AI Integrated FLAPPY BIRD using NEAT Python Module

Report

BACHELOR OF ENGINEERING

COMPUTER ENGINEERING

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Title:

Using NEAT python module to variate the outcomes and modify the traditional Flappy-Bird game so as to understand the integration of AI and Python and features of pixel perfect collision using masks.

Problem Statement:

To successfully implement AI aided algorithms into the basic Flappy-Bird game using NEAT Python module

Prerequisite:

Basic concepts of Python programming, Artificial Neural Networking and Computer Graphics.

Software Required:

IDE (Sublime, Atom, etc.), NEAT python module, Python 3.0, Pygame.

Outcome:

Using the AI powered Genetic Algorithm only the fittest Flappy-Bird will survive and it's Score and Generation will be displayed.

Operations Performed:

Algorithms used-

- **Genetic Algorithm**: A genetic algorithm is a search heuristic that is inspired by Charles Darwin's theory of natural evolution. This algorithm reflects the process of natural selection where the fittest individuals are selected for reproduction in order to produce offspring of the next generation. Here, a Genetic Algorithm based approach is used for constructing an AI which can play the Flappy Bird game in a much more efficient manner as compared to a normal human being.

- **NEAT Python Module:** NEAT (NeuroEvolution of Augmenting Topologies) is a method developed by Kenneth O. Stanley for evolving arbitrary neural networks. NEAT-Python is a pure Python implementation of NEAT, with no dependencies other than the Python standard library**.** Implements NEAT algorithm to train game playing bot (Neural Network). The NEAT algorithm is implemented using the NEAT-Python package.

Result Description:

Generation 1:

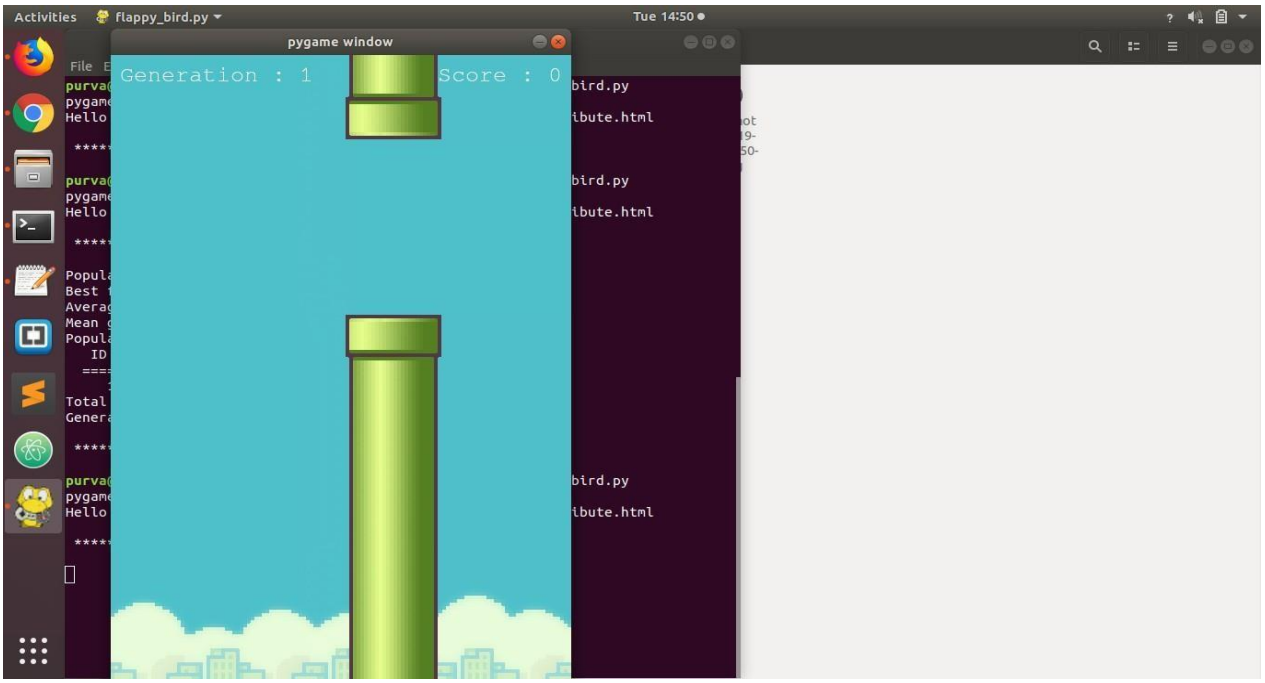

Fig 1 : The Initial frame of Pipes and background.

