Logic And Artificial Intelligence Project Thesis.
Circle Packing.

Michael, G.M And Abdelrahman, M.A

1 Team Members

Name: George Michael ID: 150485

Name: Mohammad Adel ID: 146876

2 Responsibilities

All tasks are divided equally from the design to the implementation across the members of the project, at the end of the project the AI Agent will be able to find a solution for a specific circle packing problem instance with providing the Graphical representation of that solution to the specific problem.

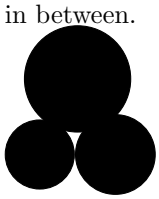
3 Summary

The project goal is to arrange and distribute a given list of circles in an infinite two dimensional plane such that the maximum distance between any two circles is minimized as possible by using an intelligent artificial agent, the project goal is to make the agent able to find the closest solution to the given problem if not the optimal given the following two constraints:
1-No two or more circles are overlapped.
2-The rearrangement happens only in the two dimensional infinite plan.

4 Problem Description and Background

Circle Packing is one of the hardest problems in the field of Geometry, given the above two constrains and a list of radius of circles, the solution to the problem is to minimize the area in which the list of circles will occupy, alternatively, the goal is to minimize the maximum distance between any two given circles.

Let us assume that in the above figure we have a list of Circles with radius list [3,5,10] respectively, so the maximum distance can be easily obtained by configuration of the circles in a straight line one after another without inner-spaces in between.



While the configuration in the above figure the distance between any two circles is minimized than the first configuration, providing a list of n circles to the agent, it should give the closest solution possible if not the optimal to minimize the maximum distance between any two circles.

5 Proposed Technique or Solution

In this project the proposed technique is the graphical representation of each circle as a node and the radius between the touched (connected) nodes will be represented as edges, for illustration, the agent will be able to manipulate the graph representation of a specific problem instance in order to configuration a solution instance, ultimately, find the optimal or the closest best solution throw an evaluation function, after wards representing the proposed solution in a GUI(Graphical User Interface).

6 Experiments, Results Or Evaluation

Evaluation Reference:
https://pdfs.semanticscholar.org/9f04/17dbb3379c043da6af2525db3f3f4149c9f6.pdf

7 Software And Tools

visual studio or eclipse (possibly other graphical or geometrical software may be used).

8 Resources Found

https://pdfs.semanticscholar.org/9f04/17dbb3379c043da6af2525db3f3f4149c9f6.pdf