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MODULE HANDBOOK

Module name	**Deep Learning**
Module level	Undergraduate
Code	MII-213401
Courses (if applicable)	
Semester	Fall (Odd)
Contact person	Yunita Sari, Ph.D
Lecturer	Yunita Sari, Ph.D
Language	Bahasa Indonesia & English
Relation to curriculum	1. Undergraduate degree program, elective. 2. International undergraduate program, elective.
Type of teaching, contact hours	1. Undergraduate degree program: lectures, < 60 students, 2. International undergraduate program: lectures, < 30 students.
Workload	1. Lectures: 3 x 50 = 150 minutes per week. 2. Exercises and Assignments: 2 x 50 = 100 minutes per week. 3. Private study: 1 x 50 = 50 minutes per week.
Credit points	3 credit points (sks).
Requirements according to the Examination regulations	A student must have attended at least 75% of the lectures to sit in the exams.
Recommended prerequisites	Machine Learning

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<tr>
<td>Learning outcomes (course outcomes) and their corresponding PLOs</td>
<td>After completing this module, a student is expected to:
CO1. Able to differentiate Deep Learning to traditional Neural Network
CO2. Able to understand multi-layer perceptron and backpropagation
CO3. Able to understand components in DNN architecture such as soft max, cross entropy loss function, activation function.
CO4. Able to understand computation process in DNN including batch normalization, hyperparameter initialization, etc.
CO5. Able to understand DNN architectures including CNN (modern/traditional) and RNN/LSTM/GRU.
CO6. Able to implement Deep Learning algorithms for specific problem.

<table>
<tr><th colspan="2">PLO</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th><th>CO6</th></tr>
<tr><td rowspan="5">Program Learning Outcome (PLO)</td><td>PLO1</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>PLO2</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO3</td><td></td><td></td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO4</td><td></td><td></td><td></td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>PLO5</td><td></td><td></td><td></td><td></td><td></td><td></td><td>√</td></tr>
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<tr>
<td>Contents</td>
<td>1. Introduction and the differences between Deep Learning and traditional NN
2. Multi-Layer Perceptron, backpropagation
3. Components in Deep Neural Network including softmax, cross entropy loss function, activation function
4. Computation process in Deep Learning including batch normalization, layer and block, hyperparameter, initialization
5. Traditional CNN (AlexNet) dan Modern CNN (GoogleNet, Inception)
6. Recurrent Neural Network (RNN), Gate Recurrent Unit (GRU), Long Short-Term Memory</td>
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<td>Study and examination requirements and forms of examination</td>
<td>The evaluation is done in 2 forms:
1. Mid and final exam.
2. Three individual assignment.
3. Two group assignments to be completed within a certain timeframe, and

Assessment is done using benchmark assessment, with the aim of measuring the level of student understanding related to the target and class rank.</td>
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<td>Media employed</td>
<td>e-learning Platform (ELOK), LCD, blackboard, and websites.</td>
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<tr><td>Assessments and Evaluation</td><td>
<table>
<tr><th>Type</th><th>Percentage</th><th>CO1</th><th>CO2</th><th>CO3</th><th>CO4</th><th>CO5</th><th>CO6</th></tr>
<tr><td>Task 1</td><td>5</td><td></td><td>√</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Group Task 1</td><td>15</td><td></td><td></td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>Midterm Test</td><td>20</td><td>√</td><td>√</td><td>√</td><td></td><td></td><td></td></tr>
<tr><td>Task 2</td><td>10</td><td></td><td></td><td></td><td>√</td><td></td><td>√</td></tr>
<tr><td>Task 3</td><td>10</td><td></td><td></td><td></td><td></td><td>√</td><td>√</td></tr>
<tr><td>Group Task 2</td><td>15</td><td></td><td></td><td></td><td></td><td></td><td>√</td></tr>
<tr><td>Final Test</td><td>25</td><td></td><td></td><td></td><td>√</td><td>√</td><td></td></tr>
<tr><td>Total</td><td>100</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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</td></tr>
<tr><td>Reading List</td><td>Goodfellow, I., Bengio, Y., dan Courville, A., 2016, Deep Learning, MIT Press, US.</td></tr>
</table>

Created date : June 3, 2021

Revision date : June 28, 2022