1. Course title: DATA MINING, Data mining in practice

2. Course code: DM_DMIP


4. Level of studies: MSc programme

5. Mode of studies: intramural studies

6. Field of study: CONTROL, ELECTRONIC AND INFORMATION ENGINEERING (MACRO)

7. Profile of studies: ACADEMIC

8. Programme: DATA SCIENCE

9. Semester: 2

10. Faculty teaching the course: Faculty of Automatic Control, Electronics and Computer Science

11. Course instructor: Dr hab. Marek Sikora prof. nzw.

12. Course classification: common courses

13. Course status: compulsory/elective

14. Language of instruction: English


16. Course objectives: The aim of the course is to make the students familiar with the methodology of the data exploration process, particularly with respect to complex-structure data. Use cases analysis will be presented, along with weak and strong points of particular analytical methods. The selected analytical platforms will be discussed.

17. Description of learning outcomes:

<table>
<thead>
<tr>
<th>Nr</th>
<th>Learning outcomes description</th>
<th>Method of assessment</th>
<th>Teaching methods</th>
<th>Reference code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Student understands methodology of data exploration within the CRISP DM standard.</td>
<td>Credit</td>
<td>Lecture</td>
<td>K2A_W15, K2A_W16, K2A_W17</td>
</tr>
<tr>
<td>2.</td>
<td>Student knows methods of preparation, cleaning, and improving quality of data.</td>
<td>Credit</td>
<td>Lecture</td>
<td>K2A_W15, K2A_W18</td>
</tr>
<tr>
<td>3.</td>
<td>Student knows methods of data modeling adequate to analytical task type. Student can estimate quality of models and can choose the one most adequate to the realized task.</td>
<td>Credit</td>
<td>Lecture</td>
<td>K2A_W17, K2A_W21, K2A_W27, K2A_W28</td>
</tr>
<tr>
<td>5.</td>
<td>Student knows general principles of actions of internet browsing tools and recommendation systems.</td>
<td>Credit</td>
<td>Lecture</td>
<td>K2A_W22, K2A_W24, K2A_W26</td>
</tr>
</tbody>
</table>
6. Student can analyze exemplary data set according to CRISP DM methodology.

Laboratory tasks

Laboratory

K2A_U01, K2A_U02

7. Student is able to use results of analyses in the business process. Student can design methodology of monitoring quality of analytical models and their modifications in the course of operation.

Laboratory tasks

Laboratory

K2A_U09, K2A_U10, K2A_K07

8. Student can use main platforms of analytics and data exploration (RapidMiner, TensorFlow).

Laboratory tasks

Laboratory

K2A_U17, K2A_U18

9. Student is able to perform, with the use of the chosen tool, the analysis of the social network, can transform the network, identify societies, point out critical nodes and can visualize the network to support the analysis.

Laboratory tasks

Laboratory

K2A_U15, K2A_K01, K2A_K02

18. Teaching modes and hours

Lecture 15 / BA/MA-Seminar / Class / Project / Laboratory 15

19. Syllabus description:

Lecture:

1. Cross Industry Standard Process for Data Mining (data mining methodology)
2. Data preparation and cleaning (feature selection, feature extraction, missing values, unbalanced data)
3. Analytical model developing, selection and evaluation (classification, regression, survival/reliability analysis)
4. Model deployment and maintenance (analytical model deployment, batch mode, incremental mode, concept drift)
5. Social network analysis I (network characteristics and measures, network extraction)
6. Social network analysis II (network visualisation, community identification)
7. Beyond PageRank (intelligent search and recommendation engines)

Laboratory:

3. Social Network analysis – use cases (Pajek, Gephi – network transformation, identification)

20. Examination: semester NO

21. Primary sources:


Wasserman, S., Faust, K. Social network analysis: Methods and applications. Cambridge university press. 1994

22. Secondary sources:

23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Teaching mode</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>15/15</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>15/15</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>/</td>
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<tr>
<td>5</td>
<td>BA/ MA Seminar</td>
<td>/</td>
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<tr>
<td>6</td>
<td>Other</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>30/30</td>
</tr>
</tbody>
</table>

24. Total hours: 60

25. Number of ECTS credits: 2

26. Number of ECTS credits allocated for contact hours: 1

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 1

26. Comments:

Approved:

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(date, Instructor's signature) (date, the Director of the Faculty Unit signature)