Design Lab
Constraint Satisfaction Problem in AI

Colouring India's Map and Visualising it using Video

Tushar Bokade
19CS30011

Department of Computer Science and

Technology Indian Institute of Technology

Kharagpur

Autumn Semester 2023-24

November 12, 2023

Folder Structure:

{Algo} —
|— {Colouring Algo} —
|— {Number of Colours Used) —
|— Images
|— Scripts
|— Video

Algorithms:

Algo1: (Basic Backtracking)

1. We generate a set of colours used by the neighbouring states. Then we get the set of possible colours using one of the get_colour algorithms. Then we start colouring the current state with one of the unused colours.
2. After colouring the current state, we try to colour it's neighbouring uncolored state.
3. If the current state can't be coloured, then we backtrack.

Algo2: (Modified Backtracking)

1. We generate a set of colours used by the neighbouring states. Then we get the set of possible colours using one of the get_colour algorithms. Then we start colouring the current state with one of the unused colours.
2. After colouring the current state, the next state is chosen based on the maximum in-degree of the remaining uncoloured states. The in-degree is defined as the number of coloured neighbouring states.
3. If the current state can't be coloured, then we backtrack.

Colour Choosing Algorithms:

Algo1: (Predefined order of colour)

1. Using the set of used colours, a set of usable colours is generated.

Algo2: (Shuffled Colours)

1. Using the set of used colours, a set of usable colours is generated.
2. This is then randomly shuffled.

Algo3: (Least used colour first)

1. Using the set of used colours, a set of usable colours is generated.
2. Then they are sorted based on the number of times they are already used.
3. In this way, the colour used the least will be used first.