Snake Game ‘Змія’

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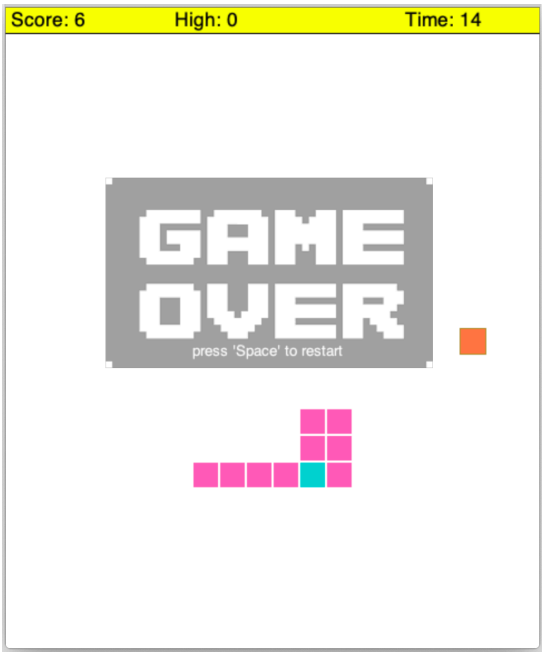
Project is my own implementation of classic snake game made with Python using Pyglet and Numpy.

1. **Problems**:
One of the problems it solves is converting pyglet image to numpy 3-dimensonal ndarray and back. Then something that was completely new for me is making class methods and attributes of which autonomically working with each other just by getting “4-button” input from user. And of course drawing labels, pictures and sprites that update each 1/10 seconds on the screen.

2. **Methods/Algorithms**:
To convert pyglet RGBA image to numpy ndarray I firstly converted it to bytes array and then using numpy ‘frombuffer’ function converted it to numpy ndarray. And on the way back using tobytes numpy function converted numpy ndarray to pyglet.image.ImageData
Whole application is represented almost by a single class. Each frame ‘update’ method is called which checks, if snake has not bumped into itself, if food has not been eaten or maybe, if game has been won by user et cetera and calls certain methods. Player can interact with game by pressing keyboard keys and changing snake direction or restarting game after it was lost/won[1]
Drawing and updating each frame is made by changing pixels in the background picture using already mentioned algorithm.

3. **Future improvements**:
In the future improvements and updates I’d love to add different level, difficulty and game modes systems. For example levels with concrete tasks such as collect 5 point of food with same colour and don’t get bumped to randomly generated walls and so on…
Also for testing purposes control algorithm will be implemented. It will use reinforcement learning to know how to move towards food.

4. **Results**:
I have achieved almost all results I expected. Snake moves smoothly, dies when moves inside itself and grows by eating food. Old classic snake game…
Also a little scoreboard and timer are on the top panel of game-screen show player ongoing attempt time and current, high scores.
Only one problem i didn’t have at the beginning but it appeared later due to improve of effectiveness of reaction to player interaction and you can see it below (when snake bumps into itself we can see its head gets to body position before ‘game over’ sign comes up).



5. **Control algorithm**:
Agent will get bonus points for moving towards food, collecting food and will get maximum bonus for winning the game. It will lose points by dying (moving towards itself, walls…) and moving to the opposite direction from food.

6. **Sources**:
- Pyglet documentation
- Numpy documentation
- All used pictures are taken from Google Images

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1. Mainly lost, in 99.9% cases