Observatório do Emprego

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Deep Learning trends

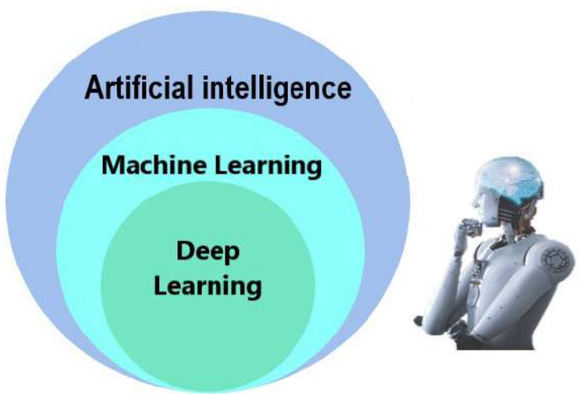
In the last decade, the *Deep Learning* expansion has been notorious, which involves the need for sophisticated hardware and programming tools to deal with large amounts of data and the implementation of complex algorithms. *Deep Learning* offers benefits over *Machine Learning* as it trains computers to perform tasks like human beings, namely which include skills such as speech recognition, image identification and prediction development. Thus, computers are trained to “learn on their own” by recognizing patterns at various layers of processing.

Application domains are very diverse. And *Deep Learning* has been applied in optimizing processes in fish farming in Norway, in automating the monitoring of illegal logging in the Amazon Region and in accelerating real-time computer-generated holography.

In the short term, four emerging trends are pointed out. The first one is the reuse of packages in order to gather functionality, once, currently, most of the *Deep Learning* workflows are not completely efficient, as they rely on recreating the same types of models repeatedly and enabling continuous training from scratch. The second trend is the automation and higher-level workflows growth. In the next five to ten years, it is estimated that *Deep Learning* workflows will be more automated, and will replace the adjustments that are now made manually, through the mechanization of trial and error.

Large-scale workflows in cloud is another trend which coincides with computer science, as it already exists, in bigger scale, faster, more specialized and larger chips (such as TPU) and distributed computing. The last trend, is the real-world deployment. Currently, only a small part of the problems is solved using the *Deep Learning* technology. In this sense, it is estimated that its use will grow due running models from anywhere, from a mobile device, a web browser or a device embedded in a microcontroller.

Thus, it is important to know that there are many synergies between these trends. As automation makes using machines and distributed cloud computing simpler, it also makes *Deep Learning* more accessible.



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The role of the Design Thinking and Mindset in Organizations Digital transition

In 2022, it is predicted that the Tesla Bot start its working, the Elon Musk's latest project at Tesla, a "friendly robot" which will have the function of helping, or even ending, the work performed by humans and considered dangerous, repetitive or boring.

According to preliminary information, the Tesla Bot will be physically similar to humans, with 1.73 meters tall and weighing approximately 57 kg, being capable of carrying weights of up to 20 kg and moving at a speed of eight kilometres per hour.

Therefore, the company seeks to contribute to the creation of a new workforce, now mechanical, using the same artificial intelligence (AI) technology as its Autopilot autonomous driving vehicles. Moreover, for the company's CEO, "*the future of physical labour it will be a choice*" and it is necessary starts on the development of alternatives.

However, the debate regarding replacing human by robots is not new, and directly affects the labour market, both in recruitment and dismissal. Thus, the transformation of typical industrial revolution occupations into technological ones is inevitable due the introduction of digital innovations in the business scenario. If, on the one hand, it is expected that new technologies make workers more efficient and increase the degree of employability, on the other, it brings uncertainty related to the exchange of workers for technologies such as AI, which allow complex decisions to be made more quickly and efficiently.

Insecurities related to the technology in the labour market create a barrier for employees see the big picture and the opportunities that the combination of human and robotic skills may bring for organizations and for themselves. The fusion of technologies, such as augmented reality with human empathy, makes personal interactions more efficient due the efficiency of machines. The AI associated with Machine Learning may enable faster learning by hybrid teamwork. This allows tasks which require more creative, decision-making or emotional skills to always be performed by humans, while more tedious, repetitive and dangerous activities may be automated and performed by machines.

Currently, companies, as Nestlé, embraced technologies which may allow the implementation of a more sustainable agenda, using systems and tools that make it possible to calculate and monitor progress more reliably, such as reducing carbon emissions and managing consumption, such as water.

Therefore, technology came to optimize the work processes and the great challenge is not in the incorporation of technology itself, but in making employees aware of the benefits that these innovations can have for both the organization and the worker.

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Did you know...

Currently, Portugal ranks penultimate in the Digital ***Economy and Society Index*** (DESI). This index monitors Europe's global digital performance, as well as tracking the progress of each State Member in relation to digital competitiveness, in terms of advanced and developmental digital skills. The 2020 IDES Report points out that Portugal has only 2.4% of specialists in information and communication technologies (ICT) related to the total number of employees, which is below the average in the European Union of 3.9%.

