Course Syllabus- Artificial Intelligence, Creativity, and Society

Language of Instruction: English
Professor: Rafael Ramirez Melendez
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Course Contact Hours: 30 hours
Recommended Credit: 4 ECTS credits
Weeks: 2
Course Prerequisites: None
Language Requirements: Recommended level in the European Framework B2 (or equivalent: Cambridge Certificate if the teaching language is English, DELE or 3 semesters in the case of Spanish)
Course structure: Workshop
Course classification: Introductory

Course Description:
Students will learn the fundamentals of Artificial Intelligence and understand the implications of these techniques in creative processes, and in society as a whole. During the course, students will explore the intersections of technology, creativity, and culture, and how artificial intelligence can contribute to these areas in exciting and innovative ways. Students will gain a deeper understanding of the potential of artificial intelligence as a tool for artistic expression and creativity. From generative music to computer-generated poetry, we will explore how AI can be used to create new forms of art that challenge our preconceived notions of what it means to be creative. Secondly, students will examine the ethical implications of AI, particularly in the context of art, culture and society. We will consider the role of AI in perpetuating biases and inequalities and discuss strategies for creating AI systems that are more equitable and inclusive. The course will encourage students to explore the intersections of AI and creativity. Through class discussions and project work, we will share ideas, perspectives, and experiences that will enrich the student's understanding of this field. Hopefully, beyond the course, students will continue exploring AI's potential in creative processes, embrace the opportunities that arise from combining their creative talents with technological innovation, and create meaningful and impactful work.

Learning Objectives:
At the end of the course, the student will be able to:

1. Understand the basic principles, concepts and techniques of artificial intelligence and its potential for use in a creative context.
2. Analyze and critically evaluate the ethical implications of using AI in the context of creativity and culture.
3. Understand the intersection of technology and the arts and identify opportunities for innovation and collaboration.
4. Develop practical skills in using AI technologies for creative purposes, such as generative music, computer-generated poetry, and interactive installations.
5. Collaborate effectively with peers on creative projects that incorporate AI technologies.
6. Reflect on personal values and ethical considerations related to the use of AI in creative contexts.
7. Demonstrate knowledge of the historical, cultural, and social contexts that shape the use of AI in the arts and culture.
8. Generate creative ideas for using AI in innovative and impactful ways.
9. Communicate effectively about the role of AI in the arts and culture to a variety of audiences.
10. Develop a lifelong interest in exploring the intersections of technology, creativity, and culture.

These learning objectives aim to provide students with a well-rounded understanding of the use of AI in artistic contexts and the skills and knowledge needed to apply this understanding in practice. Through the achievement of these learning objectives, students should be prepared to engage with AI technologies in creative and ethical ways, contribute to society and to the ongoing dialogue about the role of AI in the arts and culture, and create meaningful and impactful work that combines artistic talents with technological innovation.

Course Workload:
The course is divided into lectures, discussions, and projects. Students should be prepared to read between 30 to 60 pages per week.

Methods of Instruction:
The course consists of five main components:

- Discussions about the new role of AI in society and in creative processes
- Concept learning based on hands-on exercises
- Projects with practical applications
- Invited talks by experts using AI in the arts
- Final project

Discussions on the new role of AI in society and creative processes: This component introduces Artificial Intelligence and how it is changing society as a whole and in particular the arts (music, painting, etc.) and the creative processes. Students will read texts about this topic and will participate in discussions around them.

Concept learning based on hands-on exercises: This component introduces the course's basic concepts through labs and exercises. After a brief and intuitive explanation, the students will directly carry out exercises on the computer applying artificial intelligence in a creative context. Slides will be used to complement the explanations which will be distributed to students as class notes and study material. The explanations and the hands-on exercises will be interactive to motivate and stimulate critical thinking among the students.

Projects with practical application: Students will apply the concepts learnt to implement small art projects. In this component, students will work on a practical problem well-defined by the teacher and will be supervised during the process. At the beginning of this process, the teacher will clearly explain the objectives of the project and will give instructions on how to achieve those objectives. Students may work in groups if necessary. The projects allow students to put into practice the concepts learned.

Invited talks by experts using AI in the arts: Experts and professionals working and applying AI to the arts will be invited to present their work as invited talks. These talks will provide students with a clear view of current work in the area as well as provide insights and ideas for their own projects.

