlight the importance of understanding business requirements and estimating practical aspects of development. In terms of market trends, some companies observe that the market of AI specialists is getting better and better, but others find it challenging to source AI specialists, even at the junior level.

Main conclusions:

- There is a severe shortage of AI specialists in the job market.
- Knowledge of AI-related fields and fields needed to work with AI are below standard for some companies.
- Theoretical knowledge of AI specialists is good, but practical skills are often lacking.
- Some companies feel that practical experience in simple AI projects is essential.
- Understanding business requirements and estimating practical aspects of development are crucial competences.
- Some companies do not feel the need for AI specialists.
- The market of AI specialists is improving, but some companies still find it challenging to source them.

3.23 What are your impressions as an employer concerning the specialists, graduating with a training degree in an information technology?

The question asks companies that work in AI and Data Science field to indicate their impressions as an employer concerning the specialists, graduating with a training degree in an information technology. Answers are in free text form and the results are presented below:

- It all depends on how much time they judged on practical solutions to obencyh problems in the market of needs.
- Their lack of creativity when it comes real life usages of AI
- The requirements for skills related to machine learning and data science are not high. Employers do not require knowledge of the subject.
- Very good background and experience.
- My concern is that there is no practical use of ML experience with specialists.
- They have good basic skills and we have zero language barrier, as in most companies we need English on tech level, however, more practical exercises would be beneficial
- Specialists in information technology more and more work in teams; nowadays the software is not prepared by one specialist but it is complex and complicated. Therefore collaboration skill we identified as the most needed.Q24 - not applicable.Q25 - we don`t need AI specialistsQ31 - currently difficult to say
- There is sufficient pool of good Junior talent on job market, but situation gets worse (from employer perspective) at Regular/Mid or Senior level specialists.
- The market for IT specialists is at a high level.
- I have no specific feedback, it's similar for me like with people with degree in AI.
- Same as above.
- They learn quickly, are technically proficient.
- Less practical skills
- The "output" is heterogeneous, but that is how it has worked since I was a student in 1990s. Few brilliant kids, a decent number of good ones, and then "the others" who made the wrong career choice.
- Bad
- Knowledge and skills are at relatively high level. It would be beneficial to have more specialists understanding the causes of particular behaviors.

Data description:
The data consists of free-text responses from companies in the IT industry regarding their impressions as employers of specialists graduating with an information technology degree. The responses are in the form of opinions and experiences of the employers with regards to the skills and abilities of the graduates in the IT field.

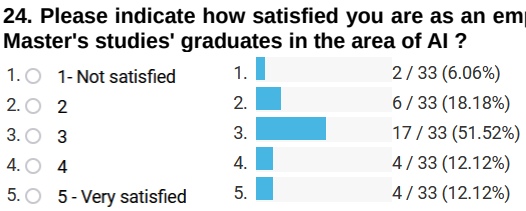
Discussion:
The results show that opinions on the quality of graduates with an IT degree are mixed. Some employers appreciate the good background and technical proficiency of these specialists, while others find their practical skills lacking. Employers seem to agree that collaboration and creativity are essential skills for IT specialists, and there is a sufficient pool of good junior talent on the job market. However, the situation becomes more challenging when looking for regular/mid or senior-level specialists. Some employers indicate that there is no need for AI specialists, while others say there is a severe gap in the job market for AI specialists.

Main conclusions:

- Employers have mixed opinions on the quality of IT graduates, but generally appreciate their technical proficiency and good background.
- Practical skills and creativity are crucial skills for IT specialists, and collaboration skills are essential for working in teams.
- The job market for junior IT specialists is sufficient, but finding regular/mid or senior-level specialists can be challenging.
- Opinions on the need for AI specialists are divided, with some employers indicating a severe gap in the job market, while others say there is no need for them.

3.24 Please indicate how satisfied you are as an employer with the level of preparation of Master's studies' graduates in the area of AI ?

The question asks companies that work in AI and Data Science field to indicate how they are satisfied, as an employer, with the level of preparation of Master's studies' graduates in the area of AI. The results are presented below:



Data description:
The data consists of responses from companies working in the AI and Data Science field who were asked to rate their level of satisfaction with the level of preparation of Master's studies' graduates in the area of AI on a scale of 1-5, with 1 indicating "Not satisfied" and 5 indicating "Very satisfied". The responses were collected from a sample size of 33 companies.

