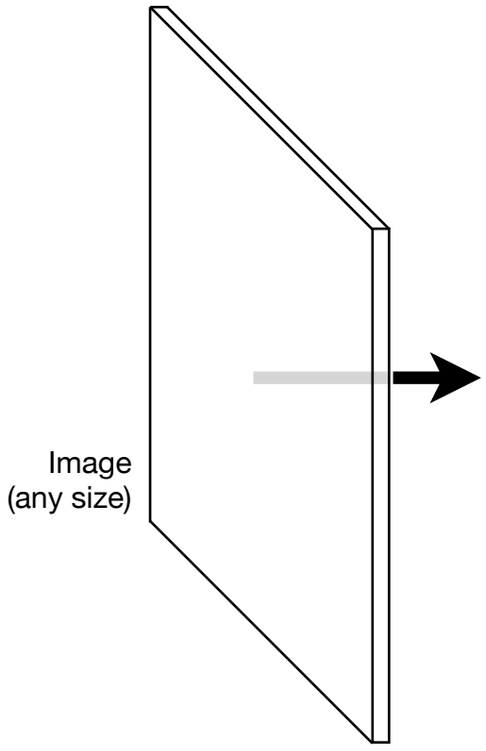
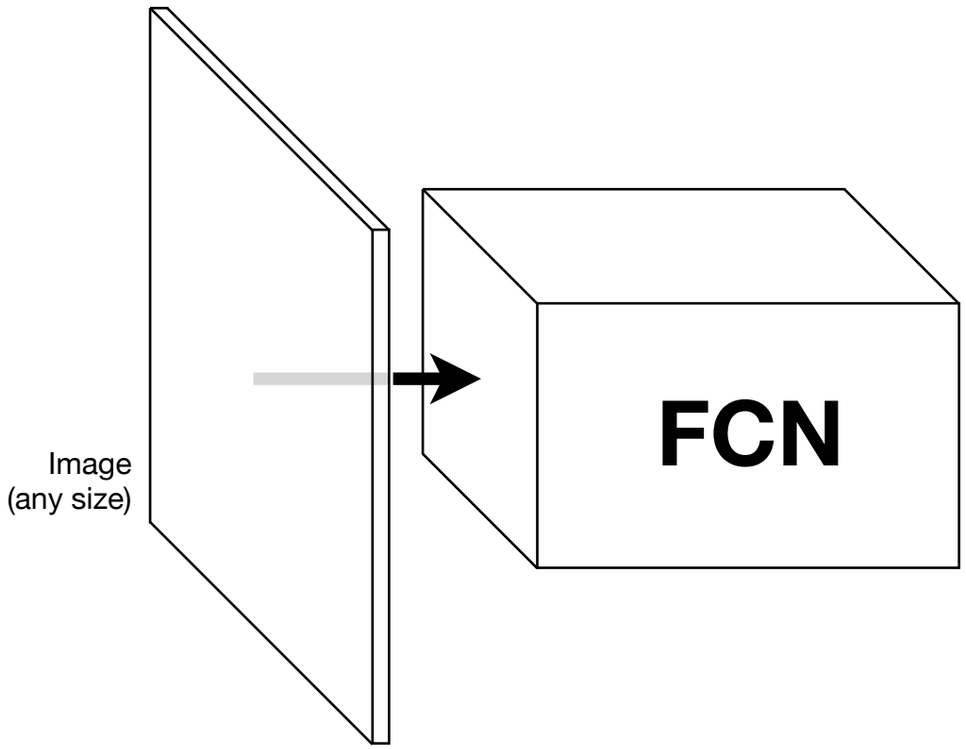
Faster RCNN

Faster RCNN



Faster RCNN



Faster RCNN

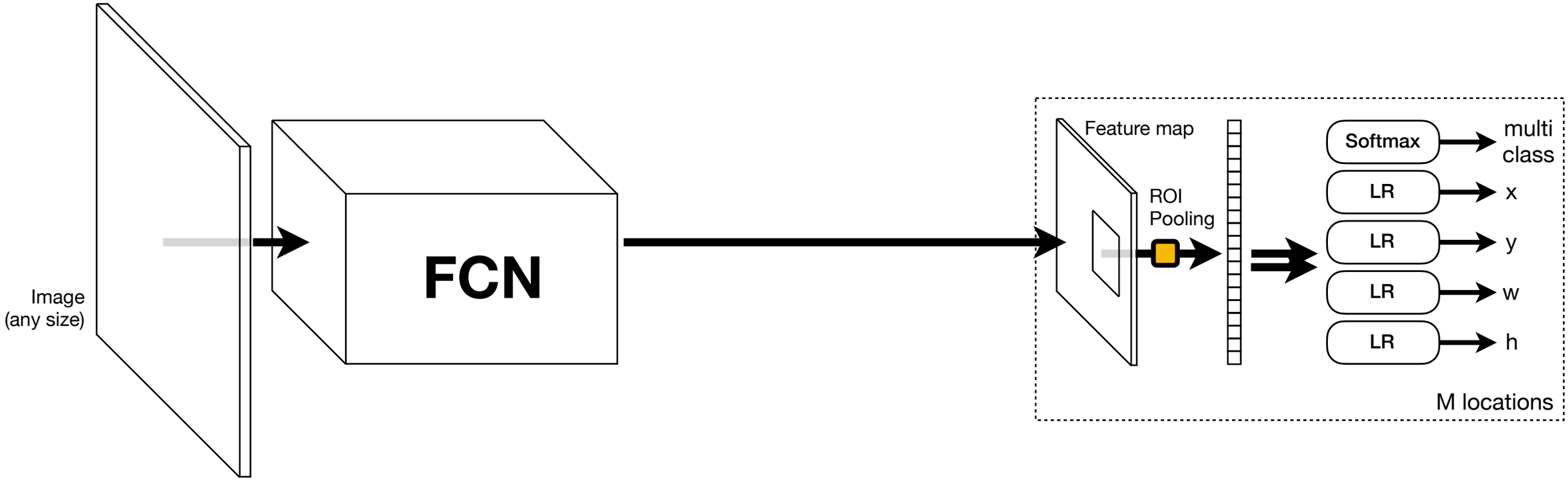
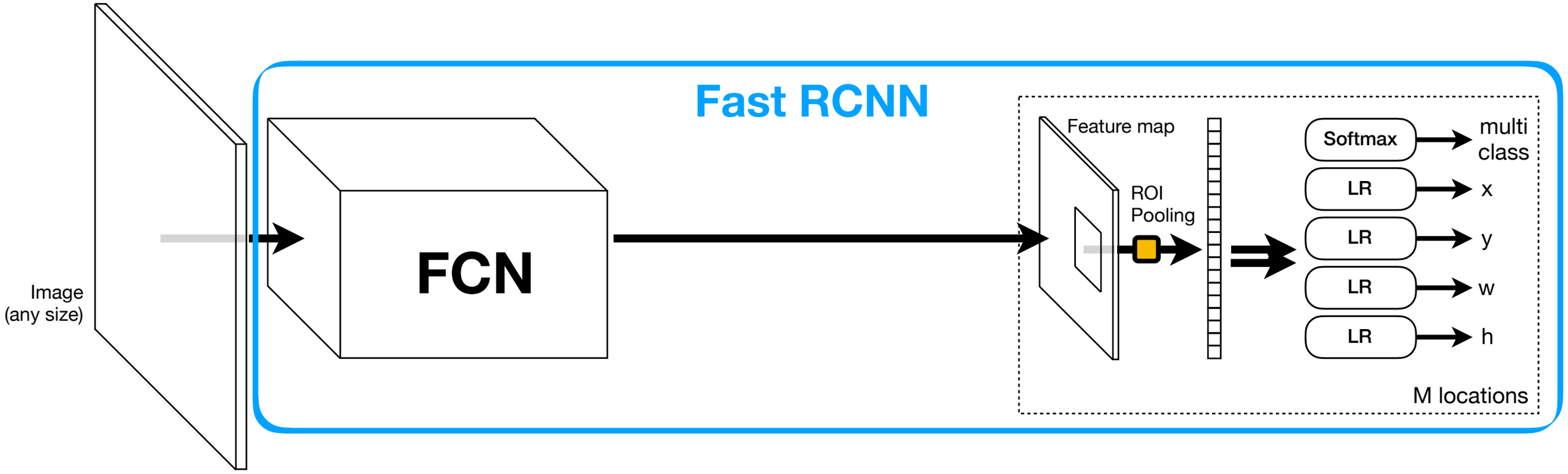


