In [2]:
```
import os
print(os.getcwd())
```

```
/Users/heosangbeom
```

In [3]:
```
import sys
import matplotlib.pyplot as plt
```

In [4]:
```
print(os.getcwd())
```

```
/Users/heosangbeom
```

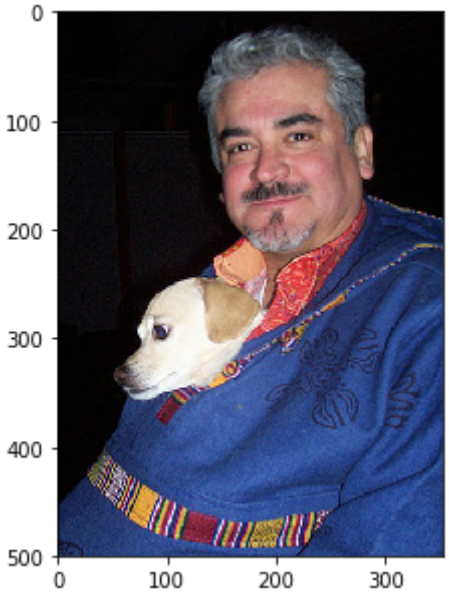
In [5]:
```
os.chdir("/Users")
os.getcwd()
```

Out[5]:
```
'/Users'
```

In [6]:
```
os.chdir("/Users/heosangbeom/Desktop/VOC2007/JPEGImages")
os.getcwd()
```

Out[6]:
```
'/Users/heosangbeom/Desktop/VOC2007/JPEGImages'
```

In [7]:
```
import matplotlib.pyplot as plt

from PIL import Image
from PIL import ImageFont
from PIL import ImageDraw

image_path = ("/Users/heosangbeom/Desktop/VOC2007/JPEGImages/000001.jpg")

image = Image.open(image_path).convert("RGB")

plt.figure(figsize=(5,5))
plt.imshow(image)
plt.show()
plt.close()
```

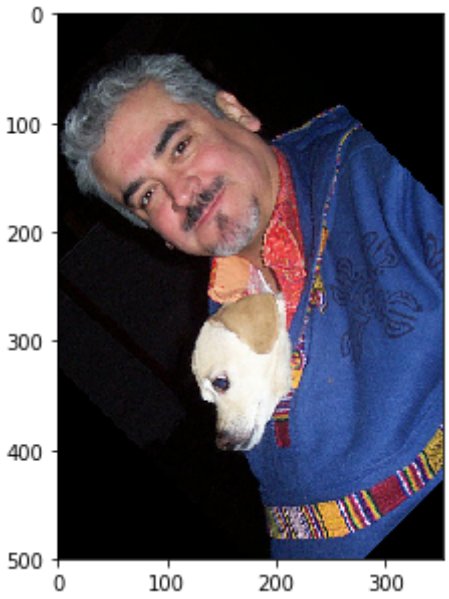


In [8]:
```
import xml.etree.ElementTree as Et
from xml.etree.ElementTree import Element, ElementTree
```

In [9]:
```
xml_path = ("/Users/heosangbeom/Desktop/VOC2007/Annotations/000001.xml")

print("XML parsing Start\n")
xml = open(xml_path, "r")
tree = Et.parse(xml)
root = tree.getroot()
size = root.find("size")
width = size.find("width").text
height = size.find("height").text
channels = size.find("depth").text

print("Image properties\nwidth : {}\nheight : {}\nchannels : {}\n".format(w

objects = root.findall("object")
print("Objects Description")
for _object in objects:
    name = _object.find("name").text
    bndbox = _object.find("bndbox")
    xmin = bndbox.find("xmin").text
    ymin = bndbox.find("ymin").text
    xmax = bndbox.find("xmax").text
    ymax = bndbox.find("ymax").text

    print("class : {}\nxmin : {}\nymin : {}\nxmax : {}\nymax : {}\n".format

print("XML parsing END")
```

```
XML parsing Start

Image properties
width : 353
height : 500
channels : 3

Objects Description
class : dog
xmin : 48
ymin : 240
xmax : 195
ymax : 371

class : person
xmin : 8
ymin : 12
xmax : 352
ymax : 498

XML parsing END
```

