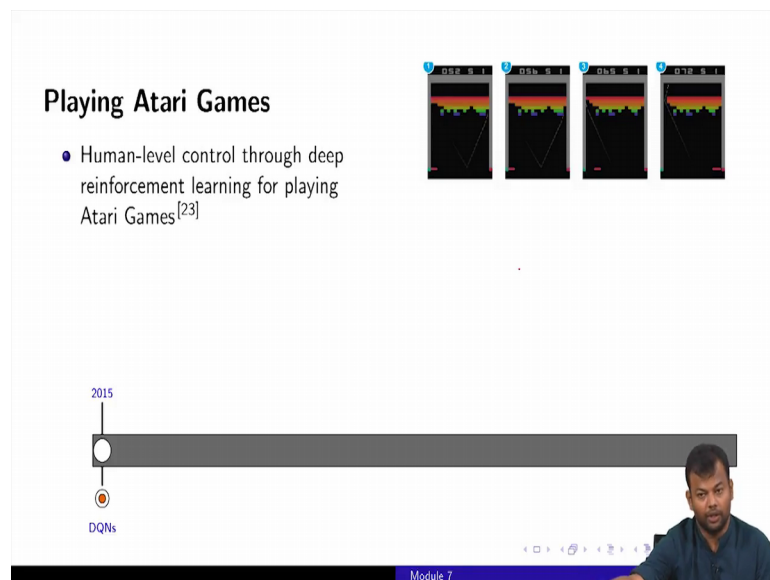


Deep Learning
Prof. Mitesh M. Khapra
Department of Computer Science and Engineering
Indian Institute of Technology, Madras

Lecture - 01
Beating humans at their own game (literally)

Now, since I mentioned r l. So, we will go on to the next chapter which was now becoming much more ambitious with what you can do with deep learning and people started beating humans at their own game quite literally.

(Refer Slide Time: 00:26)



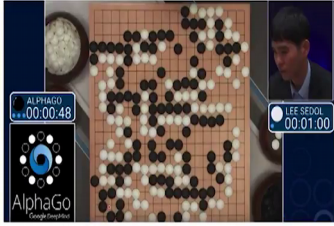
The slide is titled "Playing Atari Games". It features a bullet point: "Human-level control through deep reinforcement learning for playing Atari Games^[23]". To the right of the text are four small screenshots of the game Endorphin Race, showing a car on a track. Below the text is a horizontal timeline with a white circle at the year 2015 and a red circle below it labeled "DQNs". At the bottom right, there is a small video inset of a man speaking. The bottom of the slide has a blue bar with the text "Module 7".

So, there was this starting with Atari games in 2015, where resources from deep mind show that you could train a deep neural network to play Atari games and do much better than what humans do, right. So, that is something that they were able to show on Atari games and then, people started looking at other game.

(Refer Slide Time: 00:46)

Let's GO

- Alpha Go Zero - Best Go player ever, surpassing human players^[24]
- GO is more complex than chess because of number of possible moves
- No brute force backtracking unlike previous chess agents



2015

DQNs/AlphaGO

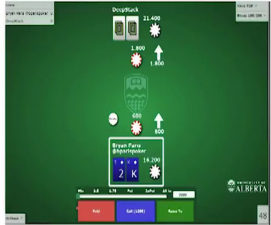
Module 7

So, then there was this GO and this popular tournament and which AlphaGO which is deep reinforcement learning based agent was actually able to beat the reigning champion, at that time AlphaGO Zero was one of the best players of GO at that time.

(Refer Slide Time: 01:06)

Taking a shot at Poker

DeepStack defeated 11 professional poker players with only one outside the margin of statistical significance^[25]



2015

2016

DQNs/AlphaGO

Poker

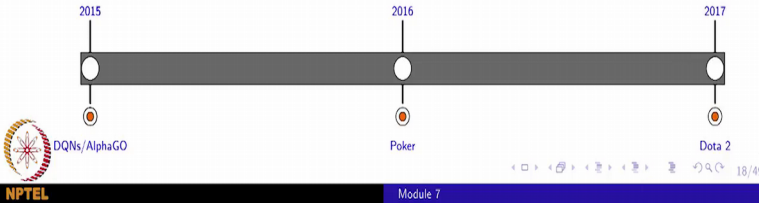

Module 7

Then, even at poker were something known as DeepStack which is again a deep reinforcement learning based agent which is able to beat 11 professional poker players at this game.

(Refer Slide Time: 01:17)

Defense of the Ancients

- Widely popular game, with complex strategies, large visual space
- Bot was undefeated against many top professional players



The slide features a timeline with three key milestones: 2015 (DQNs/AlphaGO), 2016 (Poker), and 2017 (Dota 2). A screenshot of the game Defense of the Ancients (Dota 2) is shown in the top right corner. The slide also includes the NPTEL logo and the text 'Module 7' at the bottom.

Then, other games like Defense of the Ancients since on, which is a much more complex strategy based game where again deep reinforcement learning based agents have shown a lot of success in beating top professional players on this game right.