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations

Faster RCNN


Fast RCNN
Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations

Faster RCNN

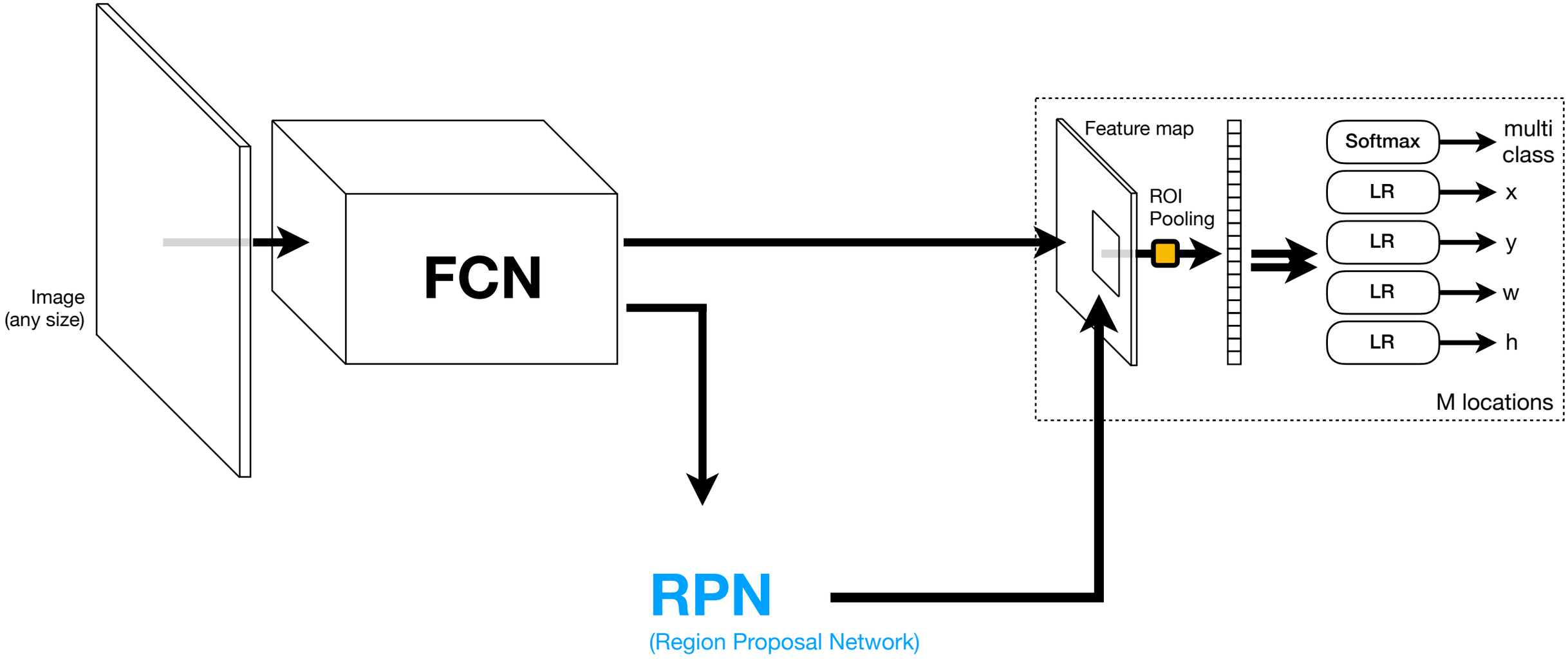


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
RPN
(Region Proposal Network)

