Simulating and Analyzing Complex Social Systems

kurs prowadzony w semestrze letnim na WMiI

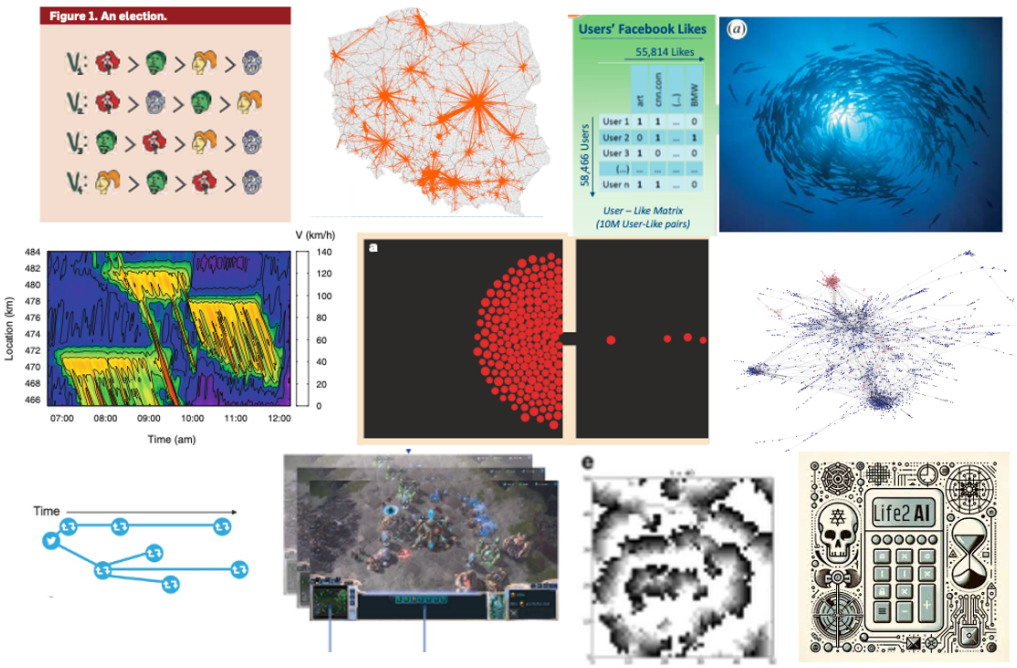
This course introduces a social component into the formal analysis. We work with data, models and algorithms which describe human behaviour. By definition non-deterministic, heterogeneic and adaptive - this is core element common to all the addressed problems.

Understanding how a single human behaves is already a challenge, understanding how people (family, group, society, nation, etc.) behaves is even more challenging, when information, perception, learning and adaptation kick-in the system becomes truly complex. Importantly here we do not take the perspective of social sciences - this course is intended for mathematicians, physics, data scientists, AI/ML engineers and computer scientists (BA/MA/PhD students) - thus we always rely on hard empirical (big) data, statistical models, verified theories and frameworks.

Topics:

- behavioural profiling (Cambridge Analytica)
- recommendation systems (Youtube and TikTok)
- virus spreading (SIS, SIR models for pandemic)
- human vs AI in games (Starfcraft AlphaStar)
- social networks (fake news spreading in communities)
- complex adaptive systems (flock of birds)
- discrete choice models (McFadden's Nobel 2000)
- voting theory (Democracy as a algorithm)
- community detection (Barabasi's Network Science)
- game theory (Cuban Missile Crisis as a game)
- LLM to predict death (Life2Vec)

Seminar + hands-on projects, 6 ECTS, code: WMI.II-SAACSS-S



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