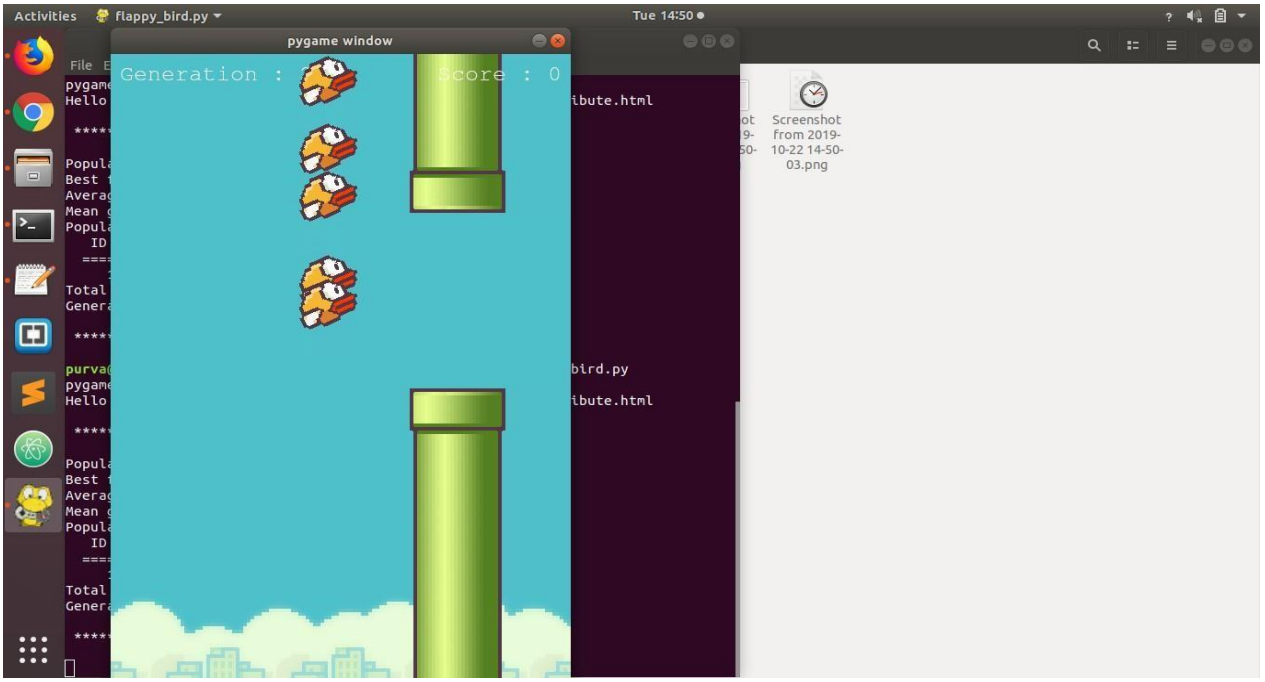

Fig 2: All the Generation 1 birds at starting position.

Generation 2:

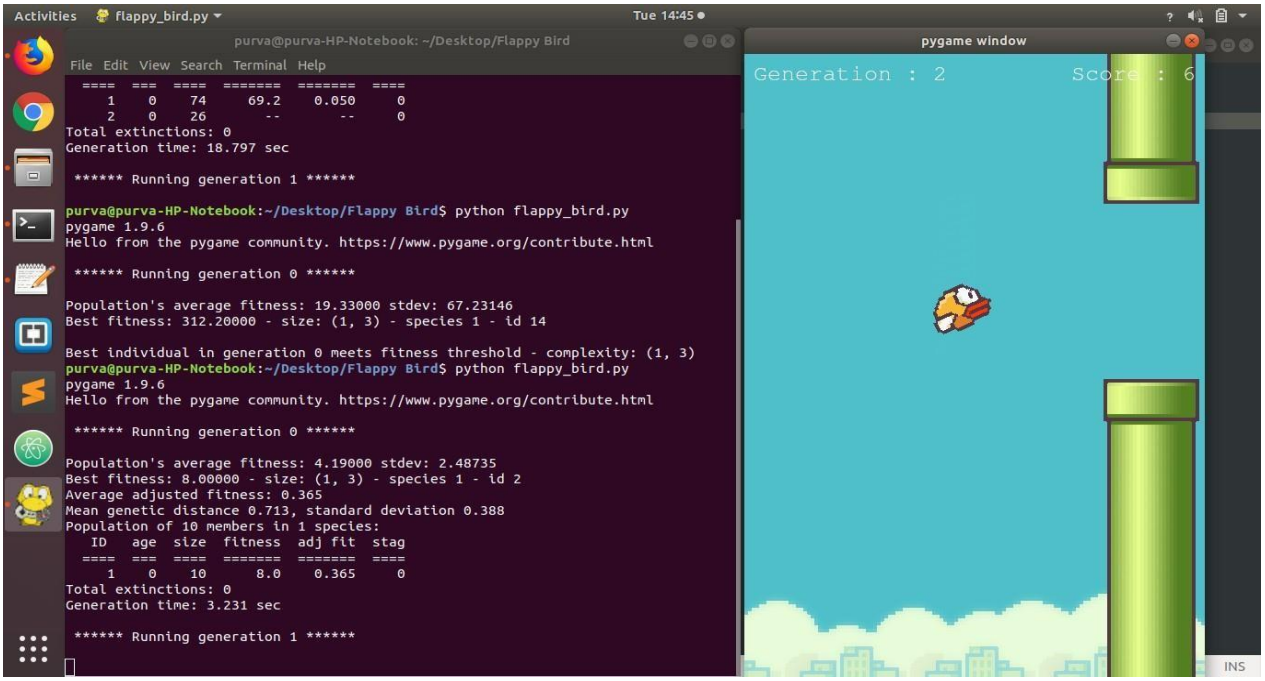

Fig 3 : Generation 2 only fittest bird survives.

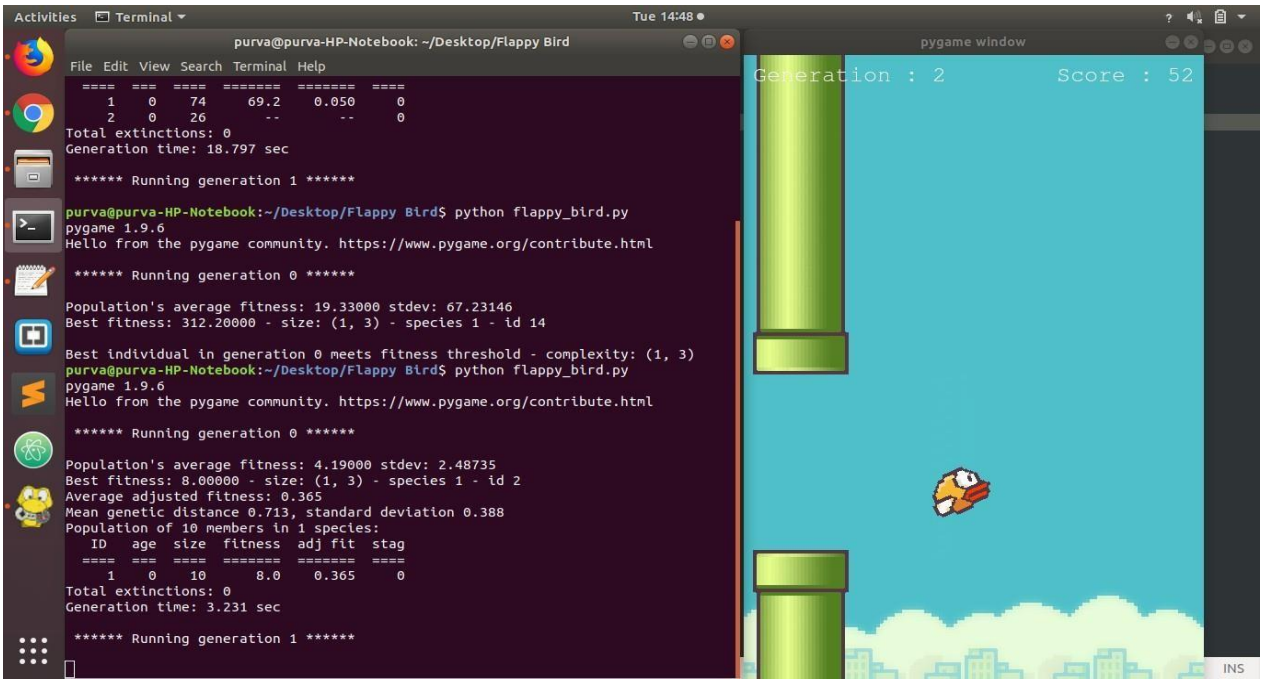

Fig 4: The final winner survives.

Conclusion:

Thus, we have successfully created an AI integrated Flappy Bird using NEAT Python module.