Faster RCNN

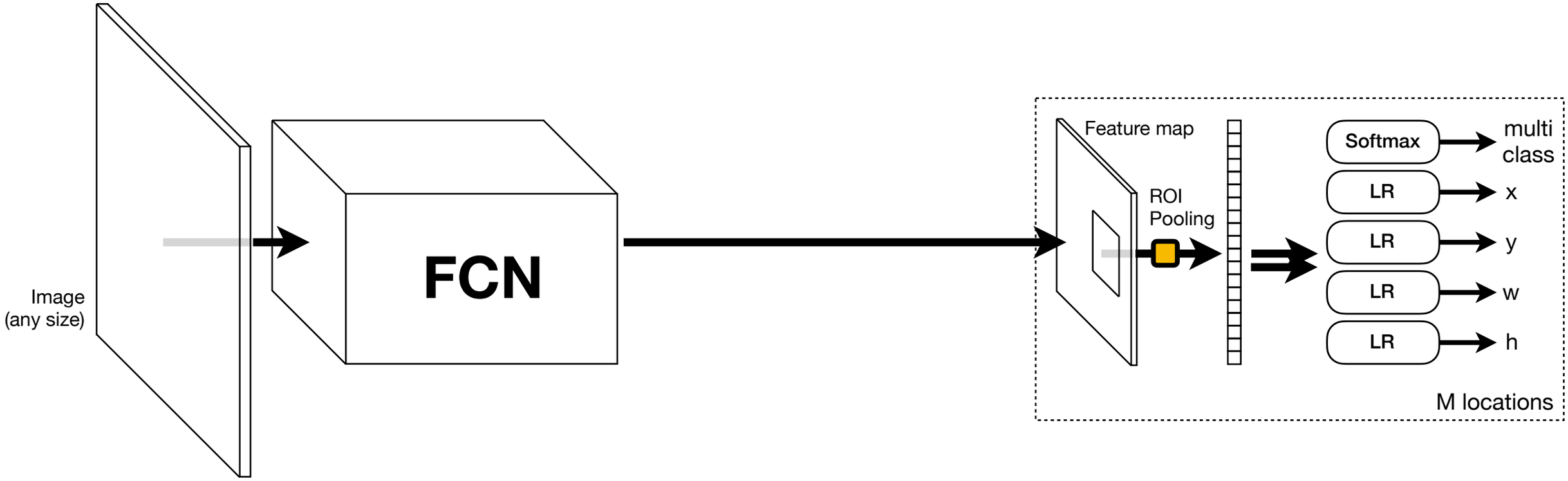


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations

Faster RCNN

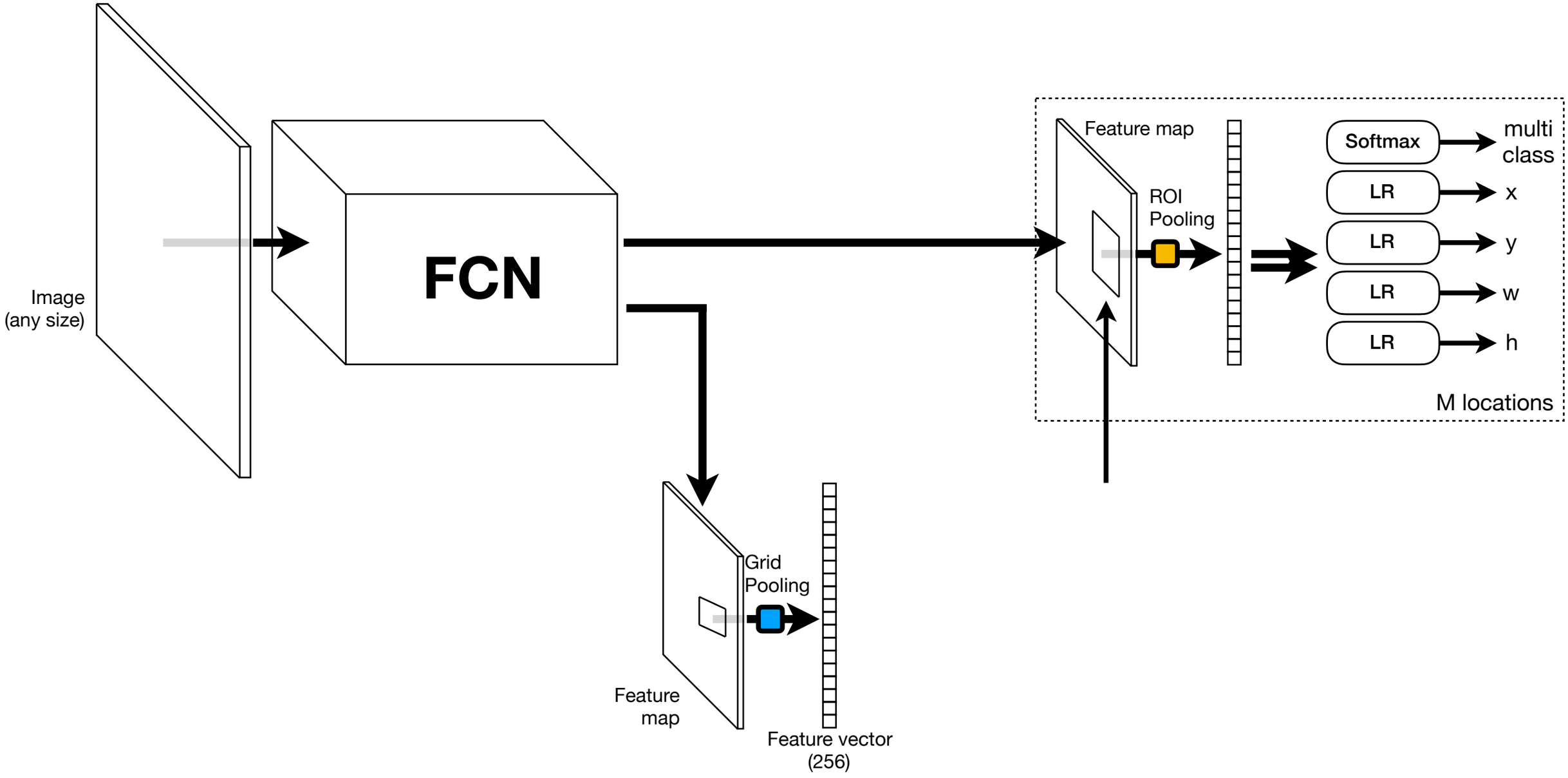


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Grid
Pooling
Feature
map
Feature vector
(256)

Faster RCNN

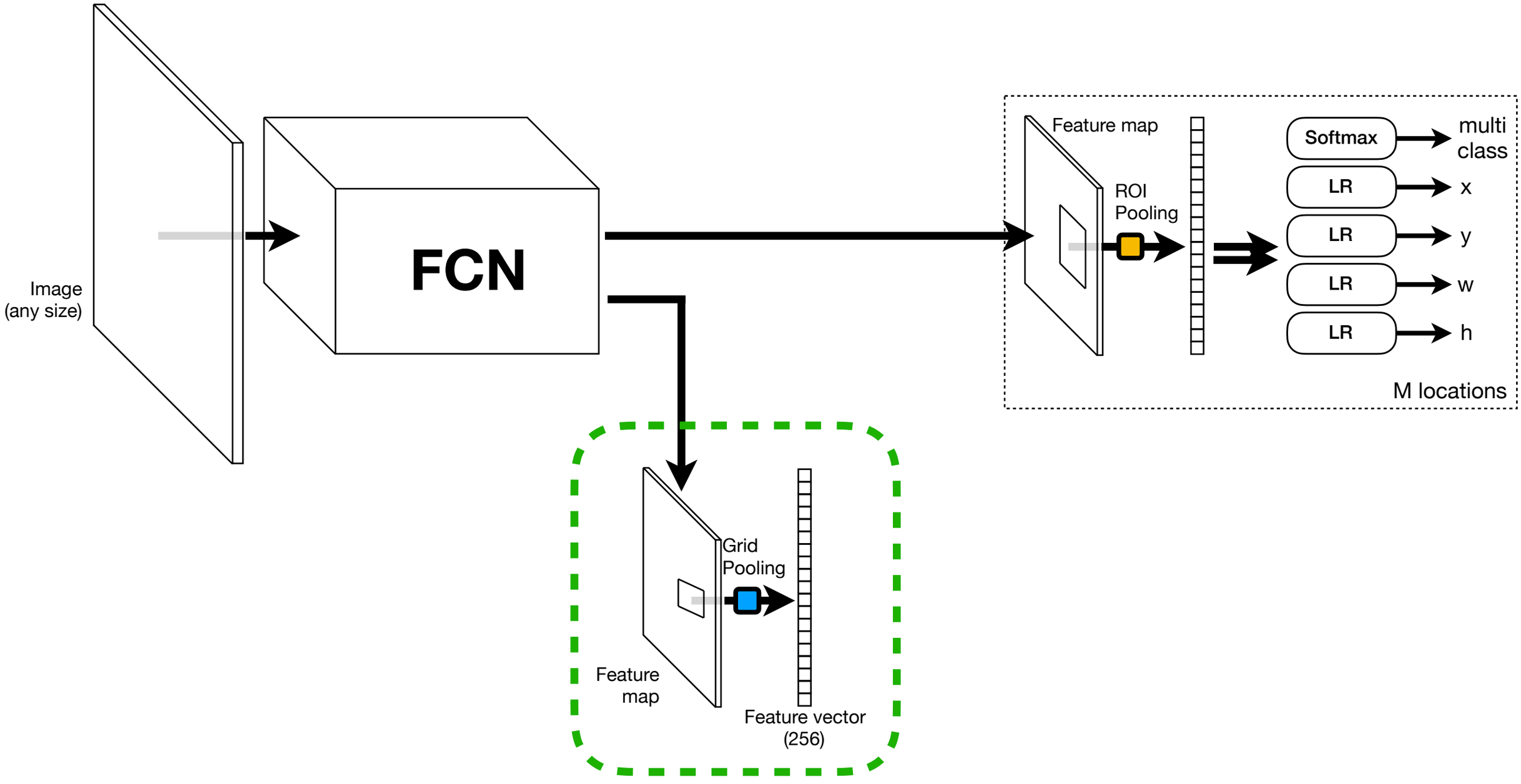
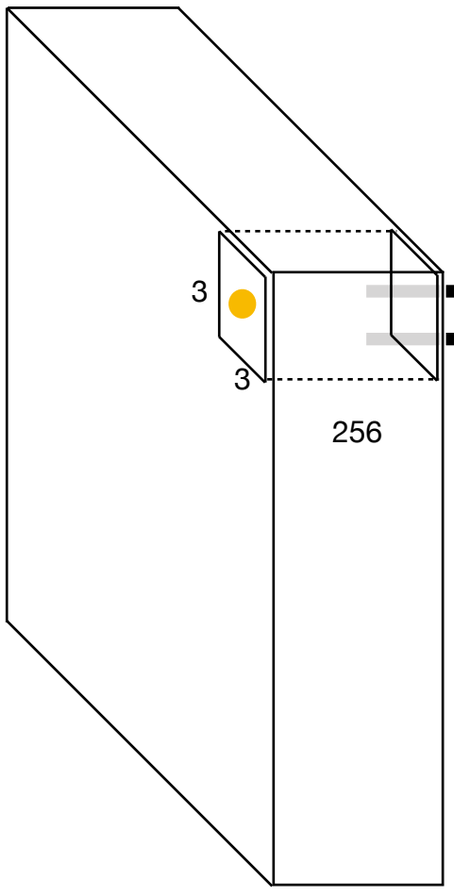


