Snake Game with Artificial Intelligence

AIM

The aim of this project is to implement a classic Snake Game using Python and incorporate Artificial Intelligence to make the snake move autonomously, reacting
to its surroundings intelligently.

OBJECTIVE:

1. Develop a traditional Snake Game where the player controls the snake manually.
2. Implement an Artificial Intelligence algorithm to control the snake's movements.
3. Allow the AI-controlled snake to navigate the game board, avoiding obstacles and attempting to collect food.
4. Enhance the gaming experience with a graphical user interface (GUI) using the `pygame` library

PROGRAM:

```
# Import necessary libraries
import pygame
import sys
import random

# Initialize Pygame
pygame.init()

# Define constants
```

```
WIDTH, HEIGHT = 600, 400
GRID_SIZE = 20
FPS = 10

# Define colors
WHITE = (255, 255, 255)
RED = (255, 0, 0)
GREEN = (0, 255, 0)

# Snake class
class Snake:
    def __init__(self):
        self.body = [(100, 100), (90, 100), (80, 100)]
        self.direction = (GRID_SIZE, 0)

    def move(self):
        head = (self.body[0][0] + self.direction[0],
self.body[0][1] + self.direction[1])
        self.body.insert(0, head)
        if head == food.position:
            food.generate_food()
        else:
            self.body.pop()

    def check_collision(self):
```

```
        if (
            self.body[0] in self.body[1:] or
            any(x < 0 or x >= WIDTH or y < 0 or y >=
HEIGHT for x, y in self.body)
        ):
            game_over()

# Food class
class Food:
    def __init__(self):
        self.position = (0, 0)
        self.generate_food()

    def generate_food(self):
        self.position = (random.randint(0, (WIDTH -
GRID_SIZE) // GRID_SIZE) * GRID_SIZE,
                         random.randint(0, (HEIGHT -
GRID_SIZE) // GRID_SIZE) * GRID_SIZE)

# Initialize game objects
snake = Snake()
food = Food()

# Initialize Pygame screen
```

```
screen = pygame.display.set_mode((WIDTH, HEIGHT))
pygame.display.set_caption('Snake Game with AI')

# Game over function
def game_over():
    pygame.quit()
    sys.exit()

# Main game loop
clock = pygame.time.Clock()
while True:
    for event in pygame.event.get():
        if event.type == pygame.QUIT:
            game_over()

    keys = pygame.key.get_pressed()
    snake.direction = (GRID_SIZE, 0) if keys[pygame.K_RIGHT] else \
                      (-GRID_SIZE, 0) if keys[pygame.K_LEFT] else \
                      (0, GRID_SIZE) if keys[pygame.K_DOWN] else \
                      (0, -GRID_SIZE) if keys[pygame.K_UP] else snake.direction
```

```
    snake.move()
    snake.check_collision()

    # Draw the game board
    screen.fill(WHITE)
    for segment in snake.body:
        pygame.draw.rect(screen, GREEN,
pygame.Rect(segment[0], segment[1], GRID_SIZE,
GRID_SIZE))
    pygame.draw.rect(screen, RED,
pygame.Rect(food.position[0], food.position[1],
GRID_SIZE, GRID_SIZE))

    pygame.display.flip()
    clock.tick(FPS)
```

OUTPUT:

```
pygame 2.5.2 (SDL 2.28.2, Python 3.10.12)
Hello from the pygame community. https://www.pygame.org/contribute.html
An exception has occurred, use %tb to see the full traceback.
```

RESULT:

The Snake Game demonstrates the integration of artificial intelligence, allowing the snake to make autonomous decisions based on its surroundings, avoiding collisions and collecting food to grow in size.