Course Logistics

- **Slot 12**: Mon & Thurs  5.30 - 6.55 pm
- **Week 1**: Thurs, Jan 7, 5.05 - 5.55 pm
- **Pre-recorded lectures + weekly live interactions (Slot 12)**
  - Recordings for week to be made available by Mon 5.30 pm
  - No lectures during live interactions -- only doubt clearing
- **Primary references**:  
  - Research papers
- **Hands-on project**
- **Evaluation**: Mid-sem, end-sem, paper presentation, project -- 90%
  - 10% based on quizzes (more attention-recall than deep thinking)
What this course is about

● Algorithmic techniques
  ○ Prove formal “properties” of ML components
  ○ Or show that they violate the “properties”

● ML components
  ○ Feed-forward neural networks
  ○ Recurrent neural networks

● Formal “Properties”
  ○ Must be mathematically precise and admit unique interpretation
  ○ Some properties
    ■ All images of cats are labeled 1
    ■ Two images that differ in less than 5% of pixels can’t be labeled differently
    ■ Robot never gets into the region within coordinates (x0, y0) and (x1, y1)
What this course is **NOT** about

- Fundamentals of logic, automata theory
- Program verification
- Fundamentals of machine learning
- Push-button techniques to prove any property about your favourite neural network
- All paper-and-pencil theory
Expectations from students

- Must have taken pre-requisite courses
  - BTechs: CS228, CS213, CS337
  - MTechs: CS433/CS771, CS725 (if you haven’t taken this, talk to me separately)
- Weekly readings of papers
  - Without this, lectures may be difficult to follow
- Attempting quizzes, even if the weightage is low
  - Those found not attempting may be penalized
- Willingness to get hands dirty with tools
- Willingness to get minds challenged with logic-based formal reasoning