

Deep Blue Semi-final

Internet Images

P1



A screenshot of the PyCharm IDE interface. The top navigation bar shows 'File Edit View Navigate Code Refactor' and the title 'deepblue [C:\Users\Tushar Juman\Pycharm...]' with an 'Output' tab. The left sidebar includes 'Project' (with 'deepblue' folder containing 'Dataset', 'Images', 'venv library root' (selected), 'cnn.py', 'cnn_processing.PNG', 'convex_hull.py', 'dataset.xlsx', 'Deep Blue Demo Docum...', 'deepblue_final.rar', 'depth.py', 'depth_predict.py', 'dim.py'), 'Python Console' (showing code execution and output), 'Structure' (file tree), and 'Favorites'. The main area displays a grayscale image of a paved road surface. Overlaid on the image are several red rectangular boxes highlighting specific areas. Large red numbers are overlaid on these boxes, indicating the count of potholes detected: 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 1740, 1839, 22478, and 1777. A legend in the bottom right corner maps colors to pothole sizes: light blue for small, medium blue for medium, dark blue for large, and orange for very large.

P2



deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

deepblue smoothing.py

Project 1: Project deepblue C:\Users\Tushar Juman\Pycharm\deepblue
Dataset Images venv library root
cnn.py cnn_processing.PNG convex_hull.py dataset.xlsx Deep Blue Demo Document deepblue_final.rar depth.py depth_predict.py dim.py

Python Console × smoothing(2) ×
Python 3.6.0 | packaged
>>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/smoothing.py')
Backend TkAgg is interactive
Number of potholes 10
>>>
6: TODO 2: Terminal 3: Python

Output

A screenshot of the PyCharm IDE interface. On the left, the project structure shows a folder named 'deepblue' containing various files like 'cnn.py' and 'dataset.xlsx'. The 'Python Console' tab shows the command 'runfile' being executed. The main window displays a road scene with several potholes. Red bounding boxes and numerical labels (e.g., 42, 100, 273, 240, 224) are overlaid on the image, indicating the locations and sizes of detected potholes. A red rectangular frame highlights a specific area near the bottom right of the road.

P3



deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

- deepblue C:\Users\Tushar Juman\Pycharm\deepblue
- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Document
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

Output

The screenshot shows the PyCharm IDE interface. On the left is the Project tool window displaying the project structure. In the center is the Python Console where the script has run, outputting the number of potholes found. On the right is the Output tool window showing the processed image of the road with detected potholes highlighted by a red bounding box and red diamond markers indicating their centers.

```
smoothing(2) >>> sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\Pycharm']) >>> PyDev console: starting >>> Python 3.6.0 | packaged by conda 4.3.3 | (default, Oct 30 2018, 13:54:50) [MSC v.1915 64 bit (AMD64)] | Type "help", "copyright", "credits" or "license" for more information. >>> >>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/deepblue_final.rar') Backend TkAgg is interactive. Number of potholes 4 >>>
```