Discussion:

Among the 33 companies that participated in the survey, the largest percentage (51.52%) rated their level of satisfaction as a 3, indicating they were moderately satisfied with the level of preparation of Master's studies' graduates in the area of AI. This was followed by 18.18% of companies rating their satisfaction as a 2, indicating they were not very satisfied. Another 12.12% rated their satisfaction as a 4, indicating they were quite satisfied, while an equal percentage of companies rated their satisfaction as a 1 or 5, indicating they were not satisfied or very satisfied, respectively. Overall, these results suggest that while the majority of employers are satisfied with the level of preparation of Master's studies' graduates in the area of AI, there is still a need for improvement to meet the expectations of all employers. It is

important for educational institutions to take these results into consideration and make necessary improvements to better prepare graduates for the job market.

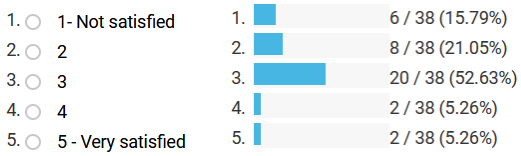
Main conclusions:

- The majority of companies were moderately satisfied with the level of preparation of Master's studies' graduates in the area of AI.
- A smaller percentage of companies were either not very satisfied or quite satisfied.
- A very small percentage of companies were either not satisfied or very satisfied.
- Overall, the responses indicate that there is room for improvement in the level of preparation of Master's studies' graduates in the area of AI, as none of the companies rated their satisfaction as very high.

3.25 Please indicate how satisfied are you with the supply (quantity) of AI specialists available for hire on the job market today and can they work?

The question asks companies that work in AI and Data Science field to indicate how they are satisfied, as an employer, with the supply (quantity) of AI specialists available for hire on the job market today and can they work. The results are presented below:

25. Please indicate how satisfied are you with the supply (quantity) of AI specialists available for hire on the job market today and can they work?



Data description:
The data represents the responses of companies working in the AI and Data Science field regarding their satisfaction with the supply (quantity) of AI specialists available for hire on the job market today. The responses are on a scale of 1 to 5, where 1 indicates "Not satisfied" and 5 indicates "Very satisfied". The data set includes responses from 38 companies.

Discussion:
From the data, we can see that the majority of companies (52.63%) are satisfied with the supply of AI specialists available for hire on the job market today. However, a significant proportion of companies (36.84%) are not satisfied or only somewhat satisfied (21.05%) with the supply of AI specialists.

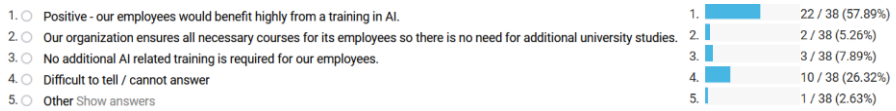
Main conclusions:

- More than one-third of the companies surveyed are not satisfied or only somewhat satisfied with the supply of AI specialists available for hire on the job market today.
- The majority of companies are satisfied with the supply of AI specialists available for hire on the job market today.
- There is still room for improvement in the quantity of AI specialists available for hire on the job market, as a significant proportion of companies are not satisfied with the current supply.

3.26 What are your views towards raising the qualification of current employees of your organization by letting them study AI at a master's level?

The question asks companies that work in AI and Data Science field to indicate what are their views towards raising the qualification of current employees of their organization by letting them study AI at a master's level. The results are presented below:

26. What are your views towards raising the qualification of current employees of your organization by letting them study AI at a master's level?



Data description:
The data presents the views of companies that work in the field of AI and Data Science on raising the qualification of their current employees by letting them study AI at a master's level. The responses are categorized into five options: Positive, No additional AI related training is required, Difficult to tell/cannot answer, Other, and Our organization ensures all necessary courses for its employees so there is no need for additional university studies.

Discussion:
The majority of the companies (57.89%) have a positive view towards raising the qualification of their current employees by letting them study AI at a master's level. This suggests that companies are willing to invest in the education and training of their employees to keep up with the advancements in AI and Data Science. However, a significant proportion of companies (26.32%) find it difficult to tell or cannot answer whether additional AI-related training is required for their employees, indicating a lack of clarity or direction in terms of training needs.