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Grid
Pooling
Feature
map
Feature vector
(256)

Region Proposal Network



Feature response
(from some layer in a CNN)

FC

Feature vector grid
location **m**

256

FC

Repeat for each
grid location

Softmax → Object probability

LR → x
LR → y
LR → w
LR → h

Bounding box
regression

For a bounding
box of size 1

Anchor box 1

Softmax → Object probability

LR → x
LR → y
LR → w
LR → h

Bounding box
regression

For a bounding
box of size 2

Anchor box 2

Softmax → Object probability

LR → x
LR → y
LR → w
LR → h

Bounding box
regression

For a bounding
box of size B

Anchor box B

RPN generates **B** boxes
proposals for **M** locations

Faster RCNN

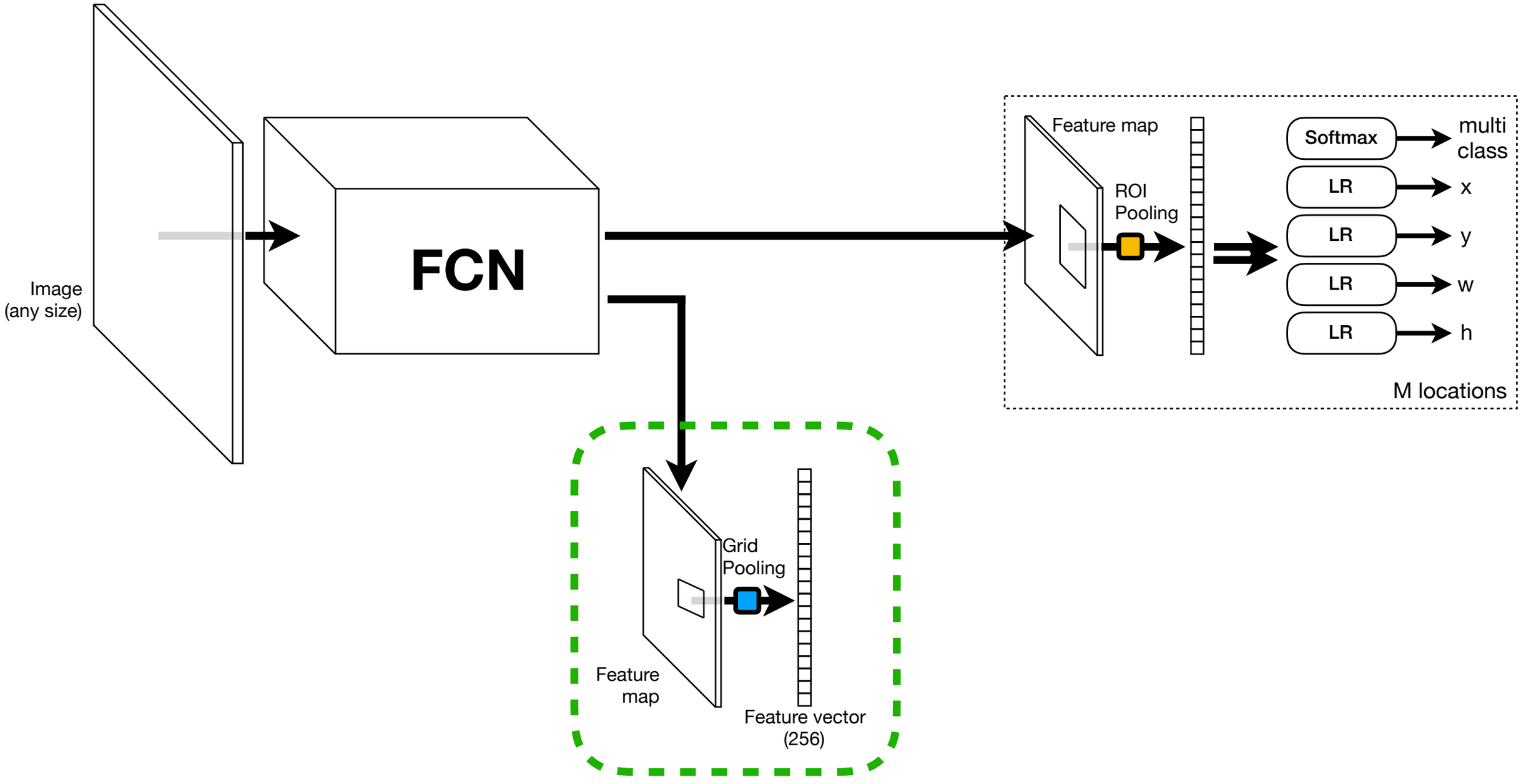


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Grid
Pooling
Feature
map
Feature vector
(256)