In [10]:
```
image = Image.open(image_path).convert("RGB")
image_new = image.rotate(45)
plt.figure(figsize=(5,5))
plt.imshow(image_new)
plt.show()
plt.close()
```



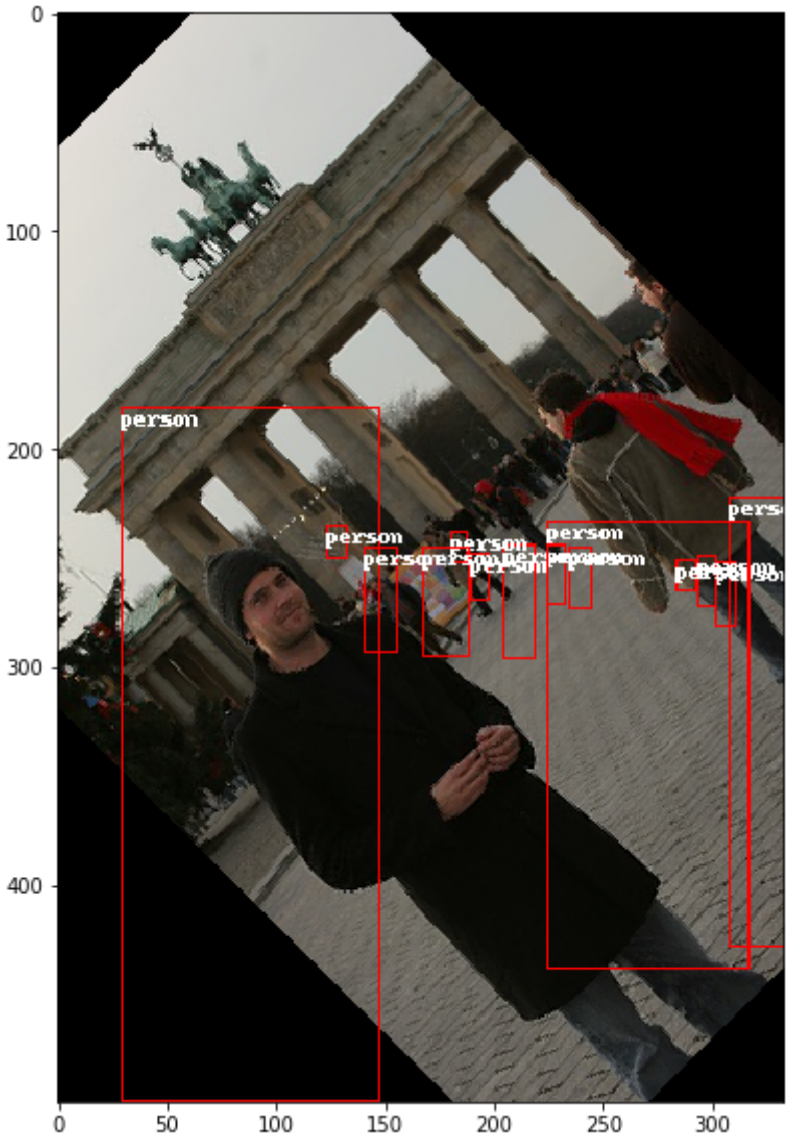
In [11]:
```
IMAGE_FOLDER = "/Users/heosangbeom/Desktop/VOC2007/JPEGImages"
ANNOTATIONS_FOLDER = "/Users/heosangbeom/Desktop/VOC2007/Annotations"
dataset_path = sys.argv[1]

ann_root, ann_dir, ann_files = next(os.walk(os.path.join(dataset_path, ANNO

print("ROOT : {}\n".format(ann_root))
print("DIR : {}\n".format(ann_dir))
print("FILES : {}\n".format(ann_files))
```

