Mannheim Master in Data Science
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- Research oriented

- Interdisciplinary
  - Computer Science
  - Mathematics and Statistics
  - Social Science

- Applied
  - Hands-on experience
  - Close cooperation with industry partners
A New Study Program

- Started this semester
- 25 places per year
Data Science in a Nutshell

- **Global Data Volume**
  - 2,5 Million Terabytes per day
  - ~6.000 DVDs *per second*

- **Challenges**
  - Data collection
  - Storage
  - Processing
  - Analysis
Becoming a „Data Scientist“

- **Competencies**
  - Mathematics
  - Computer Science
  - Statistics

- **Job Areas**
  - Business (Recommender systems, market research, pricing, …)
  - Industry 4.0 (Production planning, machine supervision, early warning systems, …)
  - Research (Social Sciences, Computer Science, Digital Humanities, …)
  - Administration (Traffic planning, intelligent energy networks, …)
  - Medical Science (Research studies, personalized medication, …)
Programme Structure

1\textsuperscript{st} Semester
- Fundamentals
  - Up to two out of
    - Data Acquisition
    - Database Technology
    - Multivariate Analysis
    - Programming

- Data Management
  - e.g., one out of
    - Algorithms
    - Database Systems II
    - Data Security
    - Information Retrieval and Web Search

- Data Analytics
  - e.g., two out of
    - Advanced Quantitative Methods
    - Computational Finance
    - Data Mining and Matrices
    - Data Mining II
    - Web Mining
    - Non-linear Optimization
    - Longitudinal Data Analysis

- Research
  - Team or Individual Project or Seminar

2\textsuperscript{nd} Semester
- Data Management
  - e.g., one or two out of
    - Query Optimization
    - Advanced Software Engineering
    - Semantic Web Technologies

- Data Analytics
  - e.g., one or two out of
    - Algebraic Statistics
    - Hot Topics in Machine Learning
    - Mathematics and Information
    - Mathematical Visualization

- Research
  - Team or Individual Project
  - Seminar

3\textsuperscript{rd} Semester
- Data Management
  - e.g., one or two out of
    - Large-scale Data Management
    - Model-Driven Development
    - Web Data Integration

- Data Analytics
  - e.g., two out of
    - Algebraic Statistics
    - Cross-sectional Data Analysis
    - Decision Support
    - Optimization
    - Research Design
    - Text Analytics

- Master’s Thesis

approx. 30 ECTS / Semester
Fundamentals

- The MMDS is an interdisciplinary study programme
  - Hence, most of you have different backgrounds:
    you are computer scientists, social scientists, mathematicians, ...
- Fundamentals help you catch up with each other
- Offered starting in the autumn fall:
  - Data acquisition
  - Multivariate analysis
  - Database technology
  - Programming
Data Management (24-36 ECTS)

- Storing, processing, and searching for data
  - Formats, standards, and methodologies

- Lecture offerings include
  - Large Scale Data Management
  - Information Retrieval and Web Search
  - Query Optimization
  - Semantic Web Technologies
  - Model-driven Development
  - Algorithmics
  - Web Data Integration
  - Record Linkage
  - Data Security
Data Analytics (30-54 ECTS)

- Analysis, subsequent processing, and visualization
  - Methods and applications

- Lecture offerings include
  - Data Mining
  - Text Analytics
  - Hot Topics in Machine Learning
  - Mathematical Visualization
  - Multivariate Analyses
  - Cross Sectional Data Analysis
  - Longitudinal Data Analysis
  - Baysian Statistics
  - Linear Optimization
  - Decision Support
  - Big Data and Social Sciences
  - Image Processing
Seminars and Individual Projects

- Seminar (4 ECTS)
  - Mostly theoretical work (e.g., literature reviews on certain topics)
  - Offered every semester
  - Watch for the announcements of different chairs

- Individual Projects (8 ECTS)
  - Practical work on a data science problem
  - Approach chairs directly for topics
Team Projects (12 ECTS)

- Work on a data science project as a team
  - Acquire team organization and management skills on top!
- Run over one or two semesters
- Topics are announced every semester in a special session
Industry Partners

- We are constantly extending our network of industry partners
  - Joint projects
  - Internships (can be combined with individual project)
  - Master‘s theses
Professors and Lecturers

Institute of Computer Science and Business Informatics

Frederik Armknecht
Colin Atkinson
Christian Bizer
Rainer Gemulla
Margret Keuper
Matthias Krause
Guido Moerkotte
Heiko Paulheim

Simone Ponzetto
Ursula Rost
Heiner Stuckenschmidt
Thomas Gautschi
Florian Keusch
Frauke Kreuter
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