DSE 203 (Fall 2020)

Class Logistics, Assignment and Project

Why This Course?

- By 2021, more than 80% of organizations will ***use more than one data delivery style*** to execute their data integration use cases.
- By 2022, organizations utilizing active metadata to ***dynamically connect, optimize and automate data integration processes*** will reduce time to data delivery by 30%.
- ***By 2022, manual data integration tasks (including recognition of performance and optimization issues across multiple environments) will be reduced by 45% through the addition of ML and automated service-level management.***
- By 2023, improved location-agnostic semantics in data integration tools will reduce design, deployment and administrative costs by 40%.

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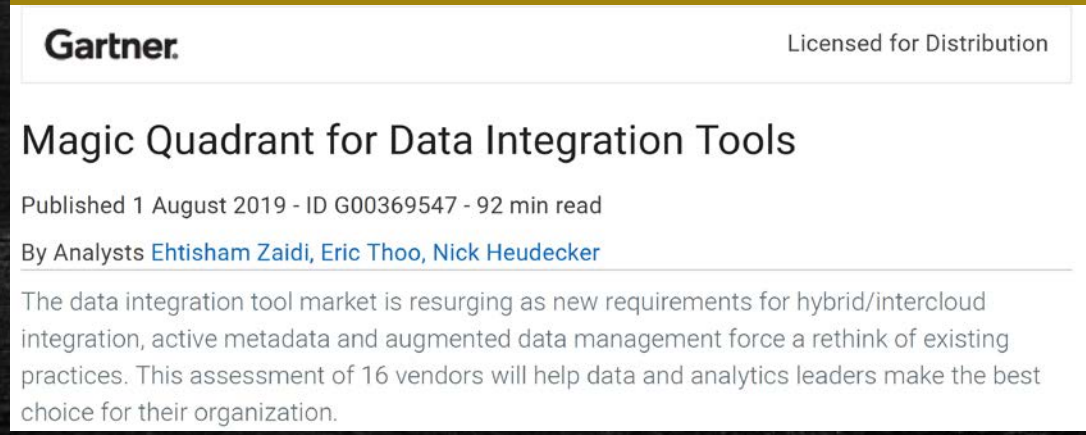
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Magic Quadrant for Data Integration Tools

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By Analysts Ehtisham Zaidi, Eric Thoo, Nick Heudecker

The data integration tool market is resurging as new requirements for hybrid/intercloud integration, active metadata and augmented data management force a rethink of existing practices. This assessment of 16 vendors will help data and analytics leaders make the best choice for their organization.

Instructors

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Syllabus

- What is data integration?
- The problem of value matching
- The problem of entity matching
- The problem of cross-model data integration
- Data Integration architectures and data warehousing
- Modern trends in data integration
  - Data lakes
  - Knowledge-based integration
  - Polystores

Several of these problems need a combination of data management and machine learning solutions

Evaluation: Assignments

- No mid-term and final exam
- 3 Programming Assignments (20 X 3 = 60 points)
- Assignment 1
  - Using data sets given to you and a library of different distance functions
    - Find the best value matching method
    - Implement a similarity join method
  - Assignment 2
    - Given a data set and an entity resolution library
    - Solve the same problem using an active learning library
  - Assignment 3
    - Given a JSON data set and a relational data set
    - Implement a workflow that will create a combined JSON data