Only a small proportion of companies (7.89%) believe that no additional AI related training is required for their employees, which could mean that they already have highly qualified AI specialists in their organization. Only two companies (5.26%) stated that their organization ensures all necessary courses for its employees so there is no need for additional university studies. This implies that some companies might

prefer in-house training programs or short-term courses to upgrade their employees' skills.

Main conclusions:

- The majority of companies have a positive view towards raising the qualification of their current employees by letting them study AI at a master's level.
- A significant proportion of companies find it difficult to tell or cannot answer whether additional AI-related training is required for their employees, indicating a lack of clarity or direction in terms of training needs.
- Only a small proportion of companies believe that no additional AI related training is required for their employees, suggesting that most companies see the value in investing in the education and training of their employees.
- Some companies prefer in-house training programs or short-term courses to upgrade their employees' skills, rather than sending them for a full master's degree.

3.27 Please indicate the level of agreement with the following statements about the university graduates in the area of AI.

The question asks companies that work in AI and Data Science field to indicate the level of agreement with the following statements about the university graduates in the area of AI. The results are presented below, from 1 to 5, where 1 (strongly disagree), 3 (neutral) and 5 (strongly agree).

27. Please indicate the level of agreement with the following statements about the university graduates in the area of AI.

	1 (strongly disagree)	2	3 (neutral)	4	5 (strongly agree)
Level of professional theoretical knowledge is high	3/38 (7.9%)	5/38 (13.2%)	19/38 (50%)	6/38 (15.8%)	5/38 (13.2%)
Graduates are well trained practically, they know how to apply theoretical knowledge in practice	1/38 (2.6%)	11/38 (28.9%)	19/38 (50%)	3/38 (7.9%)	4/38 (10.5%)
Level of basic knowledge in such areas as business management, economics, and law is good	4/38 (10.5%)	6/38 (15.8%)	19/38 (50%)	8/38 (21.1%)	1/38 (2.6%)
There is a good understanding and knowledge about the latest IS related international standards	1/38 (2.6%)	6/38 (15.8%)	22/38 (57.9%)	5/38 (13.2%)	4/38 (10.5%)
There is a strong will to create and innovate	1/38 (2.6%)	5/38 (13.2%)	18/38 (47.4%)	10/38 (26.3%)	4/38 (10.5%)

There is a strong will and commitment to finding and keeping a good job	0/38 (0%)	4/38 (10.5%)	14/38 (36.8%)	14/38 (36.8%)	6/38 (15.8%)
Graduates respect the work ethics of the corporate culture	0/38 (0%)	3/38 (7.9%)	20/38 (52.6%)	10/38 (26.3%)	5/38 (13.2%)
Personal ambitions are measured and reasonable, self-assessment – realistic	1/38 (2.6%)	2/38 (5.3%)	21/38 (55.3%)	11/38 (28.9%)	3/38 (7.9%)
The knowledge of English (or other relevant foreign language) is good	0/38 (0%)	4/38 (10.5%)	15/38 (39.5%)	12/38 (31.6%)	7/38 (18.4%)

Data description:

The data presented in the question reflects the level of agreement of companies working in the field of AI and Data Science regarding the graduates' competencies in various areas. The companies were asked to indicate their level of agreement with several statements related to theoretical and practical knowledge, business management, innovation, work ethics, personal ambition, and foreign language proficiency. The level of agreement was rated on a scale of 1 to 5, where 1 represents "strongly disagree," 3 represents "neutral," and 5 represents "strongly agree." The data includes the percentage of respondents who selected each level of agreement for each statement.

Discussion of results:
The data shows that, overall, companies in the AI and Data Science field have a neutral to positive perception of university graduates' competencies. The majority of respondents (50%) agreed that the level of professional theoretical knowledge among graduates is high. However, when it comes to practical application of theoretical knowledge, the responses were more varied, with 28.9% of respondents selecting "2" (disagree) and 10.5% selecting "5" (strongly agree).

In terms of basic knowledge in business management, economics, and law, half of the respondents (50%) agreed that graduates have a good level of knowledge. For the understanding and knowledge of the latest international standards in the field, a majority of respondents (57.9%) agreed that graduates have a good level of knowledge.

When it comes to personal attributes such as innovation, work ethics, and personal ambition, the responses were mixed. While the majority of respondents (47.4%) agreed that graduates have a strong will to create and innovate, only 36.8% agreed that graduates have a strong will and commitment to finding and keeping a good job. A majority of respondents (52.6%) agreed that graduates respect the work ethics of the corporate culture. For personal ambition and self-assessment, a majority of respondents (55.3%) agreed that graduates have measured and reasonable personal ambitions and realistic self-assessment.