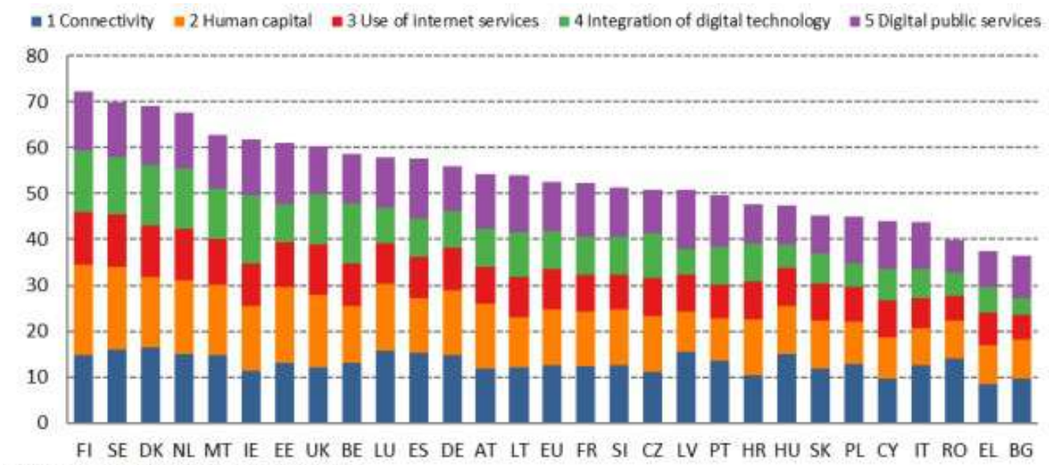
Furthermore, Portugal has only 1.9% of graduates in these fields, while the EU has 3.6%. On the other hand, the number of women ICT specialists corresponds to only 0.7% of total female employment, with half of the figure registered on average in the EU.

Regarding the minimum elementary level of digital skills, Portugal presents 52% per people while the EU has 58%. In addition, the minimum elementary level of competence in the matter of software registered, Portugal has 55% and the EU 61%. Finally, in relation to the most advanced digital skills per the total population, Portugal has 32% and the EU 33%.

Moreover, Portugal is also among the last places in terms of digital leadership skills, which evaluates how companies drive the acquisition and development of knowledge in these areas by their employees, as well as the availability of tools which promote greater digital inclusion and modernization of companies.

The report also highlights that in 2019, there was a reduction in the percentage of the Portuguese population that did not have basic digital skills, from 50% to 48%. In the other hand, 26% of people did not have any digital competence, which may be explained as many people have never used the Internet.

Therefore, in a scenario of digital transformation growth, namely accelerated by the pandemic, it shows that Portugal has notorious challenges regarding the need to develop digital skills. For this, training and qualification programs to develop the advanced skills necessary for the digital age are a strategy to potentialize talent. Such as training actions prepared by the Aveiro Labour Observatory to promote and retain talent in the Aveiro region.



Source: DESI 2020, European Commission.

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Aveiro STEAM City - Advance the Pilot Training Programs

On September 10th, in the context of the Aveiro STEAM City project, the first training course, "Digital Marketing", began. It was designed based on the qualification priorities of the ITC, Industry and Tourism sectors of Aveiro. Thus, these trainings aim to contribute to create a new generation of talent in Aveiro, in order to increase the competitiveness of local companies, but also improve the quality of life of its citizens to qualify and retain talent.

In the continuation of the training courses, started the "Design, Modeling and Management of Processes", followed by "From the factory floor to machine learning applications in industry 4.0" and the "Automatic learning and large-scale data analysis". All events continue to take place in October and November.

In total, 138 training applications were received. In order to select the 20 trainees per program, the place of residence, qualifications, participation in awareness workshops were used as ranking criteria.

In the "Design, Modeling and Management of Processes" training, the students will be able to learn more about the fundamentals of Design Thinking, Process Management, Process Analysis and Modeling and Business Process Model and Notation (BPMN 2.0).

In "Automatic learning and large-scale data analysis"training, there will be an introduction to Machine Learning and Big Data analytics, and a discussion about: fundamental components of an ML/BDA pipeline; tools and frameworks for ML/BDA; visualization and data exploration – data dashboards; cloud technologies and services – storage, distributed processing, and operationalization; data collection, cleaning and pre-processing; learning methods and model evaluation; classic models of machine learning; deep learning (Deep Learning); applications: textual data, graphs and data streams.

In the "From the factory floor to machine learning applications in industry 4.0" program, the students will be able to learn more about: Shell & Python Language; Systems & DevOp; global view of data lakes, pipelines and brokers; virtual machines and container engines; SQLs& Brokers &APIs; Machine Learning and Big Data & Visualization.

Finally, in the training of "Digital Marketing, E-marketing & E-costumers, marketing strategy" the students will learn more about: website development; e-commerce; search engine optimization; content marketing; marketing on social media; e-mail marketing; law applied to digital marketing; internet advertising and analytics & KPIs.

To learn more about the Aveiro Labour Observatory: http://observatoriodoemprego.web.ua.pt/

To learn more about the Urban Innovative Actions: https://www.uia-initiative.eu/en/uia-cities/aveiro

To learn more about the project: https://www.aveirotechcity.pt/pt/atividades/observatorio-do-emprego

Would you like to receive more information? Register and receive the newsletters: observatoriodoemprego@ua.pt

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