Abstract

The procedural content generation represents the main methods for creating game content without human interaction. The PCG in games was used since the beginning of 1980, and it is still very popular nowadays. It represents an algorithm that is used in order to create the desirable content. Lately, approaches from the domain of machine learning made their way into the PCG, therefore removing the need of specifying the rules or grammars for the generation. There are multiple ways in which we can use machine learning for this generation, these range from decision trees or neural networks to Markov chains, but in this document, we will focus on combining classic PCG with recurrent neural networks, and more precisely how can we use Long Short-Term Memory networks (LSTMs) for generating new levels of a game. Also, in this paper we will focus on the functional parts of a game and not the elements that are part of the design. The model we create using LSTMs will be trained on 150 levels from the *Lode Runner* game, and it will be used to generate new levels.

The focus of the generation will be on the diversity and the playability of the levels. We also will analyze how much repairing the level will need in order to be valid and completable. The main challenge of this approach will be the small dataset of levels we have access to, increasing the possibility of having a low diverse generated level.

This work is the result of my own activity. I have neither given nor received unauthorize assistance on this work.