**First Order Logic**

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## **Module 6**

In my image annotation project for camping furniture, first-order logic (FOL) could introduce precision and clearer rules for how items are classified. For example, I can use FOL to state that “for all x, if x is a chair and x has no arms, then x is a folding chair,” or “for all y, if y is tent and y fits more than four people, then y is labeled family tent.” These rules let the system do more than match patterns; they let it enforce relationships that make sense in the real world, reducing errors from lookalikes. Using FOL alongside statistical models also helps when data is limited or noisy, because these rules add structure that images alone might miss. Research shows that combining neural networks with FOL rules (as constraints or symbolic priors) can improve image classification when care is taken to express correct logical relationships (Roychowdhury, Diligenti, & Gori, 2018). Sharda et al. (2023) say that symbolic logic is especially helpful for interpretability and reliability, making models more trustworthy when predictions affect decisions.

Roychowdhury, S., Diligenti, M., & Gori, M. (2018). *Image Classification Using Deep Learning and Prior Knowledge*. AAAI Workshops.

Sharda, R., Delen, D., & Turban, E. (2023). *Business intelligence, analytics, data science, and AI: A managerial perspective* (5th ed.). Pearson.