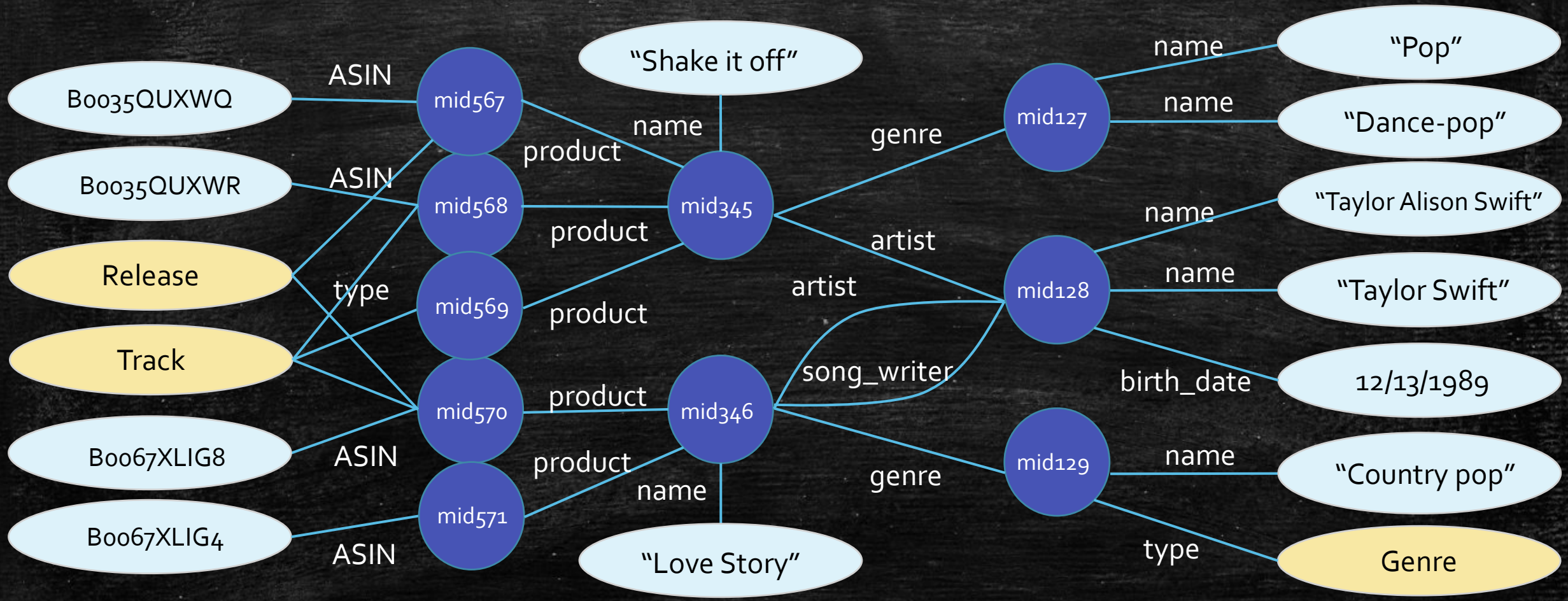
Evaluation: Project

- Goal:
  - Integrating structured, semistructured and unstructured data (40 points)
- Groups of 3 (9 groups)
- Each group will
  - Get 3 different data sets and a taxonomy from instructors
  - Create a knowledge graph
  - Load the graph in Neo4J
  - Answer a set of queries on the knowledge graph
  - Some of the queries would have analytical functions
- Deliverables
  - Project presentation with a functional demo
  - The steps of integration as Jupyter Notebook
  - The final Neo4J graph as a zipped file

