10-708 modelling networks 03/06/2020

Lec: Gaussian graphical models and Ising models

- Practical problem in real-world → new algorithmic design
(*) Network research has been active research area for a long time.
(*) ML/DL → default image/text data
(*) network research deals with relationships.
(*) EX: where does the graph come from?
  - Given, or we need to discover them?
(*) Twitter network → how is graph constructed?
  - Co-occurrences in same use, chapter, ?
  - A source of variation
  - What is considered a natural object can be a man-made artefact.
(*) EX trying to initiate a debate on
  i) the ontological status of a graph
  ii) interrogating its truth/representation value.
(*) EX: None of the common networks are physical, 'undisputable' facts.

(*) Evolving networks
- Friends and foes are interchangeable (e.g. politics)

(*) ML structural learning for completely observed GMs
- EX: Previously assumed structure was given.
- Very complex topic fraught with mathematical and algorithmic challenges.
- Trail has gone colder due to low-hanging fruit in other areas.
(*) (AI): H/W: Go through Chow-Liu algorithm; estimate graph structure
- examine a number of 'optimal' algorithms; focus on
- Pairwise MRFs: covariance selection, neighbourhood selection.