

# Thoughts of AI in Learning and Cognition

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# AI and Job Market

## McKinsey Global Institute

We estimate that between 400 million and 800 million individuals could be displaced by automation and need to find new jobs by 2030 around the world.



<https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-wages#>

# Human vs machine intelligence



What is common between human and machine intelligence?

# Human vs machine intelligence



Can they still complement each others?

# How Human Perceive the environment?



How do you know the  
above shape is a line?



<https://www.istockphoto.com/illustrations/sense-organs>

# How does the brain represent knowledge?

The brain represents knowledge through a complex network of neural connections and patterns of activation. When we learn new information or skills, our brain forms new connections between neurons and strengthens existing ones through a process called synaptic plasticity.

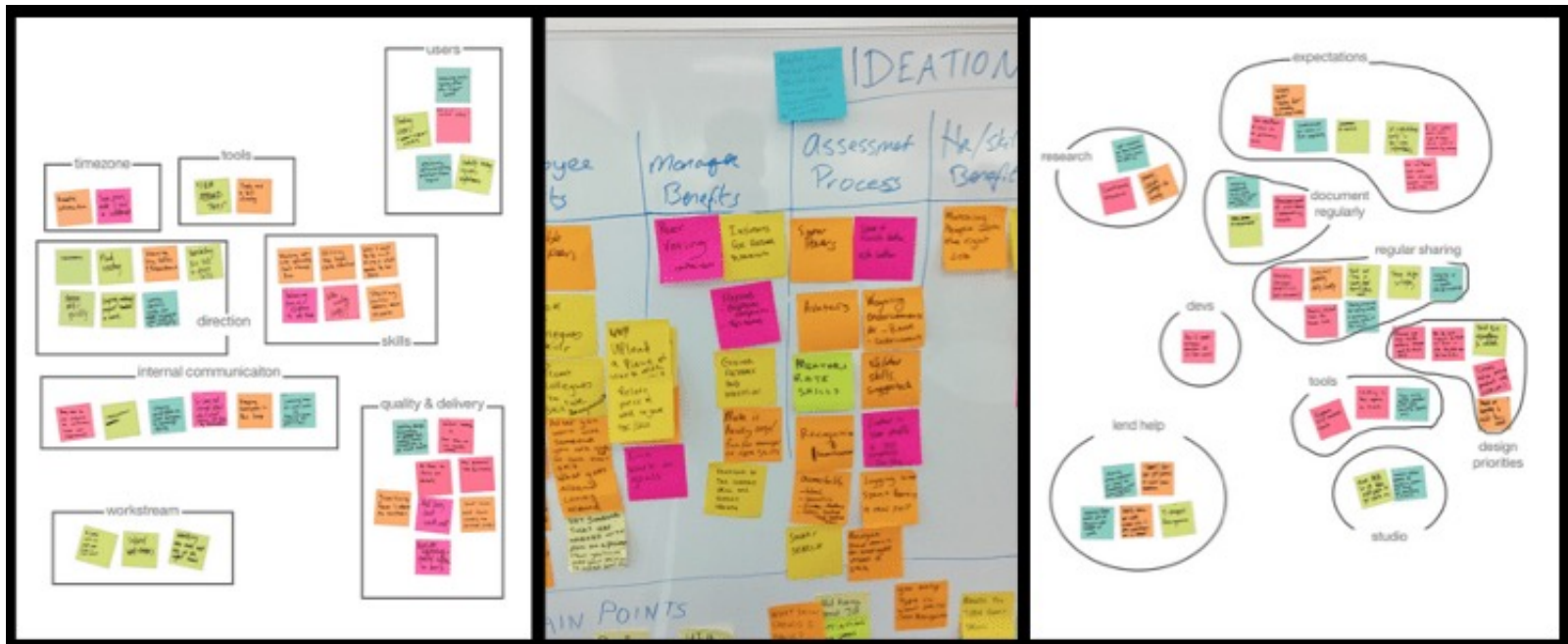


<https://www.theschoolrun.com/homework-help/human-brain-and-nervous-system>

# How does the brain represent knowledge?

How does your brain acquire knowledge?