Last Year's Project

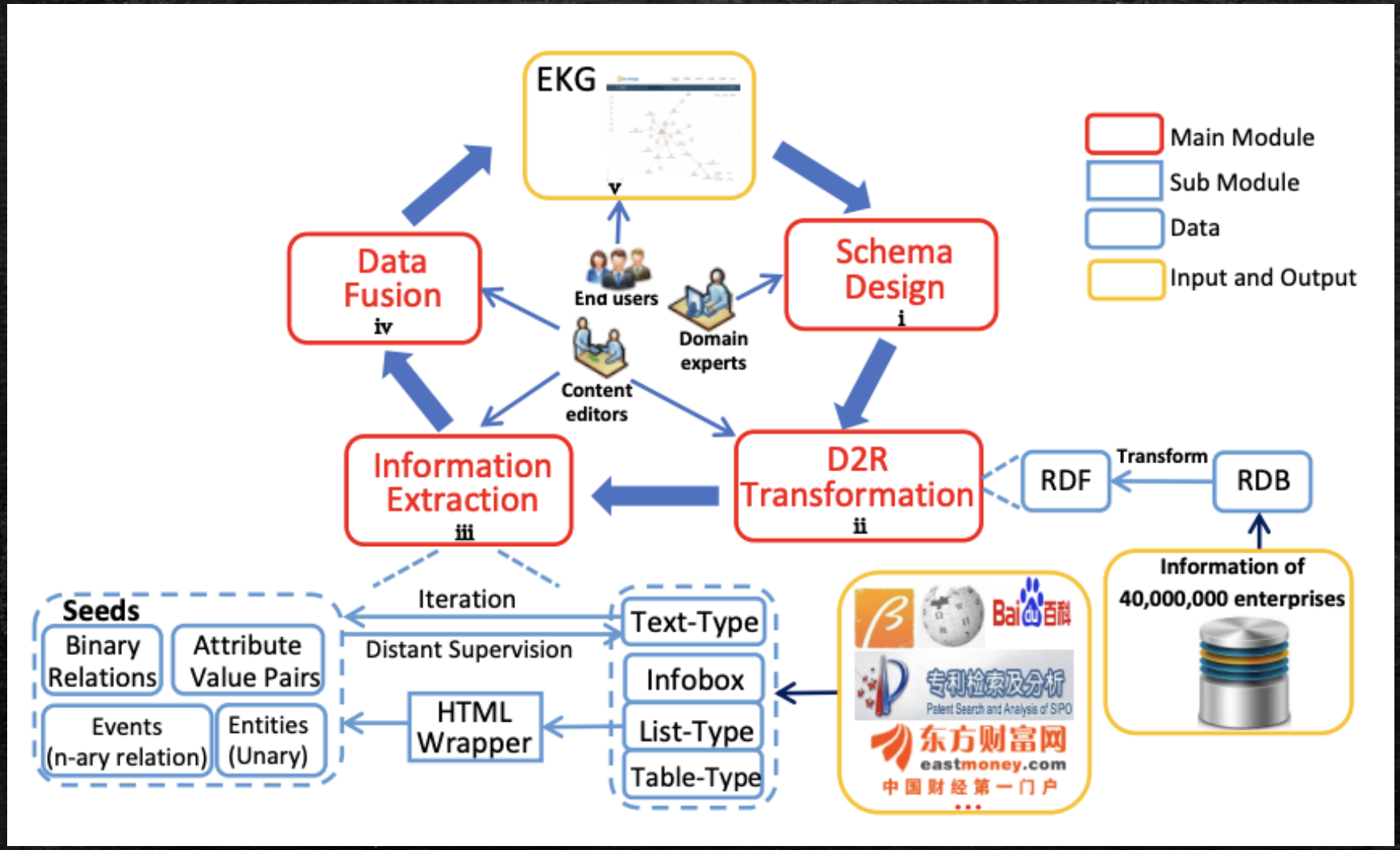
- Each group chose a company from Wikipedia
- For each company they chose three collaborator/partner/subsidiary company
- Using Wikipedia, they mined text to gather information from them
- With this information and information other sources they produced, they created a knowledge graph to answer queries like
  - Find pairs of companies that compete in some areas and cooperate in other areas. Find these areas.
  - Which companies have acquired new companies to start a new product or service line?

Product Graph Example for 2 Songs (Amazon.com)



Luna Dong, Amazon

Building a Knowledge Graph



Read This

https://towardsdatascience.com/a-practical-guide-to-build-an-enterprise-knowledge-graph-for-investment-analysis-3a15363098b7

Your Tasks

- Form your project group and inform the TAs within 1 week
- Get into a groupwise meeting with me to (Week 2)
  - Get your data sets/ pointer to data sets
  - Define the knowledge graph specs for your design
- Every week
  - Some groups meet with me/TAs to discuss progress/difficulties

This Class Project is a precursor for your Capstone Project

This is a Practical "Design-A-Solution" Class

- This class has a "real world" nature
  - We mix theory and practice
  - It combines techniques learned in other classes
  - We don't use "toy data"
- For each topic we discuss, you will find
  - There are many existing algorithms and techniques
  - None of them fits all applications
  - There is often no concrete formula by which you will get the "correct" solution
  - You have to experiment with multiple techniques
  - You may have to combine multiple techniques to get good results

For each class, you should be able to add one or more lines to your CV