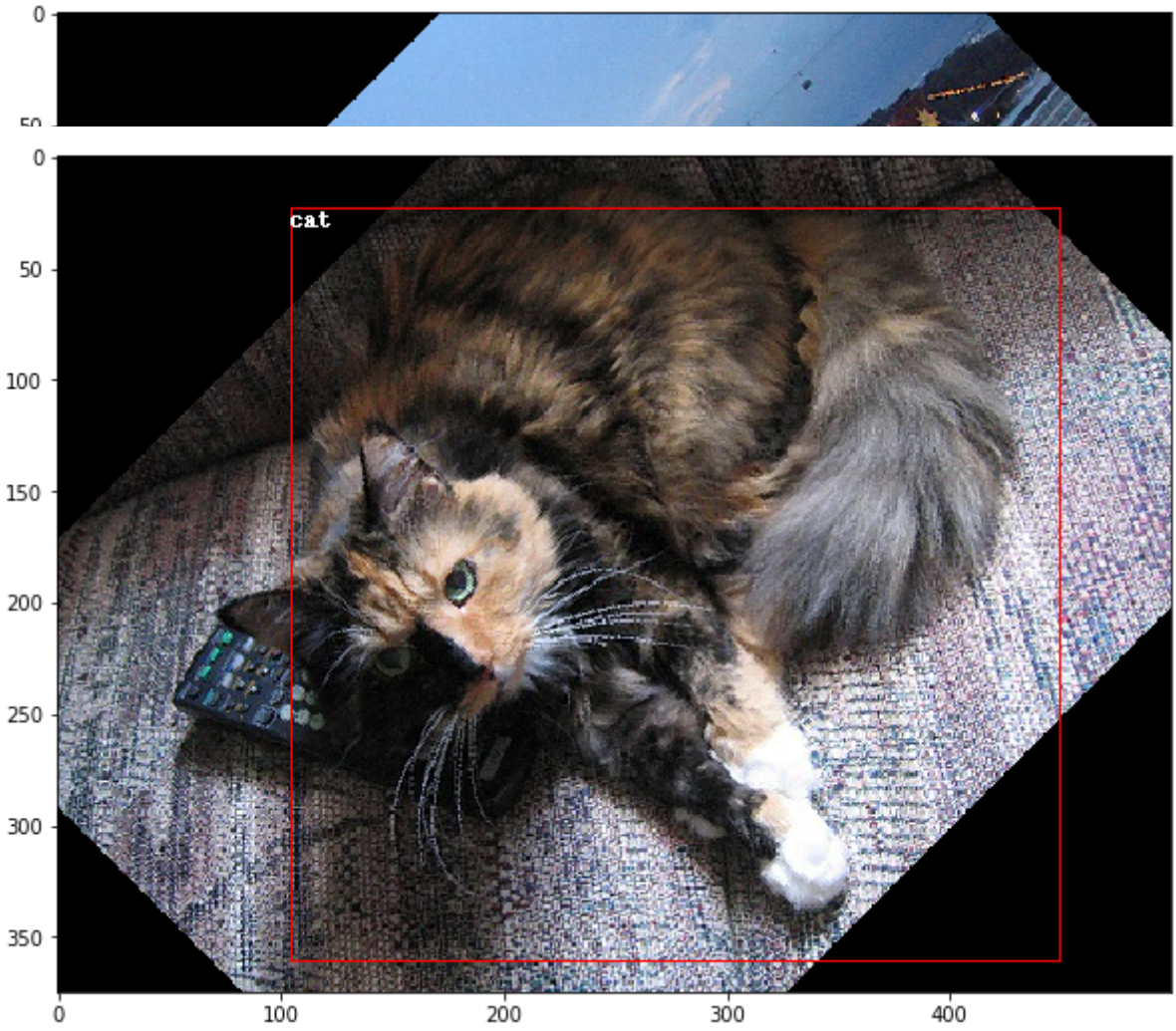
```
ROOT : /Users/heosangbeom/Desktop/VOC2007/Annotations

DIR : []

FILES : ['000191.xml', '003498.xml', '005957.xml', '004491.xml', '007198.
xml', '006292.xml', '005943.xml', '004485.xml', '002792.xml', '007832.xm
l', '000185.xml', '009837.xml', '000813.xml', '008283.xml', '000807.xml',
'004334.xml', '000152.xml', '009610.xml', '009176.xml', '006245.xml', '00
0634.xml', '005994.xml', '003329.xml', '005758.xml', '009604.xml', '00653
7.xml', '004320.xml', '008532.xml', '004308.xml', '003467.xml', '005770.x
ml', '001516.xml', '001502.xml', '007173.xml', '008240.xml', '003315.xm
l', '005002.xml', '003473.xml', '001264.xml', '003842.xml', '000393.xml',
'001099.xml', '008903.xml', '006090.xml', '004877.xml', '006906.xml', '00
8081.xml', '004888.xml', '004650.xml', '000436.xml', '006047.xml', '00172
8.xml', '006721.xml', '000350.xml', '003659.xml', '003881.xml', '005228.x
ml', '002553.xml', '000422.xml', '006053.xml', '009360.xml', '002235.xm
l', '008056.xml', '005572.xml', '003665.xml', '007403.xml', '008724.xml',
'000378.xml', '005200.xml', '004678.xml', '007371.xml', '001700.xml', '00
2396.xml', '004081.xml', '008863.xml', '007588.xml', '008877.xml', '00392
```

