Insights On Insight Problems and Artificial Intelligence

Abstract

Understanding the problem-solving process is one of the biggest problems to solve in the field of cognitive science. It is paramount to the field's advancement as well as its related fields, especially artificial intelligence during the advent of large language model research and development. Understanding any particular type of problem types provides immense value, but an especially difficult domain of problems is insight problems, which bring forth a unique set of challenges to study. Also called ill-structured problems, these require some novel shift in perspective to be solved. This literature review focuses on how humans approach and solve these types of problems, and why artificial intelligence often struggles. It also explores current attempts to integrate human knowledge and modern examples of insightful artificial intelligence. Finally, near and long-term future applications and potential research are discussed.

Literature Review

Defining Insight Problems

A good example of an insight problem

Boundary Objects and Heterogeneous Distributed Problem Solving

Introduction

- Stuff about Simon

Of course, one of the most key and difficult problems to tackle is determining what characteristics define an insight problem, and categorizing different types of

Review:

Review:

Review: Retrieval Augmented Generation

Discussion

References

Halina, M. (2021). Insightful artificial intelligence. *Mind & Language*. https://doi.org/10.1111/mila.12321

Johnson, M., Albizri, A., Harfouche, A., & Fosso-Wamba, S. (2022). Integrating human knowledge into artificial intelligence for complex and ill-structured problems: Informed artificial intelligence. *International Journal of Information Management*, *64*, 102479. https://doi.org/10.1016/j.ijinfomgt.2022.102479

Michelle Pauley Murphy, & Hung, W. (2024). Using Text Mining to Elucidate Mental Models of Problem Spaces for Ill-Structured Problems. *TechTrends*. https://doi.org/10.1007/s11528-024-00951-4

Reed, S. K. (2015). The Structure of Ill-Structured (and Well-Structured) Problems Revisited. *Educational Psychology Review*, *28*(4), 691–716. https://doi.org/10.1007/s10648-015-9343-1

Samsonovich, A. V., & Kuznetsova, K. (2018). Semantic-map-based analysis of insight problem solving. *Biologically Inspired Cognitive Architectures*, *25*, 37–42. https://doi.org/10.1016/j.bica.2018.07.017

Simon, H. A. (1973). The structure of ill structured problems. *Artificial Intelligence*, *4*(3-4), 181–201. https://doi.org/10.1016/0004-3702(73)90011-8

Yigitcanlar, T., Desouza, K. C., Butler, L., & Roozkhosh, F. (2020). Contributions and Risks of Artificial Intelligence (AI) in Building Smarter Cities: Insights from a Systematic Review of the Literature. *Energies*, *13*(6), 1473. https://www.mdpi.com/1996-1073/13/6/1473