LIFE IN THE AI ERA
First result of the Erasmus+ HEDY project

D. Careglio [1], **C. Angulo Bahón**
IDEAI-UPC, Universitat Politècnica de Catalunya
Barcelona, Spain
ORCID: 0000-0002-7931-8147, 0000-0001-9589-8199

A.I. Alves Moreira, A. Jakobi
AidLearn
Lisbon, Portugal
ORCID: 0000-0003-3572-3412, 0000-0003-2182-6939

R. Dimova, T. Dovramadjiev
Bulgarian Association of Ergonomics and Human Factors (BAEHF)
Varna, Bulgaria
ORCID: Not assigned, 0000-0003-0734-1345

A. Ejubovic, E. Sukhovii
Accreditation Council for Entrepreneurial and Engaged Universities (ACEEU)
Muenster, Germany
ORCID: 0000-0001-6154-1490, Not assigned

C. Kollar, G. Szabo
Óbuda University
Budapest, Hungary
ORCID: 0000-0002-0981-2385, 0000-0002-3963-2916

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ABSTRACT

HEDY - Life in the AI era is a 2-year Erasmus+ project started in November 2021 targeting higher education audience. Its goal is to offer a comprehensive and shared view of how Artificial Intelligence (AI) is affecting our lives and reshaping our socioeconomic, cultural, and human environments and to define which topics related to AI are of interest to different university studies and how they should be addressed.

[1] *Corresponding Author*
D. Careglio
davide.careglio@upc.edu

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Four specific free and accessible sources of information will be produced to reach these goals, the first of which is the Booklet, the subject of this paper. The Booklet is an essay defining the HEDY position on life in the AI era and its aim is to identify the challenges, opportunities and expected impact of AI on four different areas: business, governance, skills & competencies, and people & lifestyle. In this paper, we summarise the content of the Booklet. In particular, we describe our methodology to build our rationales based on collecting information from two sources: i) Literature survey, and ii) Focus groups. These two sources provide a unique contribution on AI panorama by combining state of the art research with first-hand opinions and debated questions, concerns, and ideas of interacting individuals. The main finding is that there is the necessity to train citizens in AI by providing teachings, courses and trainings in schools and higher education institutes to facilitate the use and adoption of AI for young people and future generations.

1 INTRODUCTION

The digital is invading our world, with technology being used in all dimensions of life, from education to work, health or governance. Knowledge and skills development is now a lifelong process, demanding growing digital literacy. Assuming that AI will transform the labour market, it is relevant to imagine the education system in a world where work is not a central factor in life or where jobs, as we knew them, do not exist. What would be the role of education? How could we organize it? What would be its aims and what needs would it address? How do we ensure that every citizen develops the necessary skills to remain included in an increasingly digital society? And how achieving fairness rather than amplifying inequalities?

This is the leitmotiv of HEDY – Life in the AI era [1], which is a 2-year Erasmus+ project started in November 2021. HEDY project stands for being a *free and accessible source of information* regarding the AI. The purpose is to provide teaching and course materials to incorporate the possible positive future applications, the challenges, the opportunities, and the possible impact of AI into university studies. Four specific results will be produced, being the Booklet the first of them.

The scope of the Booklet is to organise the AI features, identify challenges, opportunities, risks associated with certain uses, and expected impacts on different ambits of our society. At the time of writing this paper, we have delivered the first version of the Booklet for internal and external review. We consider therefore appropriate to present a summary of the content of the Booklet in this work.

The rest of the paper is organised as follow. In Section 2, we describe the objectives of the HEDY project as well as more details about the Booklet. In Section 3, we present the methodology we adopted to build our rationales. Section 4 discusses the main findings and highlights the key ideas. Section 5 concludes the paper.

2 THE HEDY PROJECT AND THE BOOKLET

HEDY – Life in the AI era provides tribute, in its own title, to Hedy Lamarr [2], an Austrian actress and inventor (1914-2000), co-creator of wireless communications

technology and currently still used in mobile networks, Bluetooth devices and Wi-Fi. HEDY's goal is to offer a comprehensive and shared view of how AI is affecting our lives and reshaping our socioeconomic, cultural, and human environments by promoting critical reflection, self-based learning and debate on these issues. The main (but not exclusive) target group of this project is higher education audience.

