Universitas
Ahmad Dahlan

TERM OF REFERENCE
SUMMER COURSE ON MACHINE LEARNING 2023

A. Introduction

This course is designed to introduce machine learning. Machine learning is the study of computer algorithms that improve automatically through experience and by the use of data. In this point of view, machine learning is a part of artificial intelligence. One of the methods of Machine learning is clustering. In this course, the participants will be introduced to fuzzy clustering and its implementation using google colab. Some fundamental concepts related to algebra and analysis for machine learning arealso given. The credit for this course is equivalent to 2 credits. The running of the course will be held by using elearning platform provided by Universitas Ahmad Dahlan (elearning.uad.ac.id) and zoom for virtual meeting.

B. Theme

The 2023 summer course on machine learning brings the theme fuzzy clustering and its implementation using google colab.

C. Course Mode and Duration

The summer course program would be run in 2 weeks (14 days).

D. Program Structure and Credit

The summer course program is designed for 2 credits with the following structure (See Table 1).

Table 1. Program Structure

No	Topic	Subtopic	Method	Learning Model
1	Analysis for Machine Learning	Introduction to metric space	Asynchronous and synchronous	Problem-based learning
		Lagrange optimization	Asynchronous and synchronous	Problem-based learning
2	Algebra for Machine Learning	Introduction to linear algebra	Asynchronous and synchronous	Problem-based learning

		Matrices and their properties	Asynchronous and synchronous	Problem-based learning
3	Cluster Analysis	Introduce to machine learning	Asynchronous and synchronous	Project-based learning
		Introduction to clustering	Asynchronous and synchronous	Project-based learning
		K-Means clustering	Asynchronous and synchronous	Project-based learning
4	Fuzzy Clustering	Fuzzy logic	Asynchronous and synchronous	Project-based learning
		Fuzzy clustering	Asynchronous and synchronous	Project-based learning
		Fuzzy C Means clustering	Asynchronous and synchronous	Project-based learning
5	Implementation and practice using Google Collabs	Clustering optimization problems	Asynchronous and synchronous	Project-based learning
		Coding activity	Asynchronous and synchronous	Project-based learning

E. Participants Target and Eligibility

This program is designed for undergraduate students majoring in mathematics and mathematics education. But, the participation is not strict on Mathematics and Mathematics Education, we can accept any students who are from any major who are interested to learn Machine Learning. However, participants are expected to have learning experience on Advanced Calculus or equivalent.

F. Instructors' Profile

The instructors of this program are presented in Table 2. It was a collaborative teaching between the professors in the Mathematics Department, the Mathematics Education Department, and the Center for Science Data of UAD.

Table 2. Instructors' profile

No	Name	Institution	Expertise
1	Assoc. Prof. Sugiyarto, Ph,D	Mathematics Department, Universitas Ahmad Dahlan	Big Data, Machine Learning
2	Dr. Puguh Wahyu Prasetyo, M.Sc	Mathematics Education Department, Universitas Ahmad Dahlan	Algebra
3	Dr. Burhanudin Arif Nurnugroho, M.Sc	Mathematics Education Department, Universitas Ahmad Dahlan	Analysis
4	Joko Eliyanto, M.Pd	Pusat Studi Data Sains, Universitas Ahmad Dahlan	Big Data, Machine Learning
5		Partner University	

We also invite colleagues from partner HEIs to contribute as the instructor of the summer course program (Please contact us through our PIC).

G. Important Dates

The summer course program has the following agenda (See Table 3).

Table 3. Timetable of the course

No	Agenda	Date
1	Registration	July 1-25, 2023
2	Participant Announcement	July 28, 2023
3	Opening Ceremony	August 1, 2023
4	Course	August 1-16, 2023
5	Closing Ceremony	August 16, 2023

H. Admission

The prospective students could register for this summer course program by following some procedures.

1. Preparing documents:
    a. Scan of student ID card.
    b. Recommendation letter from the origin department/university to enroll in the summer course program (Mentioning that the students have passed the Advance Calculus or equivalent subject).
2. Sending the documents/application to the PIC's email address.

I. Benefit

All participants can access the course through elearning.uad.ac.id and all materials are free. Any participant who completes the learning and task will be awarded a certificate and academic transcript.

J. Contact Person

Further information could be retrieved through the following corresponding email:

1. Afit Istiandaru (afit.istiandaru@pmat.uad.ac.id); or
2. Ida Puspita (ida.puspita@uad.ac.id).