Simon Fraser University CMPT 431 (1097) Assignment 1 Alister Zhao 200124896

Assignment 1 Report

Enhanced Universe Algorithm Approach

My approach to this problem is divid the window area into 10 columns. Each robot will be assignment a unique ID, and its position will be used to determine which column it belongs to. When UpdatePixels() method is called, all robots in robot's current and adjacent columns will be used to calculate near by robots. This way, the number of calculation can be reduced.

Code Modification

- Add a static variable called *counter*, which will be used to determine unique robot ID.
- Add a static two dimensional Vector called *sections*, it will store columns information, and maintain lists of robot that is in each column.
- Add private methods getRobotNumber(), getRobotSection() to retrieve robot ID and robot's current column.
- Add removeRobot() to remove robot from its current column list.

Data and Run Time Comparison

Enhance Universe	No. of Updates	Population	Mean	Standard Deviation	Run 1	Run 2	Run 3	Run 4	Run 5
	1000	200	1.76	0.0122	1.78	1.75	1.76	1.75	1.76
	1000	400	6.30	0.280	6.47	6.05	5.94	6.56	6.46
	1000	600	13.0	0.494	13.55	12.64	13.47	7 12.45	12.86
	1000	800	24.89	0.664	25.68	24.96	23.84	24.91	25.07
	1000	1000	34.38	0.718	35.66	34.04	34.05	34.12	34.02
Original Universe									
Oniverse	1000	200	3.459	0.0726	3.43	3.41	3.59	3.43	3.44
	1000		13.614		13.26				13.59
	1000		30.841	0.654					30.47
	1000		52.085		51.22				52.70
	1000		80.163	1.52	80.98				81.75
			3333		00.00	7 0102	00.0		00
			Final Result						
			Enhanced Universe		Original Universe		Reduce Run Time By %		
			Population	Run Time (s)	Population	Run Time (s)	711110 Dy 70		
			0		0				
			200	1.76	200			5	
			400	6.30	400		53.75%		
			600	13.0	600				
			800	24.89	800				
			1000	34.38	1000				
			Enhanced	l vs Original	Universe				
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