In terms of foreign language proficiency, a majority of respondents (39.5%) agreed that graduates have a good level of knowledge in English or other relevant foreign languages.

Main conclusions:

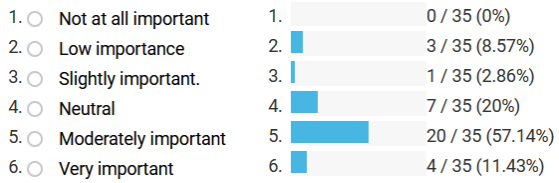
- Companies in the AI and Data Science field generally have a neutral to positive perception of university graduates' competencies.
- Graduates are perceived to have a high level of theoretical knowledge, but there is variability in their ability to apply this knowledge practically.
- Graduates are perceived to have a good level of knowledge in business management, economics, and law, as well as the latest international standards in the field.
- Graduates are perceived to have a strong will to create and innovate, respect work ethics, and have measured and reasonable personal ambition and realistic self-assessment.
- However, there is some concern regarding graduates' ability to find and keep a good job, with only 36.8% of respondents agreeing that graduates have a strong will and commitment in this area.
- The majority of respondents also agree that graduates have a good level of knowledge in English or other relevant foreign languages, which is crucial in a field that is heavily reliant on international collaboration.

Project information

3.28 How do You rate the idea of building a website which will present results AI research carried out by local University employees?

The question asks companies that work in AI and Data Science field to answer how they rate the idea of building a website which will present results AI research carried out by local University. The results are presented below.

28. How do You rate the idea of building a website which will present results AI research carried out by local University employees?



Data description:
The survey asked companies working in the AI and Data Science field to rate the importance of building a website that presents the results of AI research carried out by a local university. The responses were rated on a scale of 1 to 6, where 1 indicates "not at all important" and 6 indicates "very important." A total of 35 companies responded to the survey.

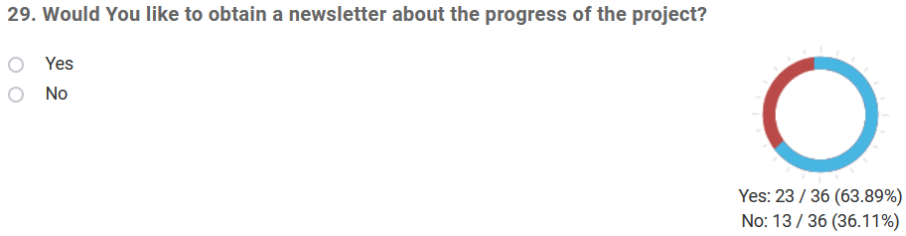
Discussion of Results:
The results indicate that the majority of companies (57.14%) believe that building a website to present AI research results carried out by a local university is moderately important. A significant number of companies (20%) were neutral, while 11.43% rated the idea as very important. A small proportion of companies (8.57%) rated the idea as having low importance, and only one company (2.86%) thought it was slightly important. No company rated the idea as not at all important.

Main Conclusions:

- Most companies in the AI and Data Science field believe that building a website to present the results of AI research carried out by a local university is moderately important.
- A significant number of companies were neutral on the idea, indicating that they may need more information or have concerns that need to be addressed.
- Only a small proportion of companies considered the idea to be of low or slight importance, indicating that the majority of companies see value in such a website.
- No company rated the idea as not at all important, indicating that even those who see the idea as less important still recognize some value in it.

3.29 Would You like to obtain a newsletter about the progress of the project?

The question asks companies that work in AI and Data Science field whether they like to obtain a newsletter about the progress of the project. The results are presented below.



Data description:
The data presented shows the responses of 36 companies working in the AI and Data Science field when asked if they would like to obtain a newsletter about the progress of the project. The options provided were "Yes" and "No".

