----- DQN 3.0 -----

This project contains the source code of DQN 3.0, a Lua-based deep reinforcement

learning architecture, necessary to reproduce the experiments

described in the paper "Human-level control through deep reinforcement

learning", Nature 518, 529–533 (26 February 2015) doi:10.1038/nature14236.

To replicate the experiment results, a number of dependencies need to be

installed, namely:

\* LuaJIT and Torch 7.0

\* nngraph

\* Xitari (fork of the Arcade Learning Environment (Bellemare et al., 2013))

\* AleWrap (a lua interface to Xitari)

An install script for these dependencies is provided.

Two run scripts are provided: run\_cpu and run\_gpu. As the names imply,

the former trains the DQN network using regular CPUs, while the latter uses

GPUs (CUDA), which typically results in a significant speed-up.

----- Installation instructions -----

The installation requires Linux with apt-get.

Note: In order to run the GPU version of DQN, you should additionally have the

NVIDIA® CUDA® (version 5.5 or later) toolkit installed prior to the Torch

installation below.

This can be downloaded from https://developer.nvidia.com/cuda-toolkit

and installation instructions can be found in

http://docs.nvidia.com/cuda/cuda-getting-started-guide-for-linux

To train DQN on Atari games, the following components must be installed:

\* LuaJIT and Torch 7.0

\* nngraph

\* Xitari

\* AleWrap

To install all of the above in a subdirectory called 'torch', it should be enough to run

./install\_dependencies.sh

from the base directory of the package.

Note: The above install script will install the following packages via apt-get:

build-essential, gcc, g++, cmake, curl, libreadline-dev, git-core, libjpeg-dev,

libpng-dev, ncurses-dev, imagemagick, unzip

----- Training DQN on Atari games -----

Prior to running DQN on a game, you should copy its ROM in the 'roms' subdirectory.

It should then be sufficient to run the script

./run\_cpu <game name>

Or, if GPU support is enabled,

./run\_gpu <game name>

Note: On a system with more than one GPU, DQN training can be launched on a

specified GPU by setting the environment variable GPU\_ID, e.g. by

GPU\_ID=2 ./run\_gpu <game name>

If GPU\_ID is not specified, the first available GPU (ID 0) will be used by default.

----- Options ------

Options to DQN are set within run\_cpu (respectively, run\_gpu). You may,

for example, want to change the frequency at which information is output

to stdout by setting 'prog\_freq' to a different value.