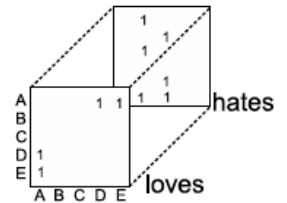
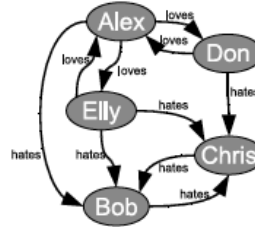


Seminar Sommersemester 2020

“Matrix and Tensor Representations for Information Retrieval and Machine Learning”

Prof. Dr. Steffen Staab
Dr. Rafika Boutalbi

First Meeting: 11. Feb 2021, 17.00 Uhr,
is a Webex meeting. Join at
<https://tinyurl.com/yxscrcnu>



Target Group

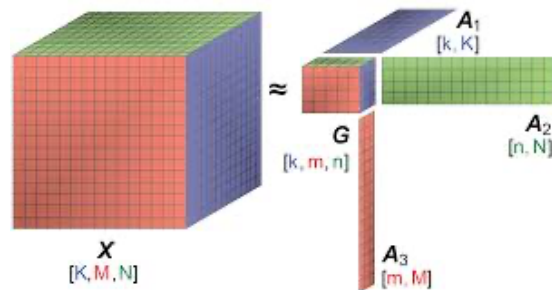
The seminar addresses Bachelor students with interests in Linear Algebra, Artificial Intelligence (AI) and Information Retrieval (IR). The seminar will be held in English.

The Topic

Tensors allow for describing multilinear relationships between objects. An order-0 tensor is a scalar, an order-1 tensor is a vector, an order-2 tensor is a matrix, and an order- n tensor can be represented by an array with n dimensions. Order-2 tensors (matrices) and order-3 tensors have been used a lot to represent objects for information retrieval or artificial intelligence. In this seminar, we want to explore representations of tensors and their mathematical analysis for a range of applications in IR and AI. Examples include ranking in Web search, unsupervised image analysis or recommendation systems:

Topics include

- Foundations in Linear Algebra:
 - Dimensionality Reduction
 - Tensor Analysis and Decomposition
 - Non-negative Matrix Factorizations
- Applications
 - Information Retrieval
 - Text Clustering
 - Recommender Systems
 - Knowledge Graphs
 - Image Classification
 - Multidimensional Time Series Segmentation
 - Microarray matrix analysis
 - Representing Evolving Graphs



Procedure

Students are assigned one or two papers and are expected to acquire knowledge in the area of these papers (also beyond these papers). They will give presentations in the weekly seminars. After the seminar presentations and before the end of the summer term lecture time, the seminar reports must be handed in.