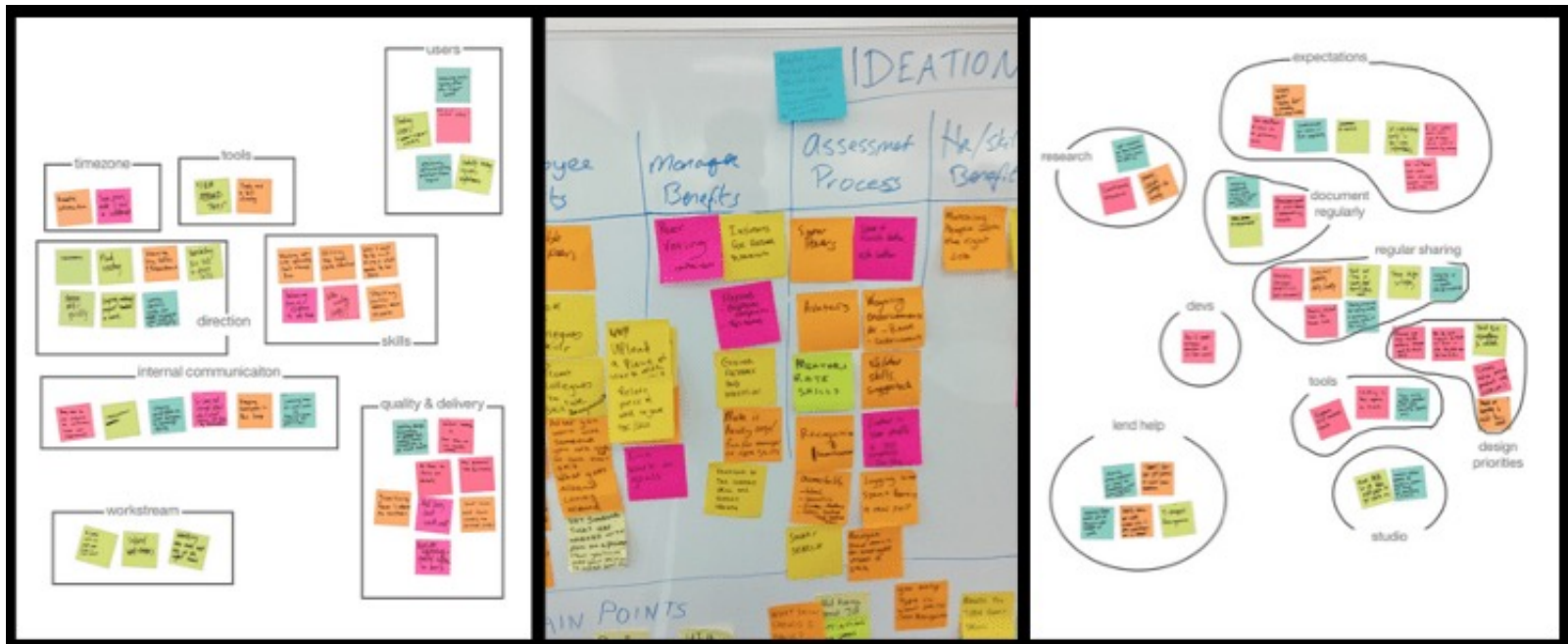
e.g., about AI from this class





# How does the brain represent knowledge?

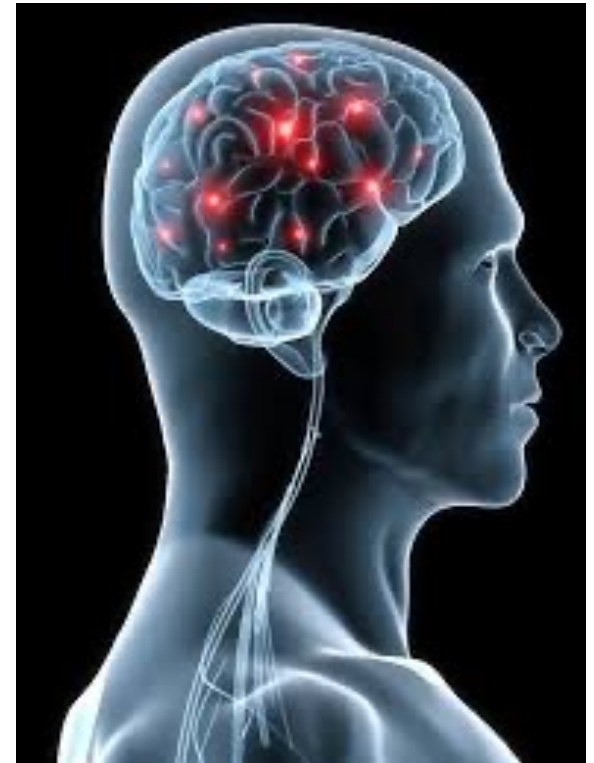