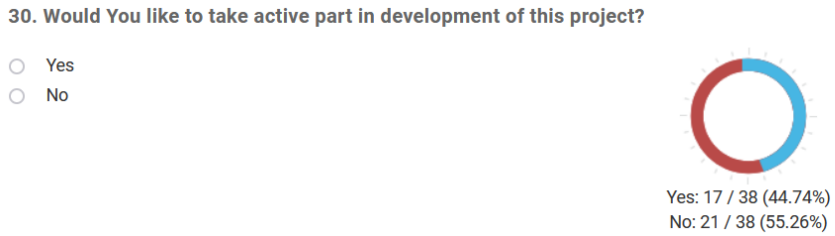
Discussion of results:
The data suggests that the majority of companies, 63.89% (23/36), would like to obtain a newsletter about the progress of the project. On the other hand, a significant minority of companies, 36.11% (13/36), are not interested in receiving such newsletters.

Main conclusions:

- The majority of companies in the AI and Data Science field are interested in receiving a newsletter about the progress of the project.
- A significant minority of companies are not interested in receiving newsletters, which should be taken into account when deciding on communication strategies.

3.30 Would You like to take active part in development of this project? (training, use-cases)

The question asks companies that work in AI and Data Science field whether they like to take active part in development of this project? (training, use-cases). The results are presented below.



Data description:
The data represents the responses of 38 companies that work in AI and Data Science field regarding whether they would like to take an active part in the development of the project through training and use-cases. The respondents were given two options: "Yes" and "No."

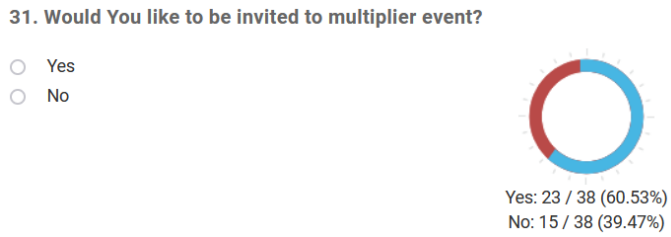
Discussion of results:
Out of the 38 companies, 17 (44.74%) responded "Yes" indicating that they would like to take an active part in the development of the project through training and use-cases, while 21 (55.26%) answered "No."

Main conclusions:

- A majority of companies in the AI and Data Science field are not interested in taking an active part in the development of the project through training and use-cases.
- The willingness to take an active part in the development of the project may depend on the specific nature and scope of the project, as well as the resources and priorities of each individual company.
- Further research would be needed to explore the reasons behind the lack of interest in taking an active part in the development of the project among the majority of the surveyed companies.

3.31 Would You like to be invited to multiplier event? (where results of the project will be presented)

The question asks companies that work in AI and Data Science field whether they like to be invited to multiplier event? (where results of the project will be presented) The results are presented below.



Data description:
The survey was conducted among companies that work in AI and Data Science fields, and the question asked was whether they would like to be invited to a multiplier event where the results of the project will be presented. A total of 38 responses were collected, out of which 23 (60.53%) responded positively and 15 (39.47%) responded negatively.

Discussion of Results:
The majority of respondents (60.53%) expressed their interest in being invited to a multiplier event where the results of the project will be presented. This indicates that companies in the AI and Data Science fields are interested in staying up-to-date with the latest developments and innovations in their field. However, 39.47% of the respondents were not interested in attending such an event.

Main Conclusions:

- The majority of companies in the AI and Data Science fields are interested in being invited to a multiplier event where the results of the project will be presented.
- There is a significant percentage of companies that are not interested in attending such an event.
- The project organizers should make sure to invite those companies that are interested in attending and try to understand the reasons for those that are not interested.

4. Conclusions

The study shows that many companies are using AI, and it is becoming increasingly important in various industries. The most commonly offered job positions in Data Science, Machine Learning, and Artificial Intelligence are Data Engineer, Data Analyst, and Data Scientist. Some job positions do not require experience in AI, but the majority require up to three years of experience. Many companies are willing to train and develop employees who are interested in learning about AI. Companies value competencies related to recognizing problems related to algorithmic and data bias, describing major areas of AI, and recognizing the utility of machine learning methods. Soft skills, such as critical thinking, communication, and working with tools and technology, are also essential. Some companies feel there is a lack of AI specialists on the job market, and the theoretical knowledge of AI specialists is good, but practical skills are often lacking. There is also a divide among employers on the need for AI specialists. Most companies are satisfied with the supply of AI specialists available, but there is still room for improvement. Companies generally have a positive view towards raising the qualification of their current employees by letting them study AI at a master's level. There is a high perception of graduates having theoretical knowledge, and many companies believe it is moderately important to build a website to present the results of AI research carried out by local universities.

REFERENCES