Data Science At ACM and ABET

Curriculum Recommendations at ACM and Accreditation Criteria from ABET

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Background

- ACM curriculum guidance for programs in computing since 1968

- All available at https://www.acm.org/education/curricula-recommendations

- Data Science recommendation: dstf.acm.org

- Task forced co-chaired by Andrea Danyluk and Paul Leidig

- Work began with a proposal to the ACM Education Council in 2017, following preliminary discussions at meetings led by Heikki Topi and myself, with NSF support.

Interdisciplinary

- The report emphasizes that data science is inherently interdisciplinary and that the guidance provided describes the <u>computing</u> contributions to the field

- It explicitly invites collaboration and coordination with other (non-computing) professional societies

Body of Knowledge for Data Science: competencies

- Analysis and Presentation
- Artificial Intelligence
- Big Data Systems
- Computing and Computer Fundamentals
- Data Acquisition, Management, Governance
- Data Mining

- Data Privacy, Security, Integrity, and Analysis for Security
- Machine Learning
- Professionalism
- Programming, Data Structures, and Algorithms
- Software Development and Maintenance

Competencies are described in terms of Knowledge, Skills, and Dispositions

ABET

- ABET accredits college and university programs in the disciplines of applied and natural science, computing, engineering and engineering technology at the associate, bachelor's and master's degree levels.

- As of the 2021-2022 accreditation cycle, Data Science is available in both computing and applied and natural science components

- For computing, the criteria build on the existing criteria for all computing programs. Added sixth required outcome: Graduates of the program will also have an ability to apply theory, techniques, and tools throughout the data analysis lifecycle and employ the resulting knowledge to satisfy stakeholders' needs.

Topic Requirements for Data Science: At least 45 credit hours (or equivalent)

a) Fundamental data analysis lifecycle topics:
   i. Data acquisition
   ii. Data management
   iii. Data prepraration and integration
   iv. Data analysis
   v. Model development and deployment
   vi. Visualization

b) Concepts that span and are applied to the data analysis lifecycle:
   ii. Data privacy, governance, and stewardship
   iii. Statistics and mathematics
   iv. Computing, including substantial coverage of data structures, algorithms, and at least one programming language

c) Advanced data science coursework that provides depth

d) Coverage of at least one application domain area to provide a context for data science activities

e) A major project that 1) incorporates an application domain area and 2) requires integration and application of knowledge and skills acquired in earlier course work

ACM and ABET

- Distinct entities operating independently
- Each aware of the other's work
- Similar goals in terms of data science
- Some overlap of the committees