Four specific objectives will be produced to reach this goal:

1) A **Booklet** – an essay defining the HEDY position on life in the AI era and the rationales for that position;
2) A **Toolkit** – a collection of influential AI audio-visual related tools, including films and expert talks with the ability to have a more immediate impact to the audience;
3) A **Massive Open Online Course** (MOOC) – a course to spread out the awareness of main developments in AI and promote extensive knowledge, critical reflection and debate on AI and its key impact on society;
4) A **Guideline** – a concise and easy-to-read documentation for the best use of the assets produced and for the creation of a solid foundation to ensure the usability of the HEDY results by a wider community of practice network.

The Booklet is the subject of this project. As stated above, its scope is to identify the challenges and the risks associated with the use of AI and the expected impacts on four different ambits of our society: **business**, **governance**, **skills & competences**, and **people & lifestyle**. Besides describing the current applications and expected impacts of AI for each ambit, we also aim at identifying the 5/6 more concerning issues about AI. Nonetheless, we are not trying to provide general solutions of these concerns; on the contrary the idea is to offer an engaging way to stimulate reflection and debate on knowledge society topics, discuss the ethical effects of these emerging digital technologies and provide paradigmatic examples.

Currently, the first version of the Booklet is under the internal review process. After that, the Booklet will be presented in a so-called Multiplier Event to a group of at least 40 selected participants. During this event, the Booklet will go through the external review process. After implementing the feedbacks received from both processes, the Booklet will be published in the project website [1]. It will be freely accessible and available in 7 different languages: English, Portuguese, Bulgarian, German, Spanish, Catalan and Hungarian. The expected publication date is July 31th, 2022.

3 METHODOLOGY

3.1 Introduction

We collected information from two different sources to build our rationales: 1) Literature survey, and 2) Focus groups. Clearly, the first source consisted of collecting the current state of knowledge about the applications and impacts of AI. The second source consisted of gathering information by interviewing people through focus groups with expert and non-experts in AI in 5 different European countries. Due to the space limit, here we can provide only a summary of our methodology while all details will be added in the extended version of the Booklet soon available in the project website [1].

3.2 Literature survey

Our first source of information came from the available literature on AI in general and on the four ambits described above in particular. The aim was to acquire an in-depth grasp of the subject and to understand current knowledge. This allowed us to: i) identify relevant theories, methods, and opinions in the existing state of the art and report them in the Booklet; and ii) organise and guide the participants through the focus groups with these bases already learned so to obtain the complementary information we needed.

Hence, we searched, read and evaluated more than 250 documents, between research papers, magazine articles, expert blogs, companies' reports, agencies' guidelines, etc. to get the proper knowledge on the challenges and opportunities of AI and the current applications and expected impacts in both short and long terms.

3.3 Focus groups

During February 2022, we prepared and conducted two different focus groups in each of the project partners' countries: one focus group with only experts in AI and one focus group with only non-experts in AI. The project defines the term *expert* as a person with a university degree, working for at least 5 years in the area of AI, digital society, human-robotic interaction or Industry 4.0, and at least 3 published scientific or professional articles. The number of participants for each group was set to a minimum of 5. In one case, the focus group was not possible to be organised due to conflicting schedules/COVID restriction; we substituted the focus group for a questionnaire. The questionnaire was created with similar questions used in the focus group. In summary, nine focus groups and one questionnaire were organised and the results analysed following the directives available in [3]. More details are listed below:

1) Two focus groups in Budapest (Hungary) about AI challenges and opportunities
   - 8 experts (7 males, 1 female) aged 28-61 years old;
   - 5 non-experts (2 males, 3 females), aged 20-28 years old, university students enrolled in a Master's degree
2) Two focus groups in Münster (Germany) about AI in business
   - 7 experts (7 males) aged 26-50 years old;
   - 7 non-experts (3 males, 4 females), aged 22-30 years old, university students enrolled in a Master's degree
3) Two focus groups in Barcelona (Spain) about AI in governance
   - 9 experts (7 males, 2 females) aged 35-70 years;
   - 10 non-experts (7 males, 3 females), aged 22-70 years old, from civil society with no previous knowledge on AI.
4) Mixed approach in Lisbon (Portugal) about AI in skills & competencies
   - 9 experts (6 males, 3 females) aged 26-67 through an online questionnaire;
   - 5 non-experts (3 males, 2 females) aged 23-55 master students or recent graduates through a focus group.
5) Two focus groups in Varna (Bulgaria) about AI in people & lifestyle
   - 6 experts (4 males, 2 females) aged 29-59 years;

- 15 non-experts (4 males, 11 females), aged 20-24 years old, students enrolled in a university degree.

