

Package ‘torchvisionlib’

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Title Additional Operators for Image Models

Version 0.2.0

Description Implements additional operators for computer vision models, including operators necessary for image segmentation and object detection deep learning models.

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Encoding UTF-8

SystemRequirements C++11

RoxygenNote 7.1.2

LinkingTo Rcpp, torch

Imports Rcpp, torch (>= 0.8.0), rlang, glue

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

NeedsCompilation yes

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ops_deform_conv2d *Performs Deformable Convolution v2,*

Description

Described in [Deformable ConvNets v2: More Deformable, Better Results](#) if mask is not NULL and performs Deformable Convolution, described in [Deformable Convolutional Networks](#) if mask is NULL.

Usage

```
ops_deform_conv2d(
    input,
    offset,
    weight,
    bias = NULL,
    stride = c(1, 1),
    padding = c(0, 0),
    dilation = c(1, 1),
    mask = NULL
)
```

Arguments

input	(Tensor[batch_size, in_channels, in_height, in_width]): input tensor
offset	(Tensor[batch_size, 2 * offset_groups * kernel_height * kernel_width, out_height, out_width]): offsets to be applied for each position in the convolution kernel.
weight	(Tensor[out_channels, in_channels // groups, kernel_height, kernel_width]): convolution weights, split into groups of size (in_channels // groups)
bias	(Tensor[out_channels]): optional bias of shape (out_channels,). Default: NULL
stride	(int or Tuple[int, int]): distance between convolution centers. Default: 1
padding	(int or Tuple[int, int]): height/width of padding of zeroes around each image. Default: 0
dilation	(int or Tuple[int, int]): the spacing between kernel elements. Default: 1
mask	(Tensor[batch_size, offset_groups * kernel_height * kernel_width, out_height, out_width]): masks to be applied for each position in the convolution kernel. Default: NULL

Value

Tensor[batch_sz, out_channels, out_h, out_w]: result of convolution

Examples

```

if (torchvisionlib_is_installed()) {
  library(torch)
  input <- torch_rand(4, 3, 10, 10)
  kh <- kw <- 3
  weight <- torch_rand(5, 3, kh, kw)
  # offset and mask should have the same spatial size as the output
  # of the convolution. In this case, for an input of 10, stride of 1
  # and kernel size of 3, without padding, the output size is 8
  offset <- torch_rand(4, 2 * kh * kw, 8, 8)
  mask <- torch_rand(4, kh * kw, 8, 8)
  out <- ops_deform_conv2d(input, offset, weight, mask = mask)
  print(out$shape)
}

```

ops_nms

*Performs non-maximum suppression (NMS) on the boxes***Description**

Performs non-maximum suppression (NMS) on the boxes according to their intersection-over-union (IoU).

Usage

```
ops_nms(boxes, scores, iou_threshold)
```

Arguments

boxes	Tensor[N, 4] boxes to perform NMS on. They are expected to be in (x1, y1, x2, y2) format with $0 \leq x1 < x2$ and $0 \leq y1 < y2$.
scores	Tensor[N] scores for each one of the boxes.
iou_threshold	float discards all overlapping boxes with $\text{IoU} > \text{iou_threshold}$.

Details

NMS iteratively removes lower scoring boxes which have an IoU greater than `iou_threshold` with another (higher scoring) box.

If multiple boxes have the exact same score and satisfy the IoU criterion with respect to a reference box, the selected box is not guaranteed to be the same between CPU and GPU. This is similar to the behavior of `argsort` in PyTorch when repeated values are present.

Value

int64 tensor with the indices of the elements that have been kept by NMS, sorted in decreasing order of scores

Examples

```
if (torchvisionlib_is_installed()) {
  ops_nms(torch::torch_rand(3, 4), torch::torch_rand(3), 0.5)
}
```

ops_ps_roi_align *Performs Position-Sensitive Region of Interest (RoI) Align operator*

Description

The (RoI) Align operator is mentioned in [Light-Head R-CNN](#).

Usage

```
ops_ps_roi_align(
  input,
  boxes,
  output_size,
  spatial_scale = 1,
  sampling_ratio = -1
)

nn_ps_roi_align(output_size, spatial_scale = 1, sampling_ratio = -1)
```

Arguments

input	(Tensor[N, C, H, W]): The input tensor, i.e. a batch with N elements. Each element contains C feature maps of dimensions H x W.
boxes	(Tensor[K, 5] or List[Tensor[L, 4]]): the box coordinates in (x1, y1, x2, y2) format where the regions will be taken from. The coordinate must satisfy $0 \leq x1 < x2$ and $0 \leq y1 < y2$. If a single Tensor is passed, then the first column should contain the index of the corresponding element in the batch, i.e. a number in [1, N]. If a list of Tensors is passed, then each Tensor will correspond to the boxes for an element i in the batch.
output_size	(int or Tuple[int, int]): the size of the output (in bins or pixels) after the pooling is performed, as (height, width).
spatial_scale	(float): a scaling factor that maps the box coordinates to the input coordinates. For example, if your boxes are defined on the scale of a 224x224 image and your input is a 112x112 feature map (resulting from a 0.5x scaling of the original image), you'll want to set this to 0.5. Default: 1.0
sampling_ratio	(int): number of sampling points in the interpolation grid used to compute the output value of each pooled output bin. If > 0, then exactly <code>sampling_ratio x sampling_ratio</code> sampling points per bin are used. If ≤ 0 , then an adaptive number of grid points are used (computed as $\text{ceil}(\text{roi_width} / \text{output_width})$, and likewise for height). Default: -1

Value

Tensor[K, C / (output_size[1] * output_size[2]), output_size[1], output_size[2]]: The pooled RoIs

Functions

- `nn_ps_roi_align`: The `torch::nn_module()` wrapper for `ops_ps_roi_align()`.

Examples

```
if (torch::torch_is_installed()) {  
  library(torch)  
  input <- torch_randn(1, 3, 28, 28)  
  boxes <- list(torch_tensor(matrix(c(1,1,5,5), ncol = 4)))  
  roi <- nn_ps_roi_align(output_size = c(1, 1))  
  roi(input, boxes)  
}
```

`torchvisionlib_is_installed`

Checks if an installation of torchvisionlib was found.

Description

Checks if an installation of torchvisionlib was found.

Install additional libraries

Usage

```
torchvisionlib_is_installed()
```

```
install_torchvisionlib(url = Sys.getenv("TORCHVISIONLIB_URL", unset = NA))
```

Arguments

`url` Url for the binaries. Can also be the file path to the binaries.

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