

CS 3600 – Introduction to AI

Resolution

Consider the Wumpus world problem below. The world is a 4 x 4 grid with the agent in (1, 1). The Agent's knowledge base is given, where B_{ij} means breeze in location (i, j), and P_{ij} means pit in location (i, j).

4					$\neg P_{11}$
					$\neg P_{21}$
3					$\neg P_{12}$
					$\neg B_{11}$
					$\neg B_{12}$
2					B_{21}
					$B_{11} \leftrightarrow (P_{12} \vee P_{21})$
					$B_{21} \leftrightarrow (P_{11} \vee P_{22} \vee P_{31})$
					$B_{12} \leftrightarrow (P_{11} \vee P_{22} \vee P_{13})$
1	A	B	P?		
	1	2	3	4	

The Agent wants to know if there is a Pit in location (3, 1), i.e., P_{31} .

Use Resolution to determine whether P_{31} is entailed by the knowledge base.

1. Convert the formulae in the knowledge base to conjunctive normal form.
2. Negate the conclusion and convert the conclusion to conjunctive normal form.
3. Draw out the resolution search space. Use the following heuristic:
 - Prefer clauses derived from the conclusion from smallest to largest (# of literals).
 - Next prefer clauses not derived from the conclusion, from smallest to largest.
 - Break ties in alpha-numeric order, e.g., B_{11} , B_{12} , B_{13} , ..., B_{21} , B_{22} , ..., P_{11} , P_{12} , ...