In [1]:
```
%reload_ext autoreload
%autoreload 2
%matplotlib inline
```

In [2]:
```
#cd under the directory of fastai#
```

In [3]:
```
cd C:\Users\Teeno\fastai
```

```
C:\Users\Teeno\fastai
```

In [4]:
```
from fastai.conv_learner import *
from fastai.transforms import *
from fastai.conv_learner import *
from fastai.model import *
from fastai.dataset import *
from fastai.sgdr import *
from fastai.plots import *
arch=resnext101_64
```

In [5]:
```
#path that contains the train folder, test folder, and labels.csv for type cla
ssification#
```

In [6]:
```
PATH ="C:/Users/Teeno/Desktop/result/roof prediction/"
```

In [7]:
```
label_csv= f'{PATH}labels.csv'
n=len(list(open(label_csv)))-1
val_idxs = get_cv_idxs(n)
```

In [8]:
```
def get_data(sz,bs):
    tfms=tfms_from_model(arch, sz, aug_tfms=transforms_top_down,max_zoom=1.1)
    data=ImageClassifierData.from_csv(PATH,'train',f'{PATH}labels.csv',test_na
me='test',num_workers=4,
                                      val_idxs=val_idxs,suffix='.jpg',tfms=tfms,bs
=bs)
    return data if sz>300 else data.resize(340,'tmp')
```

In [9]:
```
data = get_data(500,5)
learn = ConvLearner.pretrained(arch,data,precompute=False)
```

In [10]:
```
learn.load('45_top_roof_res101')
```

In [11]:
```
#Path that hosts the images that need to be classified#
```

In [12]:
```
PATH = "C:/Users/Teeno/Desktop/result/predict/"
```

In [13]:
```
#change the name of fn#
```

In [14]:
```
fn = "com_2_1.jpg"
```

In [15]:
```
PATH+fn
```

Out[15]:
```
'C:/Users/Teeno/Desktop/result/predict/com_2_1.jpg'
```

In [16]:
```
Image.open(PATH+fn).resize((150,150))
```

Out[16]:

In [17]:
```
trn_tfms,val_tfms=tfms_from_model(arch,500)
```

In [18]:
```
ds = FilesIndexArrayDataset([fn],np.array([0]),val_tfms,PATH)
dl = DataLoader(ds)
```

In [19]:
```
preds = learn.predict_dl(dl)
np.argmax(preds)
```

Out[19]:
```
0
```

In [ ]:
```
#'0' means membrane; '1' means metal; '2' means shingle; '3' means tile.
```