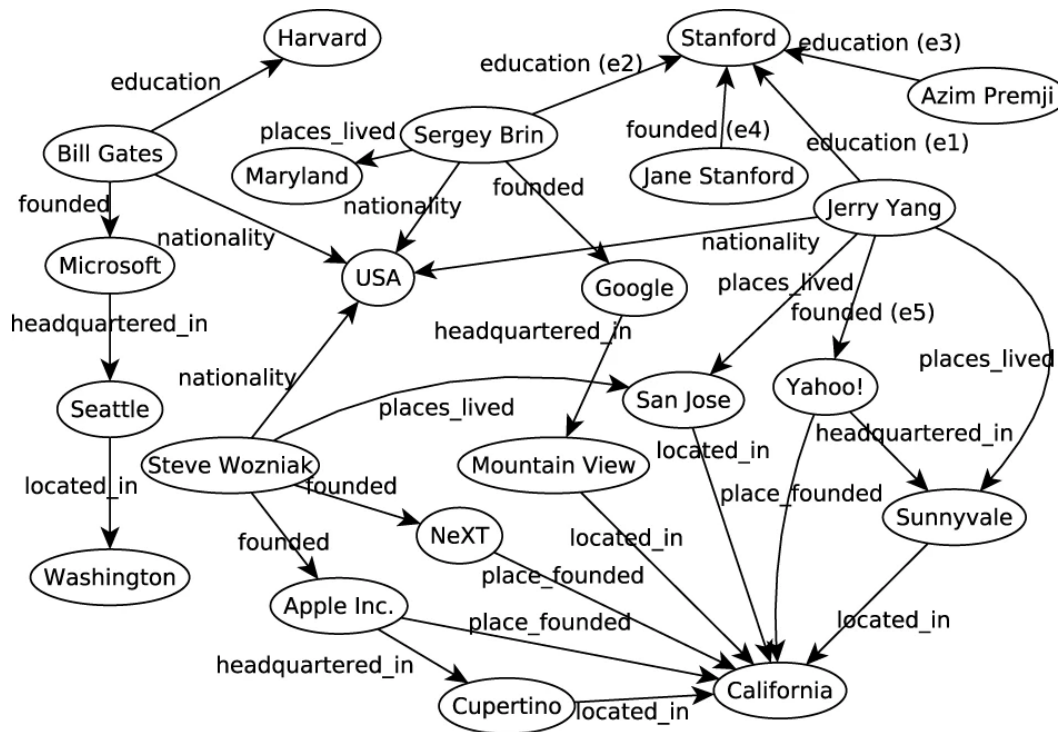
- Brainstorming session
- Ideation
- Grouping items
- Identifying relationships between items





