torch cheatsheet

Torch for R

torch is a machine learning framework that helps accelerates the path from research prototyping to production deployment.

It is part of an ecosystem of packages to interface with specific dataset like torchaudio for audio-like and torchvision for image-like data.

Installation

The torch R package uses the C++ libtorch library. You can install the prerequisites directly from R.

```
install.packages("torch")
library(torch)
install_torch()
```

See `?install_torch` for GPU installation instructions. See also the installation page.

Components in torch

torch has a modular API including the following components:

- **nn_modules**: to manage state of models and layers.
- **datasets and dataloaders**: to manage fast and efficient data loading.
- **optimizers**: to encapsulate optimization algorithms in a single function call.

Defining a new `nn_module`

`nn_module`s are defined by passing an `initialize()` and a `forward()` method to the `nn_module()` function.

```
Linear ← nn_module(
  # Initializes the model parameters and stores
  # them in `self`
  initialize = function(input_shape) {
    self$w ← nn_parameter(torch_randn(input_shape, 1))
    self$b ← nn_parameter(torch_zeros(1))
  },
  # Does the computation with input and parameters.
  forward = function(input) {
    torch_mm(input, self$w) + self$b
  }
)
```

Using `nn_module`s

```
# Calls the `initialize` function and returns a model
# object.
linear ← Linear(input_shape = 10)
```

```
# Calls the `forward` function using the initialized
# parameters.
linear(torch_randn(1, 10))
```

```
torch_tensor
 3.1221
[ CPUFloatType{1,1} ]
```

Chart C

Chart C

Chart D

Chart D