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Elements of AI: Busting AI Myths on a Global Scale

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ABSTRACT

Considering the quick technological development in our society, as well as the continuous demand for workforce equipped with sufficient technology skills, self-paced online learning materials on hot topics like artificial intelligence (AI) play an important role in filling knowledge gaps and supporting life-long learning. In addition to technology professionals, citizens with all kinds of backgrounds have the right to gain a basic understanding in ground-breaking technologies, in order to have an equal and balanced say in what kind of technological solutions we should have in the future.

Furthermore, the need for quality distance learning has been accelerated by the COVID-19 pandemic, and massive, open online courses (MOOCs) have the capability to cater for both academic students and the general public searching for reskilling and upskilling opportunities.

KEYWORDS

Massive Open Online Courses (MOOCs), Artificial Intelligence, inclusion, higher education, life-long learning, online education

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1 INTRODUCTION

The Elements of AI MOOC series, first launched with the Introduction to AI course in Finland in 2018, tackles the demand for easy-to-access, academic-quality learning materials on artificial intelligence for non-professionals. Elements of AI courses are created and managed jointly by the University of Helsinki and the digital consultancy company Reaktor. Elements of AI has reached over 750,000 users, with a completion rate of 12.4%. The Introduction to AI course has been launched in 24 languages. As of September 2021, it has users from over 170 countries.

2 COURSE DESIGN PRINCIPLES

Elements of AI courses are self-paced and targeted to the general public, and all design choices have been validated with user research. The key issue identified in the project preparation phase in 2018 was that most introductory courses on artificial intelligence already required either skills in programming, or at the very least, mastery of technical terminology.

The first course in the series, Introduction to AI, introduces the key methods and applications of AI. This is achieved through generic problem-solving, middle-school-level math exercises, and by inviting the participants to express their own opinions and interpretations on the course topics. Several exercises include a peer-review mechanism, and the course is accompanied by a community platform for expanding the course experience and providing student support.

Natalie Lao [3] proposes a machine learning (ML) curriculum rubric and analyses the intentions and success of the Elements of AI: Introduction to AI within it. According to Lao, the course covers themes such as general machine learning (ML) knowledge, societal implications, problem scoping, analysis of ML design intentions and results, and ML advocacy. Based on her analysis of observed results from students and external feedback, the course achieves all the intended learning outcomes.

The second course in the series, Building AI was launched in fall 2020, and it dives deeper into the practical uses of AI methods. Building AI consists of three, flexible difficulty levels: beginner level requires no programming, intermediate level consists of small quizzes and simple code editing exercises, and advanced level requires the students to be comfortable with writing short Python programs.

In addition to topics like machine learning and neural networks, course themes include media criticism, busting AI myths – both on the positive and negative extremes –, as well as introducing a balanced mix of scientific approaches and industry practices. Societal, ethical and philosophical implications are addressed throughout the courses. The conversational, respectful tone of voice is a result of pedagogical consideration, and it aims to further enhance the everyday connections of the subject matter [5].

The courses have been designed mobile-first, and they contain no bandwidth-heavy video content, the purpose of which is to maximize usability in environments with poor connectivity [4]. Coding exercises of the Building AI course can be done in a desktop web browser, and no installations are needed. Graphic design choices deliberately aim to please the eye and to create a friendly atmosphere, while omitting imagery typical for sci-fi or the hype around technology [7].

3 RECEPTION

Elements of AI courses have proven to attract a wide, global audience, and they keep receiving positive feedback from users that may otherwise be unlikely to participate in computer science education. On Class Central[1], the course is currently the highest rated

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[1] https://www.classcentral.com/course/independent-elements-of-ai-12469

CS course (out of 5168 courses) with an average rating of 4.8 on a 1–5 scale. Introduction to AI users who responded to a 2019 survey have a very balanced gender distribution: the ratio of female users was 40% globally, and almost 60% in Finland and in Sweden. The aim to cater for life-long learning is supported by the fact that 25% of the course takers are over 45 years of age, and that 62% of the survey respondents were full-time employees according to the same survey. Many report they have never taken an online course before, which indicates that high quality MOOCs for the general public have the capability to widen the user base of online education. Companies are an important target group for the course, and over 500 firms have pledged to train their staff as a result of communication campaigns aimed at the business sector.

Elements of AI courses are accepted as elective, cross-curricular, bachelor-level courses, equivalent of 1-3 ECTS study credits, in several universities across Finland and Europe. For example, in the University of Linköping, Sweden, Introduction to AI has been completed by 2600 students between 2019-2020, with an average student rating of 4.4 / 5 [1]. This includes numerous non-degree students: only about 14% of the global course takers are students in higher education or secondary schools. Elements of AI has had an impact on universities' brand value, as well.

4 FUTURE WORK

There is a number of different steps that can be taken to evolve the reach of the Elements of AI courses and to further improve the learning experience of the students.

4.1 Learning paths for life-long learning

It is necessary to ensure that the course movement provides sufficient learning paths for those seeking to effectively advance their careers. This can be achieved by introducing new co-creation methods like workshops and hackathons, which enable the Elements of AI team to tackle user needs in direct collaboration with the end users [2]. New partnership models that allow linking validated, partner-produced AI learning content to the Elements of AI brand need to be investigated and implemented, in order to produce more brand value for the partners, and to reduce the pressure for continuous content delivery by the Elements of AI core team. The online community platform is an essential tool for co-creation and partner activities.

4.2 AI education for the least developed countries

The Elements of AI partnership network of academic and promotional organizations is currently the strongest in Europe. Based on feedback and ongoing collaboration initiatives, there is a substantial need to reach a higher number of users in the least developed countries, especially in Africa. On a conceptual level, Elements of AI has the potential to support national education goals in the least developed countries, but extensive user research is necessary for making sure that the learning objectives and content match with the end users' capabilities and individual needs [4, 6].

4.3 AI education for younger children

The current Elements of AI courses are best suited for participants over 14 years of age. The content can however be adjusted and supplemented with learning material that improves its applicability in the K12 context. Attitudes towards technology form at an early age, and empowering hands-on experiments and creative projects on AI have the potential to leave a lasting imprint. Such experiences lay a solid foundation for the mindset required for the continuous development of technology skills throughout one's life.

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