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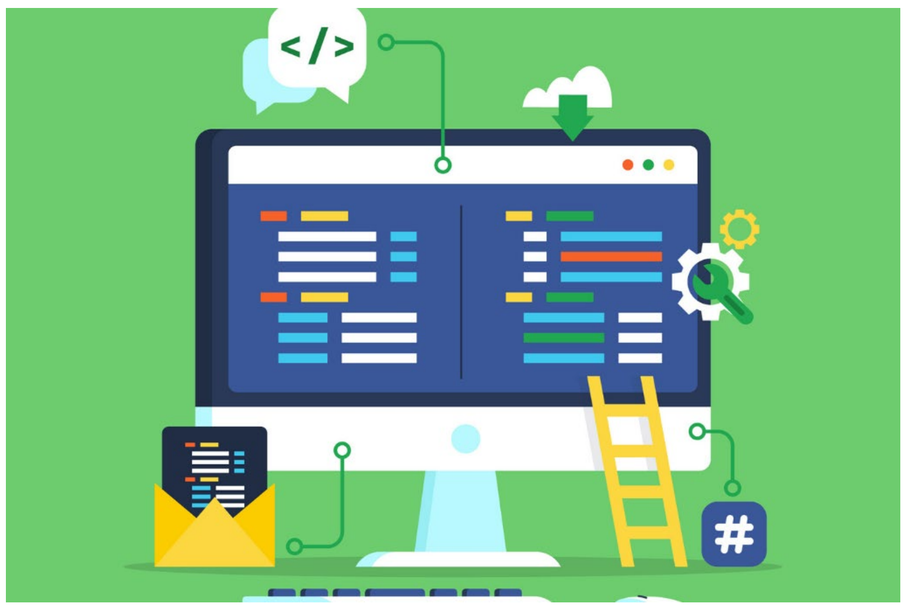
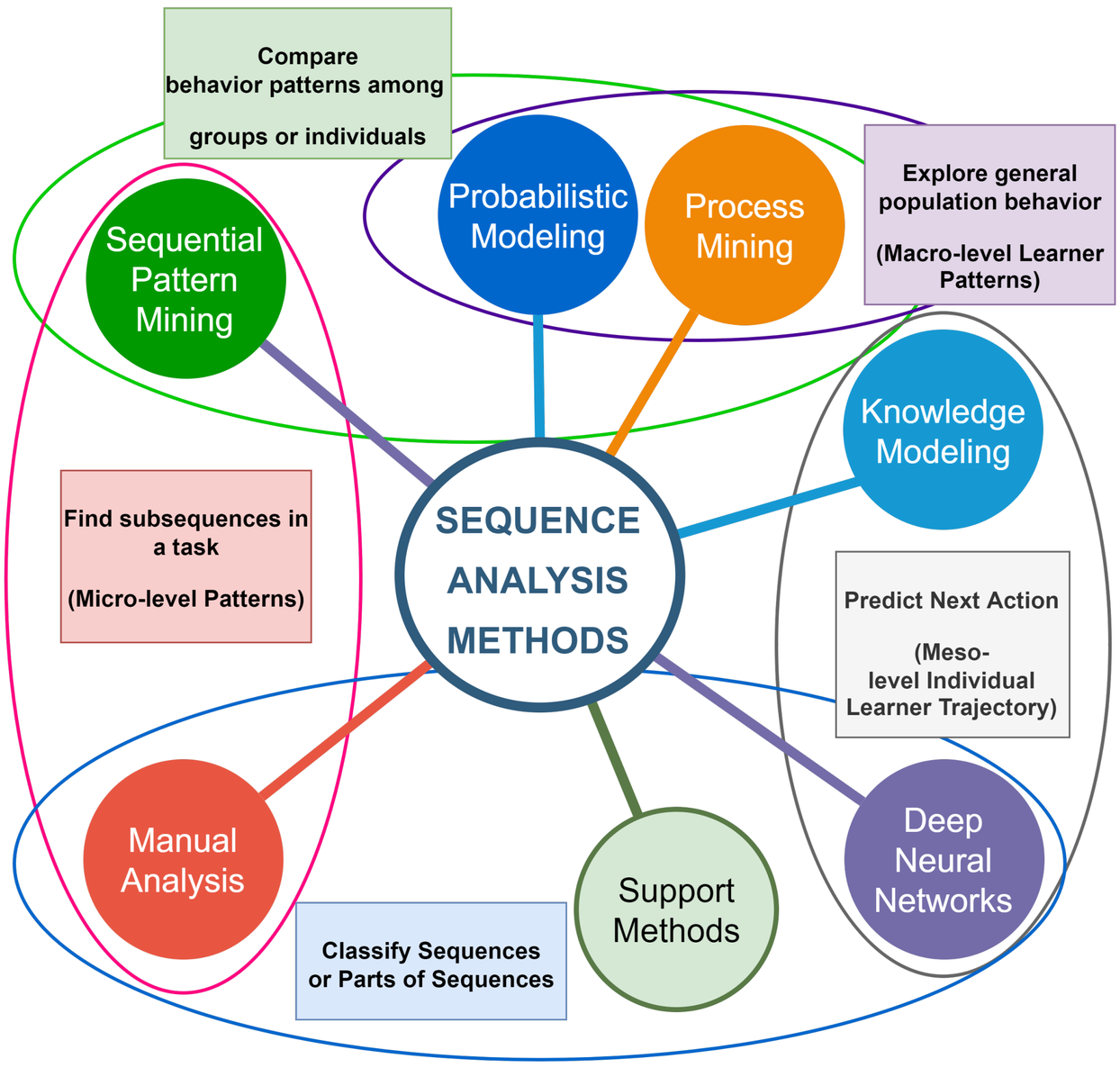
Learning Analytics – Using Action Sequences for Learner Support