Faster RCNN

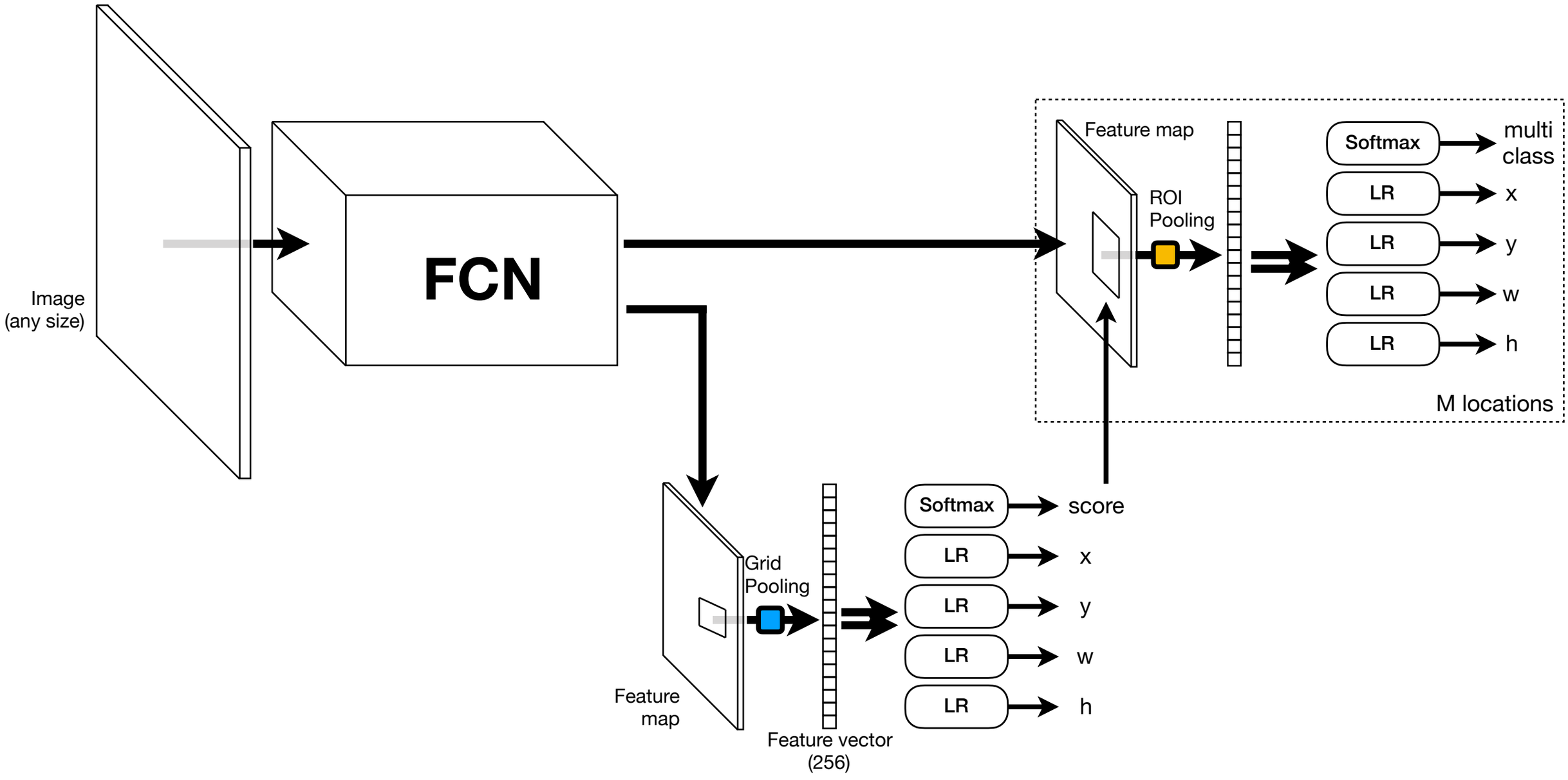


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Grid
Pooling
Feature
map
Feature vector
(256)
Softmax
score
LR
x
LR
y
LR
w
LR
h

Faster RCNN

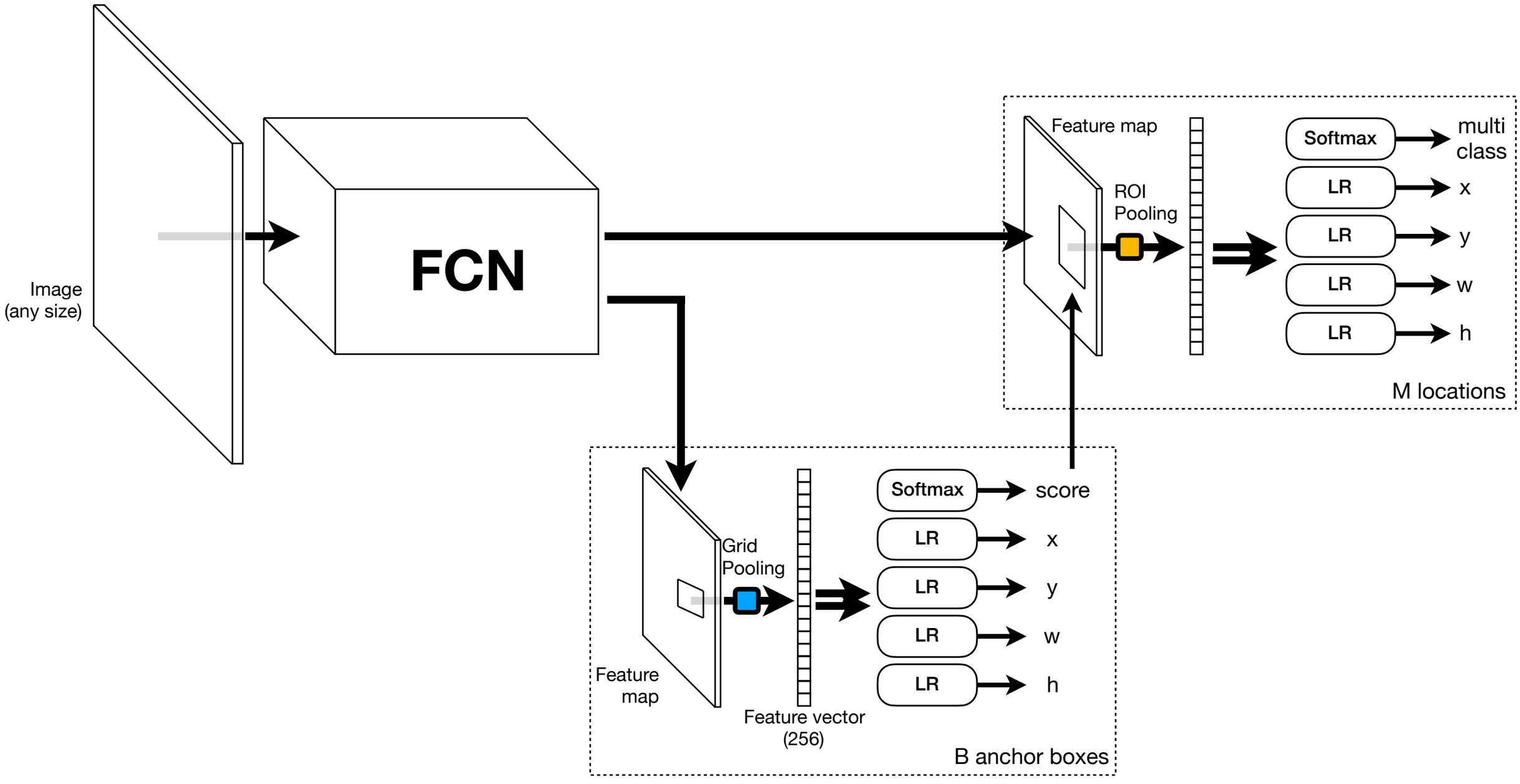
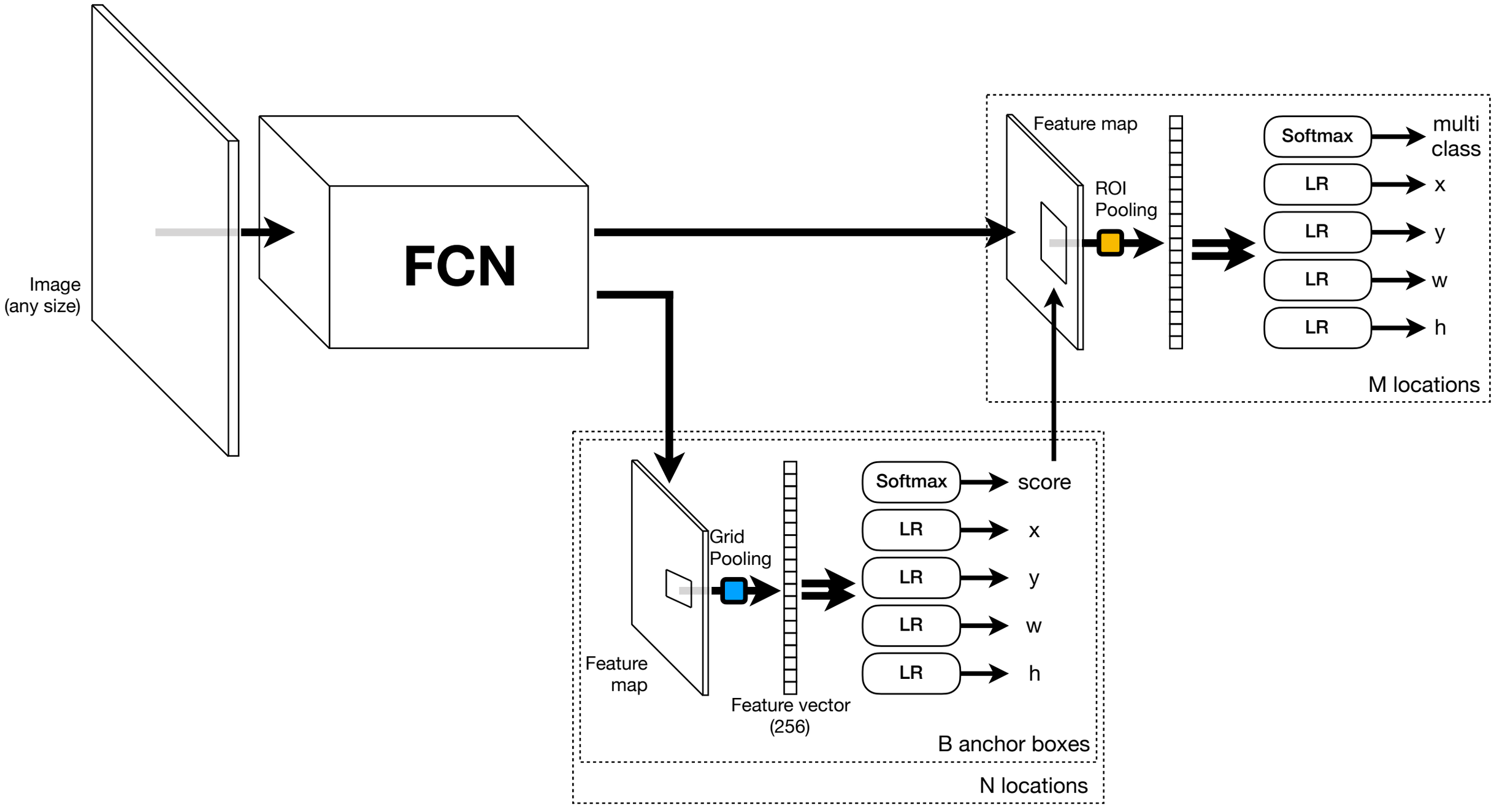


