

Contemporary Intelligent Information Technology (CIIT)

Artificial Intelligence-13(I)

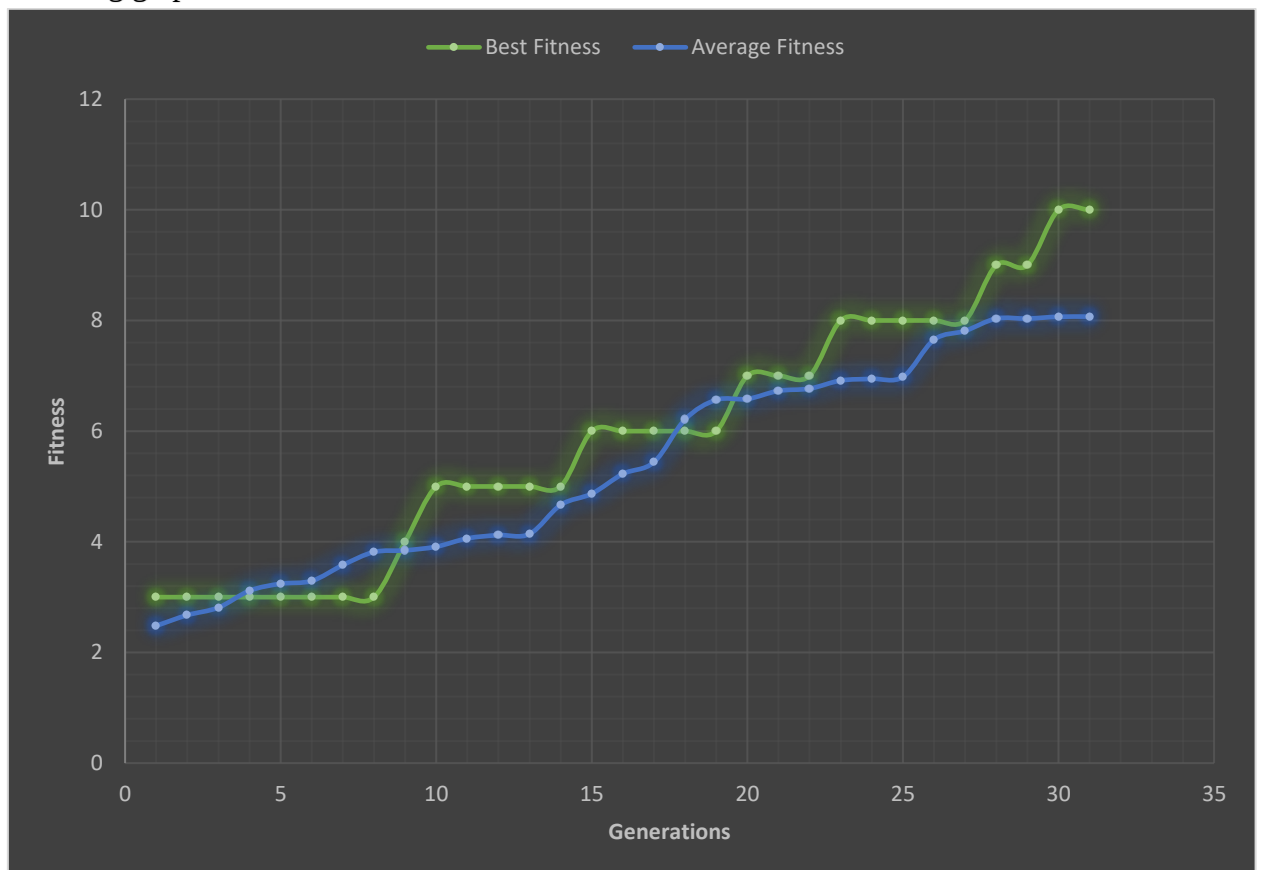
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Iterated Prisoner's Dilemma

Number of players:	40
Size of chromosome:	64
Temptation:	5
Reward:	3
Punishment:	1
Mutate probability:	0.001
Crossover probability:	0.95

Evolving graph:



Evolution process:

Generation:	Best Fitness:	Average Fitness:
1	3	2,4822
2	3	2,67528
3	3	2,81164
4	3	3,11628
5	3	3,24228
6	3	3,29363
7	3	3,58029
8	3	3,8158
9	4	3,84564
10	5	3,91211
11	5	4,06169
12	5	4,12054
13	5	4,14161
14	5	4,66724
15	6	4,86978
16	6	5,22809
17	6	5,44101
18	6	6,21291
19	6	6,56584
20	7	6,58162
21	7	6,72882
22	7	6,76848
23	8	6,91514
24	8	6,94565
25	8	6,98047
26	8	7,65265
27	8	7,81242
28	9	8,03468
29	9	8,0348
30	10	8,06755
31	10	8,07

Intermediate generation best versus 8 full random, all zeros and all ones:

		Strategy:	Result:
Best	A	101110001011	20
Random	B	101101011011	25
Best	A	101110001011	32
Random	C	001001101010	22
Best	A	101110001011	20
Random	D	011110001111	25
Best	A	101110001011	38
Random	E	000010001010	18
Best	A	101110001011	27
Random	F	001110010011	22
Best	A	101110001011	21
Random	G	110111101001	26
Best	A	101110001011	20
Random	H	101010011111	25
Best	A	101110001011	21
Random	L	010111101011	26
Best	A	101110001011	50
All zeros	ZERO	000000000000	15
Best	A	101110001011	7
All ones	ONE	111111111111	32
Best	A	101110001011	22
TFT	TFT	101000001011	22
Games won	A = 4		

Last generation best versus 8 full random, all zeros and all ones:

		Strategy:	Result:
Best	A	111110111011	25
Random	B	101101011011	15
Best	A	111110111011	37
Random	C	001001101010	12
Best	A	111110111011	25
Random	D	011110001111	15
Best	A	111110111011	44
Random	E	000010001010	9
Best	A	111110111011	32
Random	F	001110010011	12
Best	A	111110111011	25
Random	G	110111101001	15
Best	A	111110111011	25
Random	H	101010011111	15
Best	A	111110111011	25
Random	L	010111101011	15
Best	A	111110111011	56
All zeros	ZERO	000000000000	6
Best	A	111110111011	10
All ones	ONE	111111111111	20
Best	A	111110111011	16
TFT	TFT	111110111011	16
Games won	A = 9		

Fully presented best chromosome after genetic algorithm stabilization.

11111011101110111011111111111111101101110101111101111011111011101

Conclusion: The completed work has accomplished its goals. The Prisoner's Dilemma problem has been examined and strategies to successfully play the game have been evolved. Above have been analysed and proven to display the characteristics necessary to play the Prisoner's Dilemma successfully.