# How does the brain represent knowledge?

## Open question

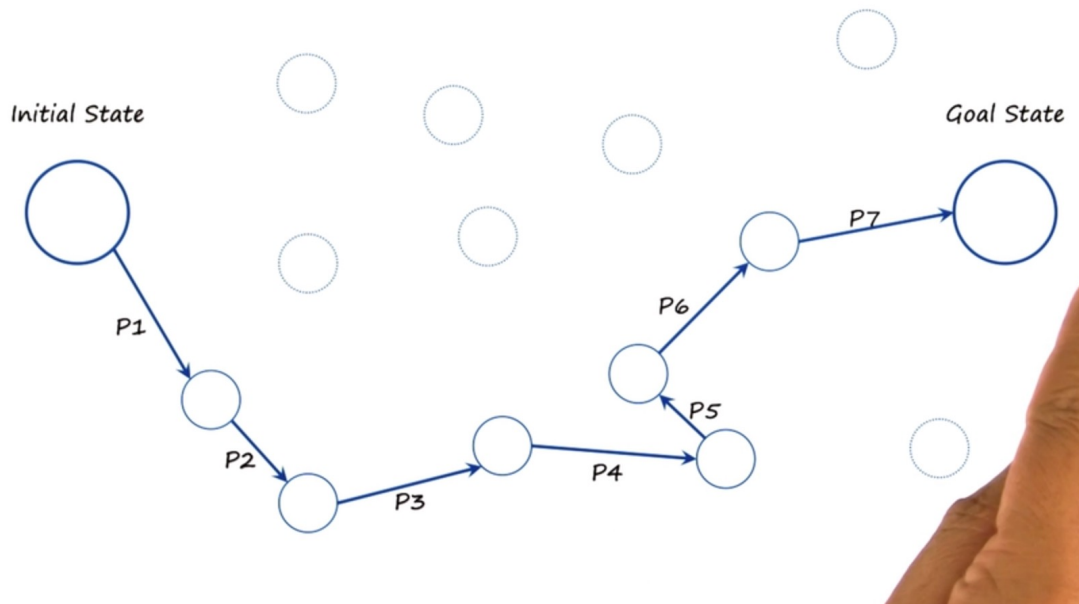


<https://www.theschoolrun.com/homework-help/human-brain-and-nervous-system>

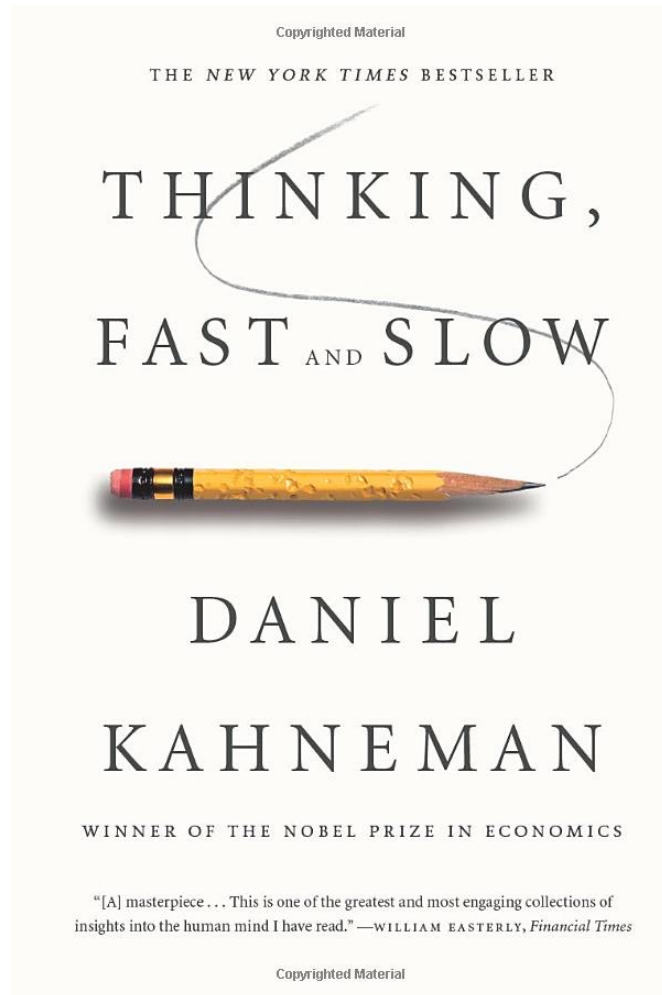
# How does human reason?

