Reading Materials

Classic Papers (Choose at least one)

1. Rumelhart, D. E., Hinton, G. E., & Williams, R. J. (1986). Learning representations by back-propagating errors. *Nature*, 323(6088), 533-536.

2. Rosenblatt, F. (1958). The perceptron: a probabilistic model for information storage and organization in the brain. *Psychological Review*, 65(6), 386.

3. Sutton, R. S., & Barto, A. G. (1981). Toward a modern theory of adaptive networks: expectation and prediction. *Psychological Review*, 88(2), 135.

4. Ackley, D. H., Hinton, G. E., & Sejnowski, T. J. (1985). A learning algorithm for Boltzmann machines. *Cognitive Science*, 9(1), 147-169.

5. Elman, J. L. (1990). Finding structure in time. *Cognitive Science*, 14(2), 179-211.

Modern Papers (Choose at least one)

1. Lake, B. M., et al. (2017). Building machines that learn and think like people. *Behavioral and Brain Sciences*, 40.

2. Stahl, A. E., & Feigenson, L. (2015). Observing the unexpected enhances infants' learning and exploration. *Science*, 348(6230), 91-94. (Note: Supplementary videos are available)

Assignment

Prepare a comprehensive report in LaTeX, addressing the following points:

1. **Historical Context and Modern Applications**
   - Identify the modern machine learning technique or algorithm that corresponds to the theory presented in your chosen classic paper.
   - Analyze the differences between the original interpretations and current implementations.

2. **Critical Analysis of Modern Research**
   - Summarize the main arguments or hypotheses presented in your chosen modern paper(s).
   - Evaluate the methods used to validate these hypotheses.
   - Assess the consistency between the hypothesis, experimental design, and conclusions.

3. **Biological Foundations in AI Development**
   - Develop a thesis on whether future AI systems should have a biological basis.
   - Propose and defend principles for devising AI algorithms.
   - Support your arguments with rigorous logic and relevant examples.

4. **Personal Insights and Reflections**
   - Share any additional thoughts, critiques, or ideas inspired by your readings.
   - Discuss potential implications for future AI research and development.

Submission Guidelines

- Format: LaTeX document (PDF)
- Length: **4 pages** minimal (not including references), but aim for conciseness and clarity
- Citations: Use proper academic citations for all referenced works

Evaluation Criteria

Your report will be assessed based on:

- Depth of understanding of both classic and modern papers (30 points)
- Critical thinking and analytical skills (20 points)
- Clarity and coherence of arguments (20 points)
- Creativity and originality in proposed ideas (20 points)
- Proper use of LaTeX and academic writing conventions (10 points)

This assignment is designed to challenge you to engage deeply with foundational and cutting-edge concepts in AI and cognitive science. It encourages you to think critically about the evolution of AI theories and their practical applications.