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Abstract

This deliverable constitutes an online, self-directed learning module on Fairness, Accountability, Transparency and Ethics in AI (FATE in AI). It has been developed based upon the educational materials produced during the CyCAT project, through the implementation of its deliverables but also its dissemination and outreach activities. The course has been developed based on the Open University of Cyprus methodologies for open and distance education for adult learners.

Keyword(s):

Educational material, FATE in AI, Open and distance education, Self-directed learning module

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1. Executive Summary

As described in the CyCAT DoA, the OUC CyCAT team shall lead the development of an online course (i.e., open learning module), based upon the materials developed through the CyCAT activities and deliverables. The course has been designed in the spirit of open and distance education, as implemented at the Open University of Cyprus, and was developed with a broad audience of adult learners in mind. The module features multimedia educational materials (e.g., video lectures) in addition to readings, self-assessment tools as well as interactive activities. In summary, the module showcases the highlights of the CyCAT project's results and activities, making them accessible to a wide range of online learners.

2. The FATE in AI Module

2.1 Accessing the module

The module *Introduction to FATE in AI* is accessible online [here](#). In addition, the course is linked to the [CyCAT project website](#).

As can be seen, the decision was taken to develop the module in the context of an independent website, drawing also from the CyCAT YouTube Channel, rather than within the in-house teaching platform of the OUC, "eClass." There were two factors that led us to this decision, after much discussion with the OUC Information Technology Department. The first is that learners would need to register with the OUC in order to have access to eClass; there is no way to provide open access without a registration. The second consideration is that the eClass system is not available year-round; it is put into "maintenance mode" during the summer months. Therefore, in order to maximize the public's access to our module, and to allow it to function as a true open course, we proceeded to develop an independent website.

2.2 Characteristics of open and distance learning

The learning module is designed in the spirit of [open and distance education](#). In particular, the module incorporates several of the required characteristics of open and distance education for adult learners, including:

- The module is open to anyone, regardless of their age, affiliation, or previous educational / professional background.
- It is self-directed; each learner can begin the module whenever they like and follow it at their own pace.
- At the beginning of each unit of the module, the main goal as well as the specific learning objectives are clearly articulated.
- At the end of each unit, there is a self-assessment quiz. Learners will receive immediate feedback on their responses, in order to gauge their understanding of the material presented in the respective unit.
- For each unit beyond the introduction, multiple activities are provided. These are activities and/or assignments that have been developed by CyCAT instructors, and that may be used by learners to apply the knowledge gained in each unit.

2.3 Topics covered by the module

Introduction to FATE in AI is structured the module into *five thematic units*:

1. *AI Ethics*

We begin with the broad topic of *AI Ethics*, which addresses ethical concerns in any AI system. In this introductory unit, we examine the key definitions surrounding AI Ethics and investigate the challenges posed by real-world systems.

2. *Algorithmic Bias - Problems and Solutions*

Our second unit focuses on the issues posed by the rise of machine learning and *data-driven AI*. This unit provides an overview of the sources of algorithmic biases (i.e., in data, algorithms themselves, or users' behaviors), as well as specific solutions highlighted in the research to date, which are aimed at mitigating bias and *promoting fairness*.

3. *Explainability*

While Unit 2 focuses on the identification of algorithmic bias and the promotion of fairness, in Unit 3 we consider the importance of *transparency*. In particular, this unit provides an overview of techniques for promoting *explainability*, such that users can more easily interpret an algorithmic system's output, and use it effectively and appropriately.

4. *FATE Awareness*

In Unit 4, we go beyond the technical solutions and consider the important issue of FATE awareness. We examine the perspectives of various stakeholders of data-driven AI systems (e.g., developers, end-users), in an effort to understand how we might raise their awareness of FATE and their own role in promoting more ethical development and use of AI systems.

5. *Application Areas*

In the final unit of the module, we examine FATE issues in the context of particular application areas and domains. Specifically, we consider applications of data-driven algorithmic processes such as Web search engines, content filtering mechanisms used in social platforms, and computer vision (in particular, automated image tagging) in an effort to understand how FATE might impact our everyday interactions in the modern information ecosystem.

2.4 Structure of the module

Each unit begins with a brief introduction to the topic, as well as an overview of the specific learning goals. The material for each unit consists of educational videos - most of which have been created through CyCAT workshops and seminars - along with the lecturers' slides, as well as a supporting bibliography (i.e., academic articles on the topic). At the end of each thematic unit,

there is also a quiz, which can be used to gauge one's understanding of the material covered. Feedback is immediately provided via Google Forms, once the responses are submitted.

As a self-taught module, learners may, of course, direct their own study in any way they like. However, we would estimate that a rigorous treatment of each unit would take somewhere between 10 and 15 hours.

3. Relation to other CyCAT / OUC activities

The FATE in AI open module has been developed primarily on the materials and deliverables produced in the context of Work Packages 3, 4 and 5 of the project. In addition, some of the materials from the CyCAT FATE Winter School, which was offered in January 2021, have also been incorporated into the module.

It should also be noted that the module is related to the course “Everyday AI” (Τεχνητή Νοημοσύνη στην Καθημερινότητα) that will be offered by the OUC CyCAT team during the Autumn Semester of 2021. *Everyday AI* will be offered in the Greek language, and will provide an introduction to the technical, social and ethical issues surrounding AI to the public, assuming no previous knowledge of the subject. This course, which will be taught through a series of eight synchronous, online lectures, will run from October - November 2021. Thus, some of the material overlaps with the open module, however, it will be simplified and offered in Greek rather than English.