## Open question

Common approach for problem solving is means-analysis: search for a path between the given and goal.



# How does human reason?



- System 1- Fast, uses heuristics, imprecise, emotional
- System 2 – Slow, precise, conscious, relying on more reasoning (rule-based, logical, analytical)

# How does human reason?

- What is the equivalent to system 1 in AI?
- What is the equivalent to system 2 in AI?
- System 1- Fast, imprecise, use of heuristics
- System 2 – Slow, precise, exhaust the possible options



# How does human act/respond?

## Take Action

Ameca can now  
speak different  
languages  
fluently



<https://www.dailystar.co.uk/tech/news/worlds-most-advanced-humanoid-robot-29702237>

# AI and Job Market

chat.openai.com/chat

LB Can you generate C# code for checking if 233337 is prime



Sure! Here's a C# code snippet to check if the number 233337 is prime:



arduino

Copy code

```
using System;

public class Program
{
    public static void Main()
    {
        int number = 233337;
        bool isPrime = true;

        for (int i = 2; i <= Math.Sqrt(number); i++)
        {
            if (number % i == 0)
            {
                isPrime = false;
                break;
            }
        }
    }
}
```

Regenerate response





# Question

How can AI help in learning and education?

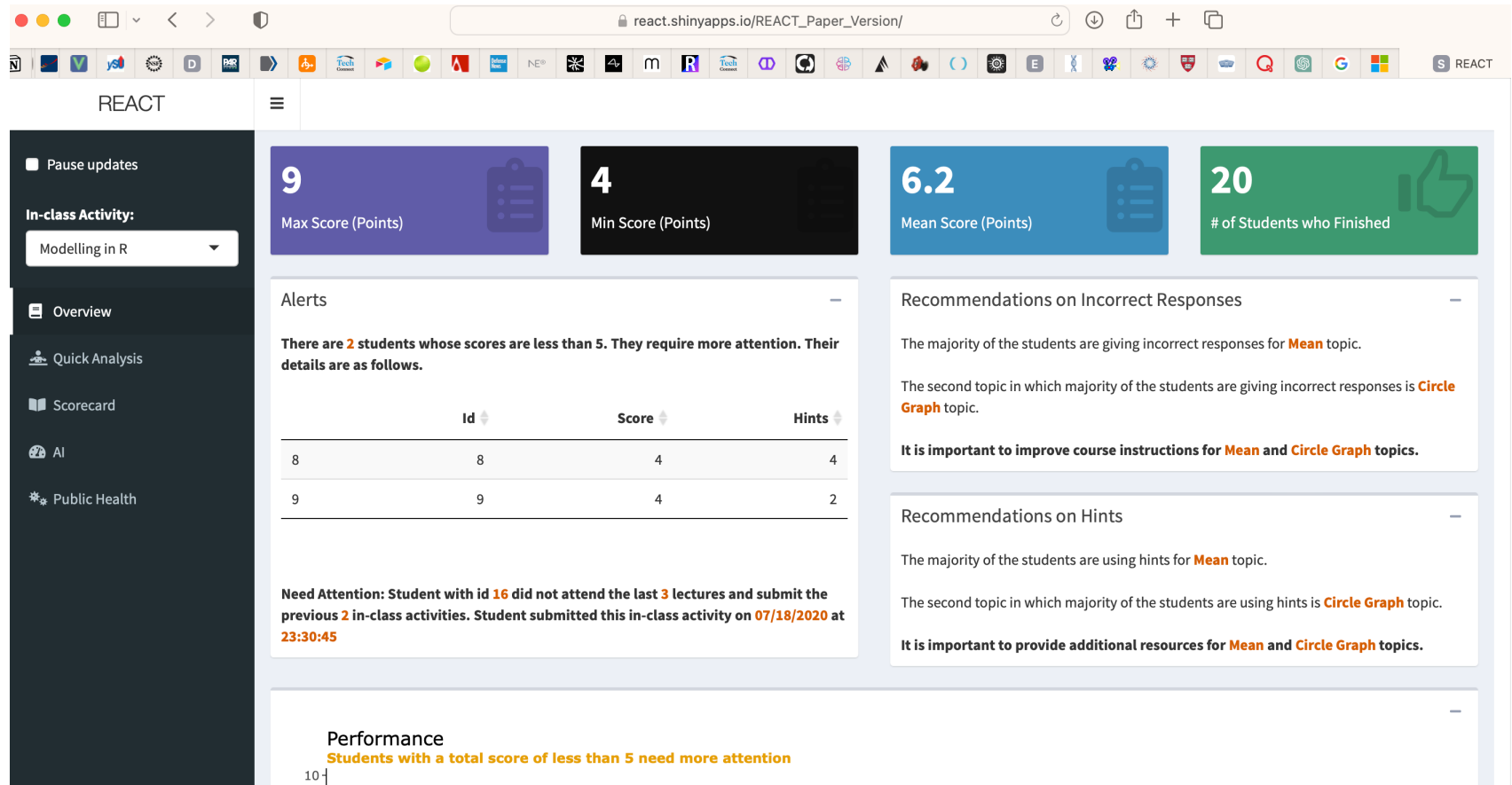




# (1) Use of AI to analyze students' performance

- This can help educators identify areas where students are struggling and provide targeted interventions to improve their learning outcomes.
- Examples:
  - Analyze student performance data and identify patterns in their behavior.
  - Generate recommendations for interventions, such as additional resources or one-on-one tutoring sessions.

# (1) Use of AI to analyze students' performance



# (1) Use of AI to analyze students performance

Currently: Measure performance and encourage students to do better



Just because you fail once, doesn't mean you're gonna fail at everything.

Keep trying, hold on, and always, always, always believe in yourself, because if you don't, then who will, sweetie?

Marilyn Monroe

© Lifehack