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Grid
Pooling
Feature
map
Feature vector
(256)
Softmax
score
LR
x
LR
y
LR
w
LR
h
B anchor boxes

Faster RCNN



Complete.

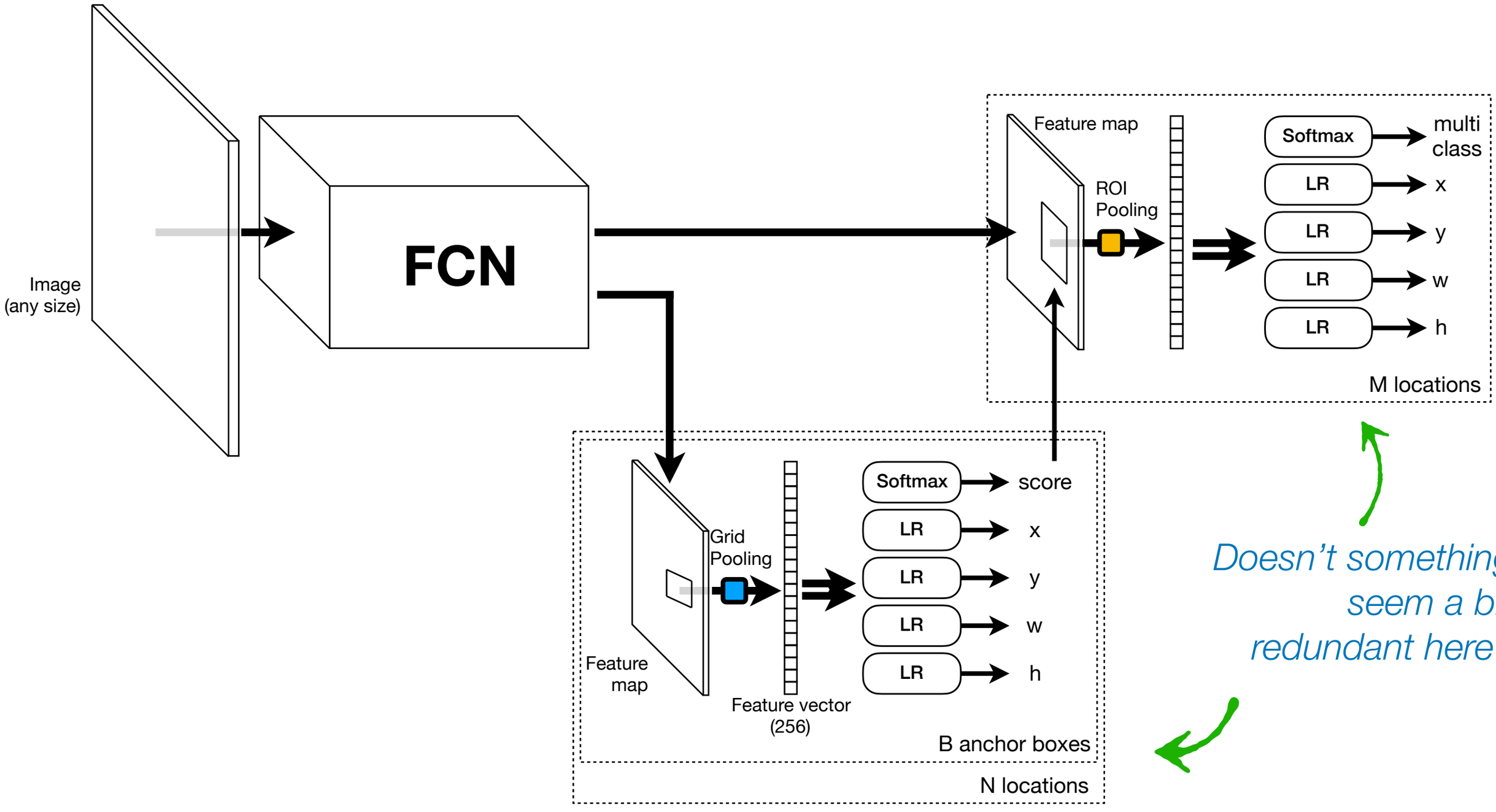
Important Concepts

- **Region proposal network (RPN)**

- **Feature Reuse:**
  Use deep features for both classification and bounding box proposals

- **Conversion to high-dimensional Regression problem:**
  Convert bounding box proposal problem into a structured output regression problem

Faster RCNN



Doesn't something seem a bit redundant here?

It's almost like we are computing the same thing twice.