4 DISCUSSION

AI came to stay in our daily lives. This is an obvious conclusion and we need to deal with it. So, how can we do that? In this paper we have reviewed many literature sources and talked directly with experts and non-experts in AI to have a better understanding of the problem, the concerns, and the opportunities AI can bring to the humanity and its impacts to our society. In this section, rather than presenting the literature survey and focus groups results separately, we prefer to discuss them together. In this way, we can reflect and contrast people's (both experts and non-experts) first-hand opinions with state-of-the-art research and vice versa. Thus, we are now able to provide a set of key ideas.

There is a clear indication that AI is conceived in two different ways:

a) **Restrictive view**: AI as one more technology and therefore needs to be treated like any other technology.

An expert said: *"AI is technology and a technology is not for everything, it is for what it is".*

b) **Disruptive view**: AI as a differential technology, which marks a before and after in human society and the relationship with technologies.

An expert said *"It simply came to stay. He has come to change society and, moreover, we will not be able to go back".*

These two ways of conceiving AI appear alternately throughout our two-fold sources. While seemingly restrictive and disruptive views may be understood as contradictory, they are in fact complementary views that make it possible to grasp the complexity of opinions, concerns and proposals around the use of AI systems.

From a restrictive point of view, AI tends to be seen as a chance: it can create new, very qualify and remunerated jobs, open new market and business opportunities, make life easier and heathy, the bureaucracy faster, etc. [4][5]. The common idea is that AI is useful in decision-making processes [6]. The challenges that may be raised by these processes are considered restricted and possibly overcome by drawing a clear border between when AI may be employed and when it cannot. In this sense, AI is thought to be particularly effective for data management and analysis, as well as information assistance for decision making and assessment, but not for automated decision making [7]. In this sense, it is thought that decisions that have a direct impact on people must be decided by people.

An expert said: *"In the end they are algorithms and we should not let them decide for us".*

In contrast, from a disruptive view of AI, the argument is that in contemporary societies any area already integrates or will integrate soon AI. It is thought that, while we do not want AI to participate in many aspects of our daily lives, it is vital to analyse the costs

and benefits, based on assessing what would happen if AI systems made incorrect decisions [8]. This may affect several areas of our environment and is in these specific areas that the risks of using AI systems need to be assessed. The justice, the people's privacy (i.e., freedom), the algorithms themselves (aka, the bias of the data), the biomedicine, the finance are only few examples of the areas identified [9].

A shared concern, which is mostly associated with a restrictive view of AI, and which appears both explicitly and implicitly throughout all sources, has to do with the relationship of AI systems with science fiction imaginaries or with the idea that AI can solve all problems of any kind.

> An expert said: *"I think I know the difference between science and fantasy, but it is the interaction between these two fields that has led to the development of both".*
>
> A non-expert said*: "It is important to see and read how science fiction artists think, and be inspired to develop real-world solutions supported by AI to help humanity evolve".*

Numerous applications have been developed in the field of AI and can be applied in many fields [5], but there is a significant gap between current functionalities and technical capabilities and the narrative of what AI could do in the future [10]. This type of narrative around AI, which does not correspond to current developments, is considered to have two types of negative effects: i) The difficulty of articulating a proven public debate on accountability when using forms of AI in decision-making processes; ii) The emergence of a series of catastrophic imaginaries that generate reluctance towards AI between public opinion and citizens [11].

Regarding the specific ambits analysed, we can summarise that:

- In **business**: AI is seen as a great potential especially when it comes to saving time, facilitating tasks and bringing innovative solutions, especially in field such as medicine, biomedicine and finance. Risk is related to finding a balance between the economic interests of companies and the non-violation of citizens' rights in matters related to privacy and individual freedom [12].
- In **governance**: there is a global agreement on a fundamental set of five AI principles that are functionally algorithm-agnostic, technology-agnostic and sector-agnostic to provide a trade-off between company's strategies and objectives, legal requirements, and ethics: accountability, transparency, fairness, safety, and human control [13].
- In **skills & competences**: the need for physical, basic cognitive and manual skills will be reduced due to the taking over through AI while digital competencies, critical thinking, teamwork, communication, technological as well as social and emotional skills will be more demanded. Education systems' priorities need a shift to reflect this to better develop students' abilities. Major risk is related to "less developed" countries which are in danger of being left behind even more [14].
- In **people & lifestyle**: AI should contribute to make person's life more productive, efficient, secure and easier. We may have personalised monitoring and diagnostic

capabilities, an increased free time, the possibility to develop our natural interests and talents, a better and faster infrastructure, etc. Major risk is related to the fact that AI can be biased and perpetuate or even increase the gender, racial, and ethnic disparity and inequity [15].