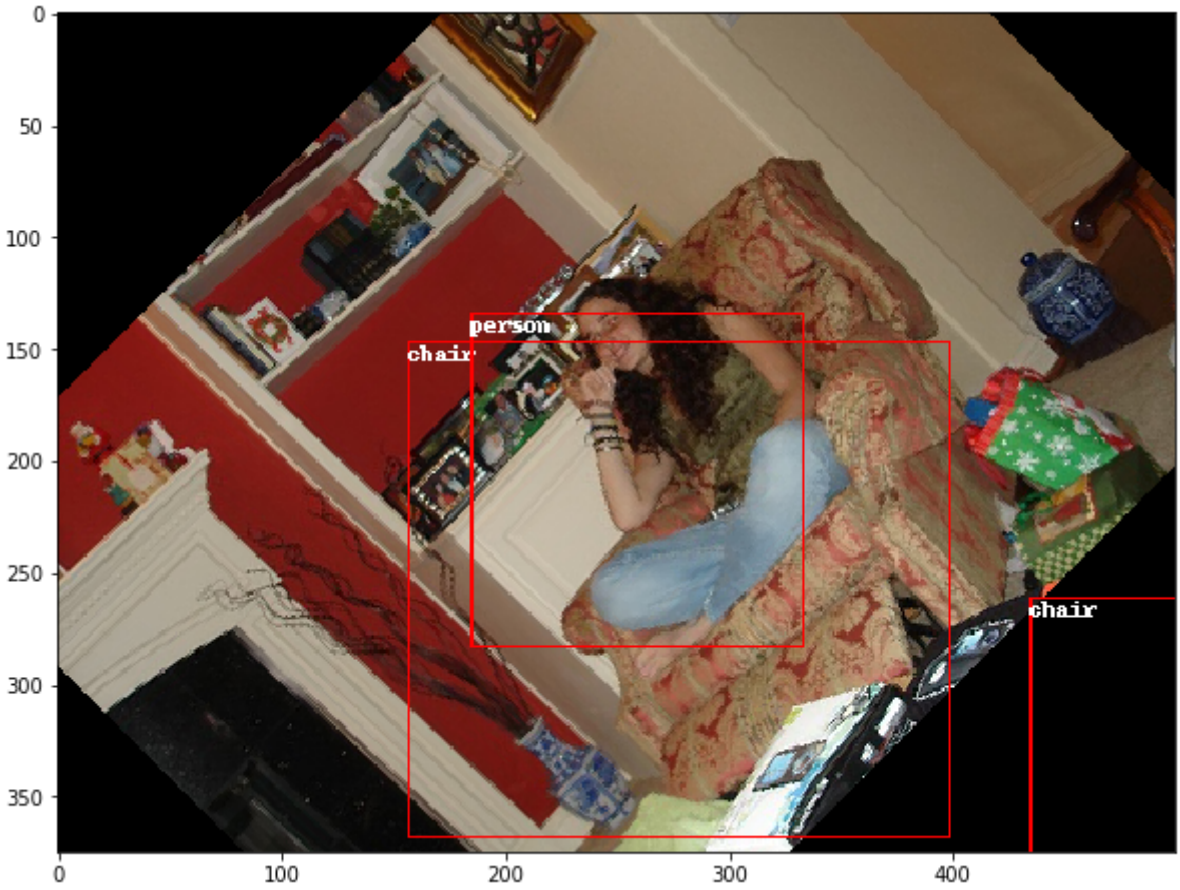
In [12]:
```
for xml_file in ann_files:
    xml = open(os.path.join(ann_root, xml_file), "r")
    tree = Et.parse(xml)
    root = tree.getroot()

    size = root.find("size")

    width = size.find("width").text
    height = size.find("height").text
    channels = size.find("depth").text

print("Image properties\nwidth : {}\nheight : {}\nchannels : {}\n".format(w

objects = root.findall("object")
print("Objects Description")

for _object in objects:
        name = _object.find("name").text
        bndbox = _object.find("bndbox")
        xmin = bndbox.find("xmin").text
        ymin = bndbox.find("ymin").text
        xmax = bndbox.find("xmax").text
        ymax = bndbox.find("ymax").text

        print("class : {}\nxmin : {}\nymin : {}\nxmax : {}\nymax : {}\n".fo
```

```
Image properties
width : 500
height : 375
channels : 3

Objects Description
class : person
xmin : 179
ymin : 47
xmax : 333
ymax : 300

class : motorbike
xmin : 72
ymin : 95
xmax : 408
ymax : 328
```