Faster RCNN

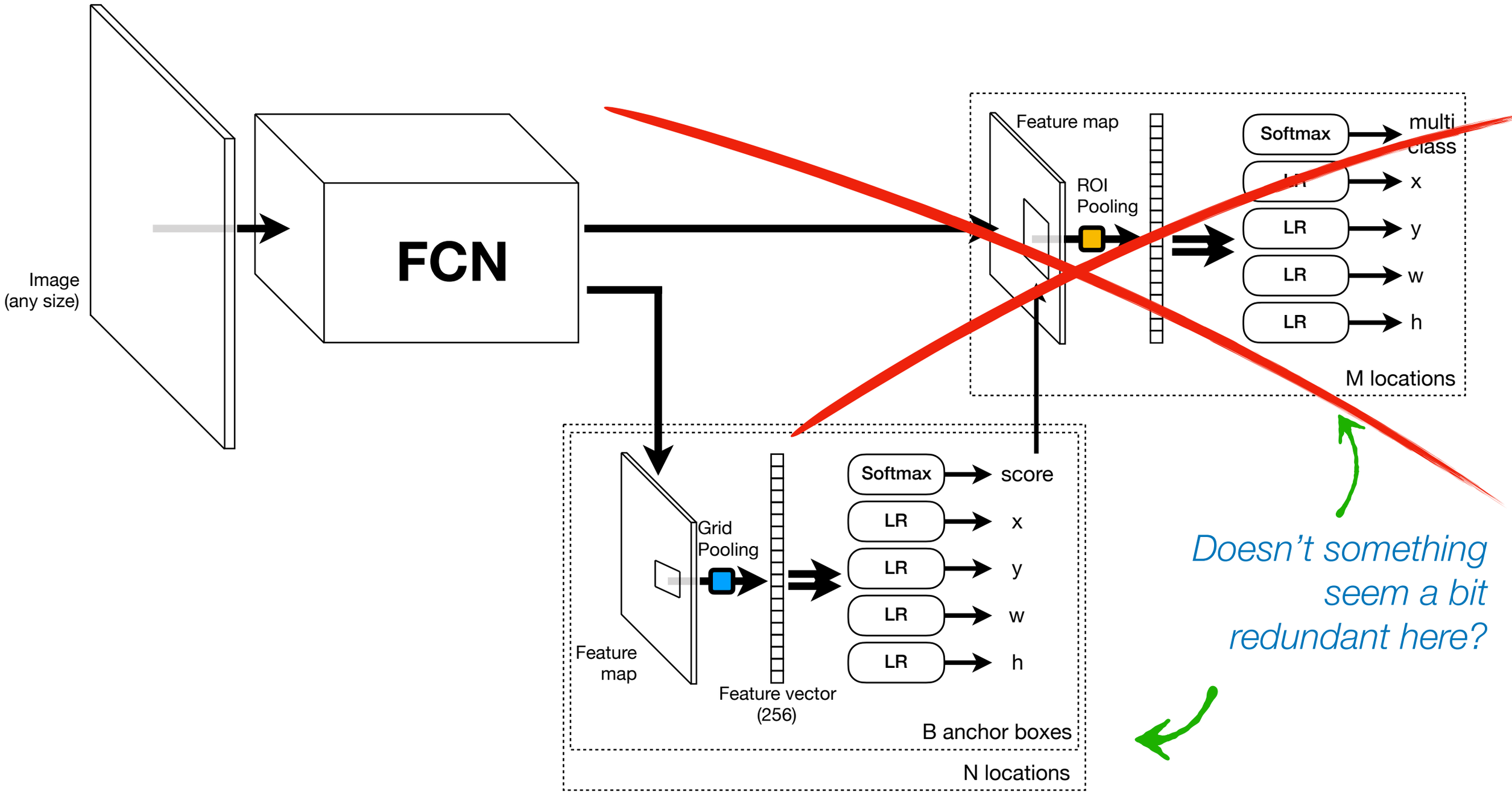


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Grid
Pooling
Softmax
score
LR
x
LR
y
LR
w
LR
h
Feature
map
Feature vector
(256)
B anchor boxes
N locations
Doesn't something
seem a bit
redundant here?
It's almost like we are computing the same thing twice.

Faster RCNN

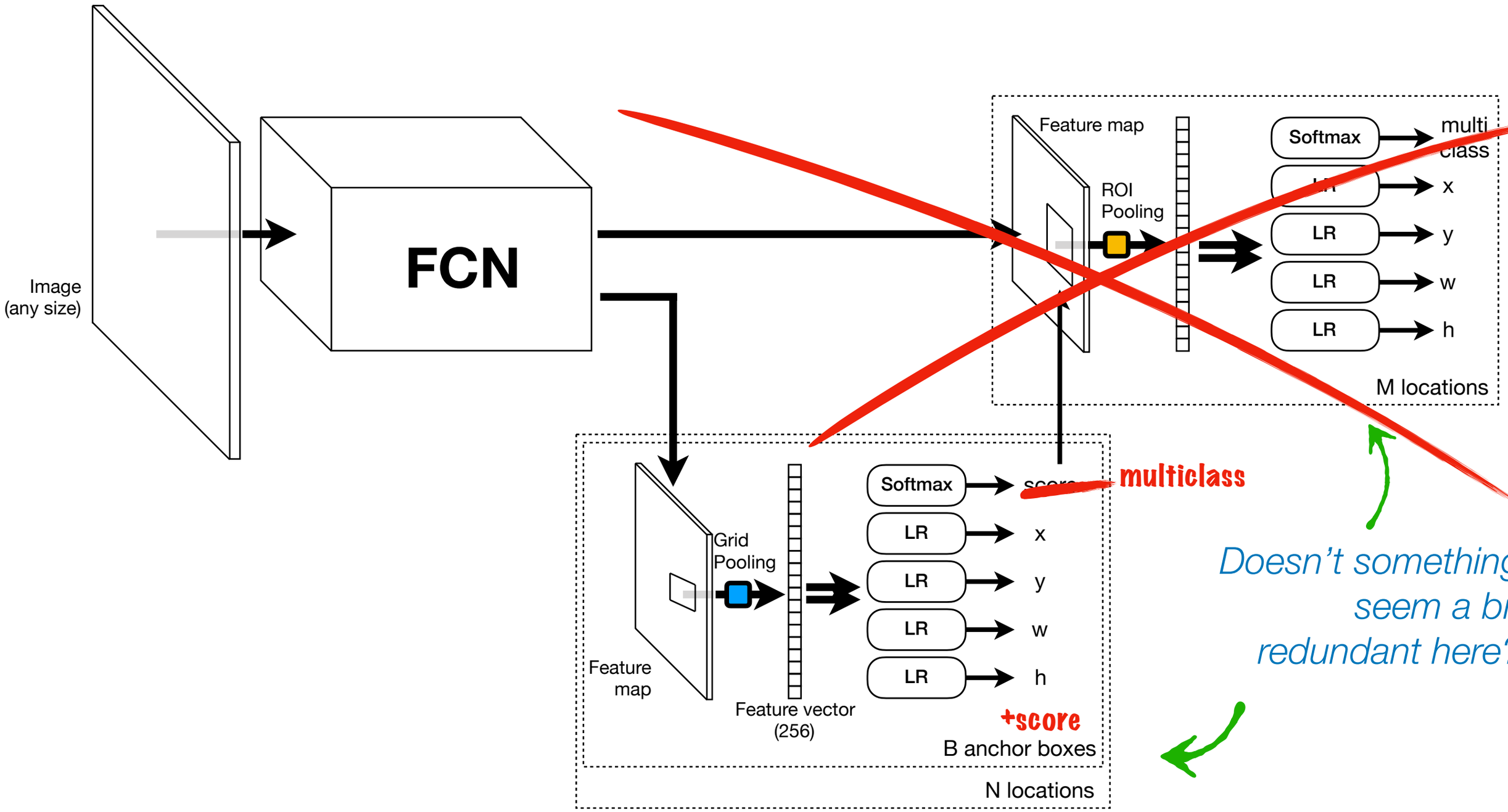


Image
(any size)
FCN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
Softmax
multiclass
LR
x
LR
y
LR
w
LR
h
Grid
Pooling
Feature
map
Feature vector
(256)
+score
B anchor boxes
N locations
Doesn't something
seem a bit
redundant here?
It's almost like we are computing the same thing twice.