Final project: The final component of the course will consist of a creative project chosen by the students using artificial intelligence. The project will be carried out in groups and each group will choose a topic of their interest and apply the techniques learned during the course, supervised by the teacher. Each group will present the methodology and results of their project to the rest of the students.

Method of Assessment:
Presentations: 25%
Projects/Labs: 25%
Final exam: 40%
Class participation: 10%

Presentations: Students will be required to read articles about the course topics and discuss them with the rest of the class.
Projects/Labs: this will consist of small projects integrating the application of AI generative models to produce creative outputs.
Final exam: this will include questions about the whole course content.
Class participation: Students will always be encouraged to participate actively in discussions and debates, and their participation will be taken into account for their final mark.

Absence Policy:
Attending class is mandatory and will be monitored daily by professors. The impact of absences on the final grade is as follows:

Absences	**Penalization**
Up to two (2) absences	No penalization.
Three (3) absences	1 point subtracted from final grade (on a 10 point scale)
Four (4) absences	The student receives an INCOMPLETE for the course

The BISS attendance policy does not distinguish between justified or unjustified absences. The student is deemed responsible to manage his/her absences.

Emergency situations (hospitalization, family emergency, etc.) will be analyzed on a case by case basis by the Academic Director of the UPF Barcelona International Summer School.

Classroom Norms:
- No food or drink is permitted.
- There will be a ten-minute break during the class.
- Students must come to class fully prepared.

Course Contents:
Please, detail here the course topics distributed on a weekly or daily schedule.

Session 1-2: Introduction
- What is artificial intelligence and machine learning?
- What is it good for?
- Artificial intelligence in society, the arts, health
- Applications in which AI can be a tool for creativity

Session 3-4: Machine Learning - Classification
- Basics of classification
- How to use it to make sense of complex data in a meaningful way?
- Instance-based learning: the nearest-neighbour algorithm
- Interpretable AI
- AI free open-source tools
- Real-time AI for artistic creativity

Session 5: Machine learning - Regression
- Fundamentals of regression
- Linear regression
- polynomial regression
- neural networks
- Hands-on practice exploring regression algorithms
- Application of regression algorithms to society and creative processes

Session 6-8: AI and the arts, AI ethics
- Applications of AI in the arts
- Ethics of AI
- Human vs AI art
- AI in music, art, and cinema

Session 9-10: AI and Health and Well-being
- Art, music and health
- Art Therapy
- Music Therapy
- Implications in stroke rehabilitation, emotional disorders, autism

Required Readings: The professor will assemble a set of readings for the course.

Recommended bibliography:

Students are encouraged to consult the following sources on their own.

- Boden, M. 1991. The Creative Mind: Myths and Mechanisms. New York: Basic Books.
- Boden, M. (ed.) 1994. Dimensions of Creativity Cambridge, MA: The MIT Press.
- Boden, M. 2009. “Computers models of creativity.” AI Magazine 30(3): 23–34.
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- Bharucha, J. 1993. “MUSACT: A connectionist model of musical harmony.” In Machine Models of Music, S. M. Schwanauer and D. A. Levitt (eds.). Cambridge, MA: The MIT Press, 497–509.
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- Dalmazzo D and Ramírez R (2019) Bowing Gestures Classification in Violin Performance: A Machine Learning Approach. Front. Psychol. 10:344. doi: 10.3389/fpsyg.2019.00344
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- Mitchell, T.M., Machine Learning, Springer
- Ortega FJM, Giraldo SI, Perez A and Ramírez R (2019) Phrase-Level Modeling of Expression in Violin Performances. Front. Psychol. 10:776. doi: 10.3389/fpsyg.2019.00776
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- Ramirez, R., Maestre, E., Serra, X. (2011). Automatic Performer Identification in Celtic Violin Audio Recordings, Journal of New Music Research, 40(2): 165–174.

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- Turing, A. M. 1950. “Computing machinery and intelligence.” Mind LIX(236): 433–460.
- Ian H. Witten, Eibe Frank, Mark A. Hall, Data mining: practical machine learning tools and techniques
- Yee-King, M., and d’Inverno, M. 2014. “Pedagogical agents for social music learning in crowd-based socio-cognitive systems.” In Proceedings of the First International Workshop on the Multiagent Foundations of Social Computing, AAMAS-2014. Paris, France.

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