In [ ]:
```
img_root, img_dir, img_files = next(os.walk(os.path.join(dataset_path, IMAG

for xml_file in ann_files:
    img_name = img_files[img_files.index(".".join([xml_file.split(".")[0],
    img_file = os.path.join(img_root, img_name)
    image = Image.open(img_file).convert("RGB")
    image_new = image.rotate(45)
    draw = ImageDraw.Draw(image_new)

    xml = open(os.path.join(ann_root, xml_file), "r")
    tree = Et.parse(xml)
    root = tree.getroot()

    size = root.find("size")

    width = size.find("width").text
    height = size.find("height").text
    channels = size.find("depth").text

    objects = root.findall("object")

    for _object in objects:
        name = _object.find("name").text
        bndbox = _object.find("bndbox")
        xmin = int(bndbox.find("xmin").text)
        ymin = int(bndbox.find("ymin").text)
        xmax = int(bndbox.find("xmax").text)
        ymax = int(bndbox.find("ymax").text)

        draw.rectangle(((xmin, ymin), (xmax, ymax)), outline="red")
        draw.text((xmin, ymin), name)

    plt.figure(figsize=(10, 10))
    plt.imshow(image_new)
    plt.show()
    plt.close()
```


0
100
200
300
400
0
50
100
150
200
250
300
person
person
person
person


0
50
0
cat
50
100
150
200
250
300
350
0
100
200
300
400


person
chair
chair
0
50
100
150
200
250
300
350
0
100
200
300
400