Faster RCNN

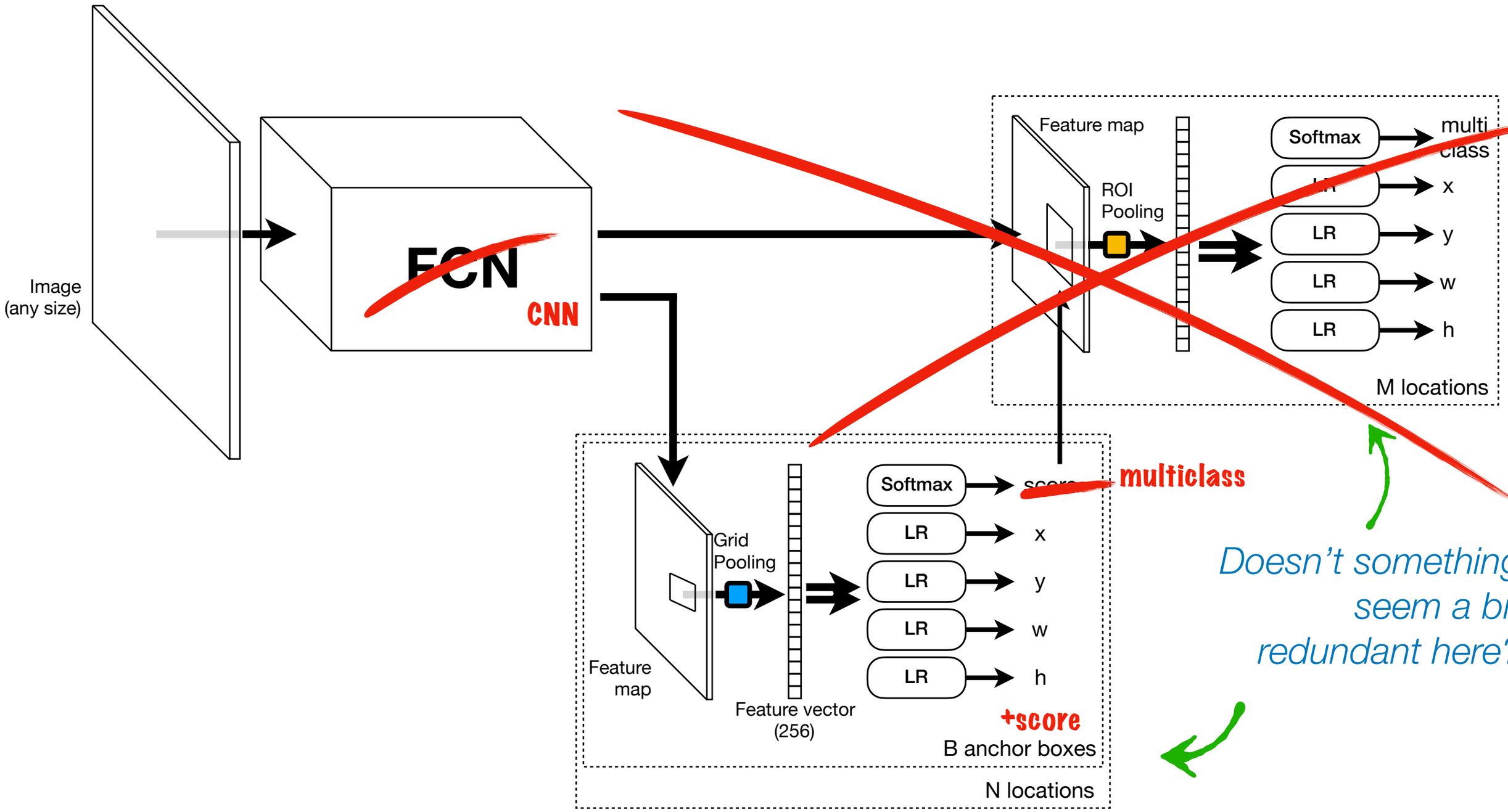
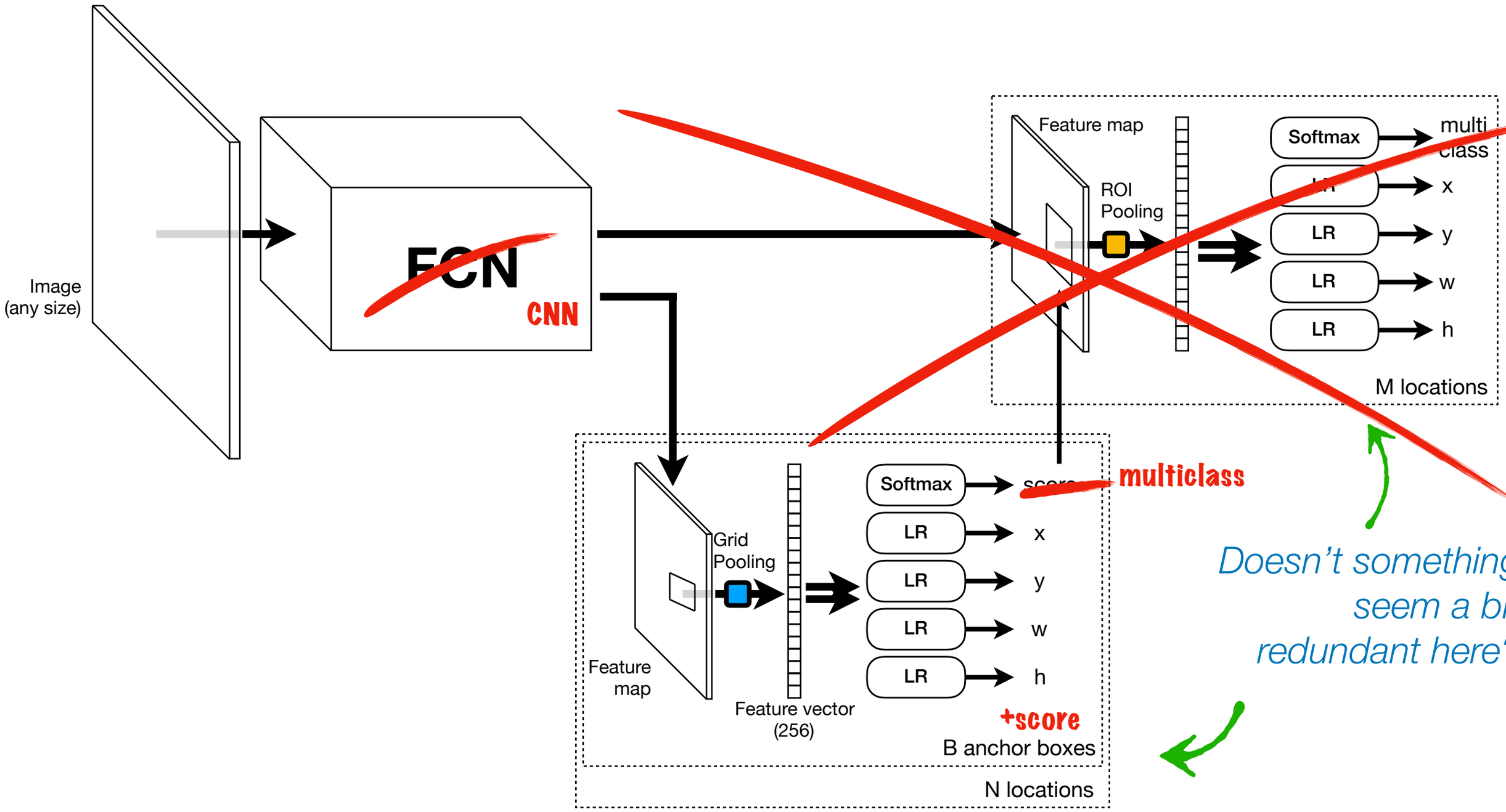


Image
(any size)
FCN
CNN
Feature map
ROI
Pooling
Softmax
multi
class
LR
x
LR
y
LR
w
LR
h
M locations
multiclass
Grid
Pooling
Feature
map
Feature vector
(256)
Softmax
LR
x
LR
y
LR
w
LR
h
+score
B anchor boxes
N locations
Doesn't something
seem a bit
redundant here?
It's almost like we are computing the same thing twice.

YOLO
~~Faster RCNN~~