
Notes ATAA project

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State representation

The state representation consists of three types of features: Enemies, the environment and the state of Mario.

Enemies

- Plant
- Red Turtle
- Wumba
- Turtle green

Environment

- pit
- step solid
- step passable
- coins
- blocks normal
- blocks ?
- mushroom
- flower

State mario

- Big vs. small
- Fireballs vs. nothing

All enemies and Environment features are encoded by their distance to Mario using an x and a y value. Only the closest one is incorporated in the state representation, except for the pit. For the pit the closest on the right of Mario and the closest on the left of Mario are represented. If a feature is not present in the scene it is encoded by 2x the maximum value for x and y. The two features that encode the state of Mario are two binary features. This results in a total of 28 features.

Learning

Use a simple neural network for learning using a hidden layer, the sigmoid function and back propagation. The training samples will consist of a feature vector and an action (using 1-of-k-coding). The target will be the user feedback.

We would like to train multiple models with a different number of hidden nodes in parallel. We can then do some weighting of the models. The training data will be repeated for training such that we can train constantly as opposed to only when the user provides feedback. If the maximum size for the repeated trainingset is reached we can e.g. remove the oldest samples in such a way that the distribution over types of feedback becomes more uniform.

Evaluation

We will build simulated users that respond to the level in a consistent way in order to be able to compare methods. Different types of users:

- Focused on speed, evaluation metric is the time needed to finish the level
- Focused on coins, evaluation metric is the number of coins collected at the end of the level
- Focused on killing enemies, evaluation metric is the number of enemies killed
- Some weighted combination of the three mentioned above