# (1) Use of AI to analyze students performance

Can you give an example of using AI for student performance analysis?

## (2) Use of AI for personalized learning

- Each student is unique, and they learn at their own pace and style.
- AI can help tailor the learning experience to meet the needs of each student.
- Example 1: An AI-powered learning platform could analyze a student's performance data and recommend specific resources or activities based on their strengths and weaknesses.
- Example 2: An AI-powered learning platform could adjust the difficulty level of the content based on the student's progress.

### (3) Use of AI to for intelligent tutoring

- Provide individualized instruction to students based on their learning style and progress.
- Example 1: A language learning app could use natural language processing to analyze a student's speech and provide real-time feedback on their pronunciation.
- Example 1: Use AI to generate personalized quizzes based on the student's performance data.

## (4) Use of AI for learning on demand

- Provide instruction to students based on the challenge they are facing
- Example 1: A students working on a vulnerability XSS will receive learning instruction that help them to address it.
- Example 2: Assume the student needs help with implementing security for a set of APIs. The AI checks its database of assessments about the knowledge of the user about the cryptography and either:
  - provide learning material about cryptography followed with learning material about API security or
  - give the students learning material about API security.



# Challenges for using AI in education

Challenges include:

- Data privacy – Used data could potentially be compromised or misused.
- Bias in AI algorithms Data used to train an AI system could perpetuate to bias its recommendations and interventions.

# Conclusions

- AI will take jobs from human. The education system needs to prepare for that.
- AI can help learners
  - By analyzing students' performance
  - Providing personalized learning
  - Providing intelligent tutoring
  - Use of AI for learning on demand
- Challenges include:
  - Bias
  - Privacy

Thank you

Any Question?