- Aim: Automatically adapt to learners' different levels of knowledge and skills.
- Problem: Online learning does not provide fine-grained and timely feedback
- Contribution: Develop methods for timely assessment and personalized feedback in long or complex learning tasks
- Procedure: Use sequential analysis to identify disadvantageous patterns early and provide adaptive support
- Outcome: improve learning in online settings





Work in Progress – May 2022

- Literature Review:
- RQ: How to model learning sequences, supported by cognitive and pedagogical theory?
  - In which scenarios is it beneficial to intervene during a learning sequence?
- Expected Outcome: decision framework, which methods to use for different scenarios

Future Work

- Intervention and Validation: Sequence analysis scenario with intervention – feedback, hints, scaffolding – using the decision framework from the literature review

Publications and Takeaways

- Ioana Jivet, Jacqueline Wong, Maren Scheffel, Manuel Valle Torre, Marcus Specht, and Hendrik Drachsler. 2021. "Quantum of Choice: How learners' feedback monitoring decisions, goals and self-regulated learning skills are related". *LAK21*

Students were provided with a visualization where they could choose 3-6 indicators from 12 available. The indicator selection was compared with student goals and self-regulated learning skills. Learners preferred indicators about completing content, some skills predict selection of indicators, but there was no relationship with goal selection.

Student-facing dashboards should be part of a feedback process, adaptable to different levels of self-regulation and personalizable to student preferences.

- Manuel Valle Torre, Esther Tan, and Claudia Hauff. 2020. "EdX log data analysis made easy: introducing ELAT: An open-source, privacy-aware and browser-based edX log data analysis tool." *LAK20*

Development of a pre-processing and visualization tool for edX log data. Based on the MOOCdb schema, ELAT generates a database of learning sessions: time periods where then student is assumed to be active in the MOOC, with specific categories such as watching videos or taking a quiz. ELAT was evaluated for usability with potential end users. Visualizations with theoretical grounding were considered most useful.

Teachers (users) should be involved in the development of LA tools: they know the course and their students' needs. Transparency, purpose and policy are key.

Collaboration – CEL, ESSB (EUR), DIPF

- From needs to data: Bottom-up analysis of learners' information needs
  - Mixed-methods qualitative (interviews) and quantitative (questionnaire) study, with learners in the center of the design process of Learning Analytics Dashboards

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