Lecture-01 Motivation, Introduction, Logistics of the course

3/01/2023

Historical Context for Motivational Purposes
- Please read chapter 1 or the book. However, I include additional material I found useful in the notes below: We look at the history through a few individuals among many that shaped AI as we know :

- Principia Mathematica of Russell and Whitehead
    - They wished to 'logic-ise' Mathematics. Mechanically arrive at theorems from a small set of axioms and some inference steps.
    - See the preface here.
    - There is a good overview of the book.
    - The book is still available on Amazon.in for example, see its ToC.
- Turing's 1950 paper
    - https://academic.oup.com/mind/article/LIX/236/433/986238
    - He introduced many concepts that are now part of standard AI discourse including machine learning.
- McCarthy
    - Furthered the symbolic method.
    - Also inventor of the AI Language LISP
        - BTW inventor of time-sharing .. invented for him to access resource he otherwise would have found difficult to get.
    - Co-Established CSAIL of MIT with Minsky
    - Established AI Lab at Stanford
- Minsky
    - Also championed the symbolic method
    - Known for work in building robots with cameras and arms
    - Described some flaws in the NN methodology, I believe addressing which are interesting parts of ML these days
- Geoffrey Hinton
    - Among the proponents and early developers of several techniques that make Neural Networks today.
- How may Logic/Symbolic AI be used in conjunction with the more data-driven AI is an important research question.

Topics to be covered in the course, very briefly:

With the above motivation, in this course we address these topics

- Search based AI
- Logic based AI
- Planning
- Semantic web

Text book:

"Artificial Intelligence - A Modern approach" by Russell and Norvig, 2nd edition or later.

If you know of a lighter text book, please let me know.

Assessment

- 30-40% Tests/ Assignments/ Projects/ Paper reading
    - Still not sure, will provide reading projects as well as coding ones
- 30% Mid Term Exam
- 30-40% End Term Exam

Introduction to the basic notions of Agent and Environment (Ch 1 & 2) of the book.

- We talked about agent, the environment, percepts and actions.
- We also talked about the different varieties of these leading to different situations
    - Environment can be Dynamic or static (ie environment does or doesn't change by itself over time)
    - Percepts and actions could be discrete or continuous in value
    - Percepts are observations, these can be either total (tell us all about the environment) or partial.
    - Actions taken could be deterministic, or stochastic or even non-deterministic in terms of the effect they produce
- We also talked about
    - Single vs multi-agent scenarios
    - Episodic vs Sequential agents
- Going into what an agent looks like:
    - Agent's intelligence could simply be a lookup table or an ML model or some knowledge represented in some form.
    - Some agents may have a learning(and exploring component)
    - Agents have other structure depending on how they are implemented. More on this next class
    - We need more time to finish this in the next class.