It is worth to mentioning also one of the most important topics not addressed in our survey and focus groups. That is the impact of AI to our environment and how it can help with the current crisis due to the climate change. On the one hand, AI is a major energy consumer given the complexity of training and inferencing on big data, above the fact that all ICT ecosystem is already one of the major contributors to greenhouse gas emissions [16]. On the other hand, AI has also been presented as the solution of the climate change due to its multipurpose capabilities, which include tracking and cutting emissions, allowing creative economic models to aid the environment, and enhancing climate resilience. For instance, a study commissioned by Microsoft [17] concluded that using AI for environmental applications has the potential to boost global GDP by 3.1 – 4.4% while also reducing global GHG emissions by around 1.5 – 4.0% by 2030 relative in business, up to 2.2% in energy and up to 1.7% in transport.

Many considers that human social and intellectual capacities like creativity, empathy, innovation, teamwork, etc. are irreplaceable by AI (see for instance [18]). In short term, the vision is that we will face the emerge of more artists as a response to the lack of those works replaced by an AI. Nonetheless, this vision seems too optimistic: AI is already able to compose symphonies, paint pictures, write poems, songs, and stories as well as play games. Some countries like Australia already accepted that an AI machine can be registered as an inventor in a patent. In the future, it is likely that these capabilities will be even more explored.

Finally, a common opinion is also that AI should not replace human capability and human freedom to make decisions should be prevented from being influence by AI-driven tools.

A non-expert said: *“I only believe in AI when it gives the same result as human intelligence”.*

In particular, ethics is a recurrent problem raised in all our sources. Even the experts we have interviewed consider that they do not have enough knowledge to be able to decide on ethical and social issues, a knowledge that should be integrated in an interdisciplinary way.

A non-expert said: *“An investigation to recognize a person from the iris was funded through tax haven funds, to identify women with burkas and whether or not they were with their husbands. I was very surprised […]. How to do it? Getting here, yes? Getting here, right? What’s the limit?”.*

In order to avoid this type of narrative and its negative effects, actions related to information and citizen participation are needed:

- **Information**: Ensuring that the media reports ethically and honestly when talking about AI systems, which allows for a clear distinction between speculative futuristic visions and current developments and possibilities. Develop a

pedagogical task that allows the public to know how AI works and what applications are being developed.

- **Participation**: Involve the public in the establishment of priorities for the development of AI, in the service of needs. This is considered to be the added value of the European AI development strategy, compared to other strategies that may be more technologically advanced or in terms of implementation, such as China or the United States. It is considered that the European strategy can incorporate as an added value to its AI the integration of citizens in the establishment of priority areas in which to develop or apply it.

5 SUMMARY AND ACKNOWLEDGMENTS

In conclusion, AI is a technology that in its design and development is so far removed from everyday life that experts believe that the population is not trained enough to make decisions about how to use AI. Although, at the same time, it is considered necessary for citizens to make decisions and decide on the course of AI. For this reason, we point out the necessity to train citizens in the operation, potential and possible effects of AI. We need therefore to provide teachings, courses and trainings in schools and higher education institutes to facilitate the use and adoption of AI for young people and future generations. This is indeed the main goal of the HEDY project. Throughout the next two years, in addition to the Booklet, HEDY will provide a MOOC with exactly the aim of reaching higher education audience and show them the capability of AI, the opportunity our society has in this moment to change our environment to a better one but also the risks we are facing from different point of views. This material will be complemented with the Rootkit: a set of supporting multimedia tools with the ability to have a more immediate and visual impact to the audience. The final contribution will be an easy-to read Guideline to ensure the usability and sustainability of the HEDY results, and promote a wide and solid community of practice network.

Finally, it is worth mentioning the limitations of our analysis. On the one hand, it is a qualitative analysis therefore general conclusions are more difficult to elaborate compared to a quantitative one. On the other hand, there is the limitation of the heterogeneity of the focus groups since most of the experts were academics and the non-experts were students. However, our two-fold approach allows us to contrast people's opinions with the available literature and vice versa, so we believe our findings are valuable and other similar work is likely to reach the same conclusions.

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