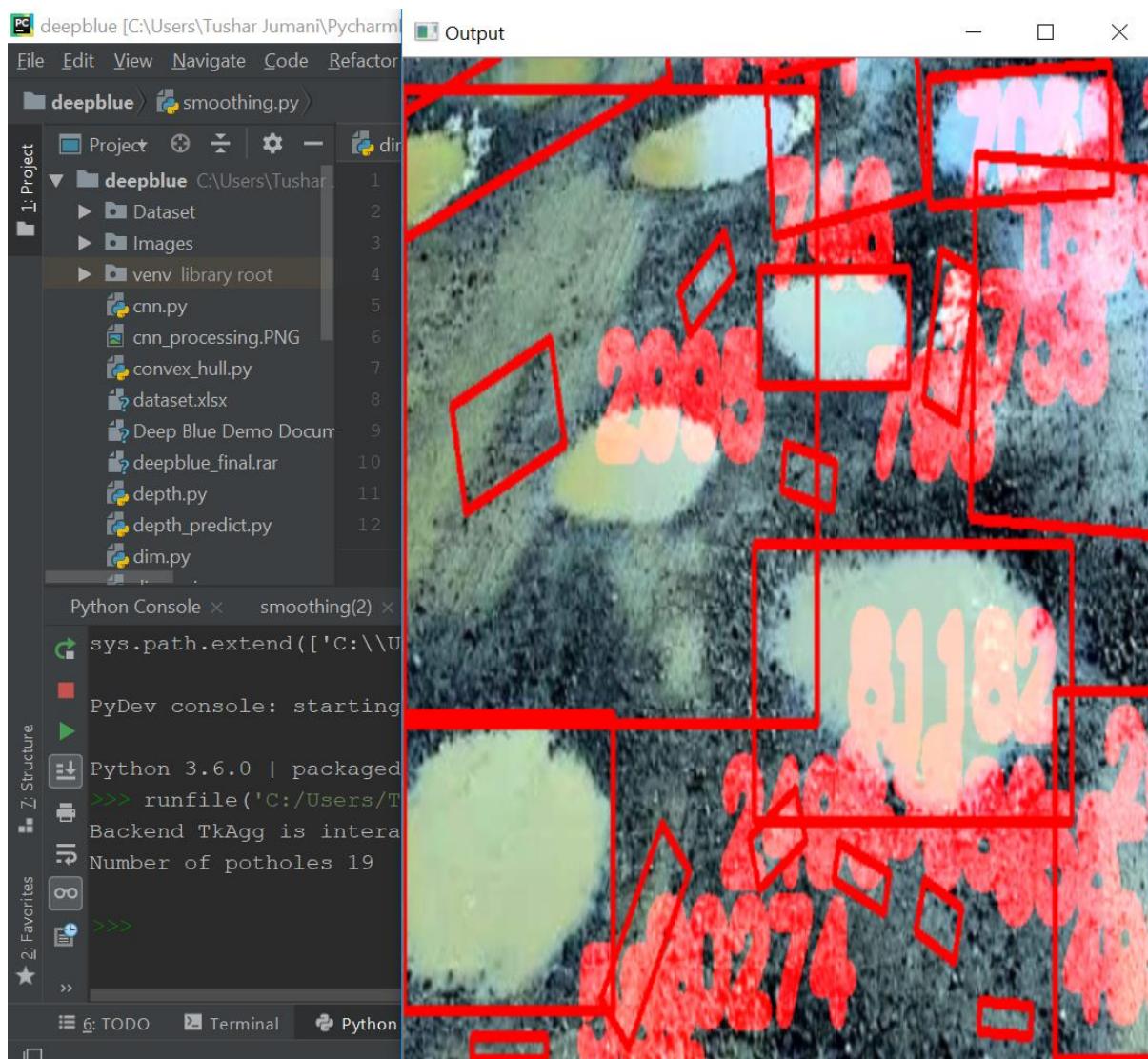
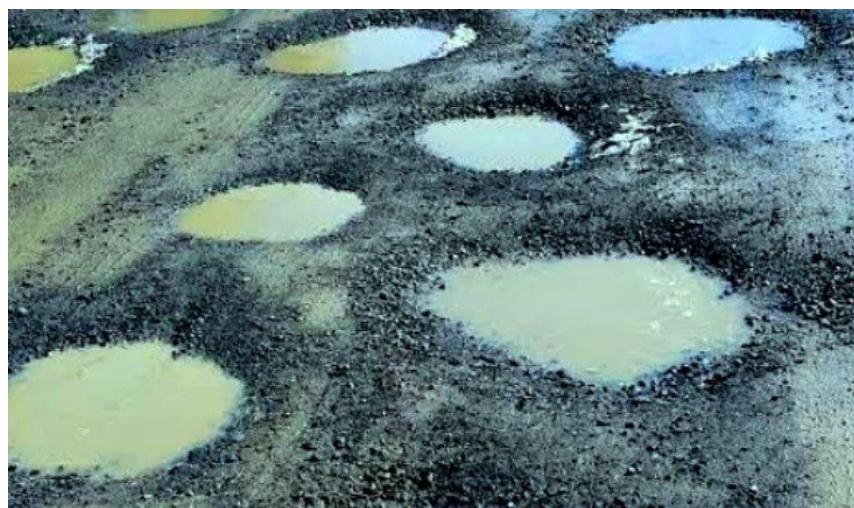
P4



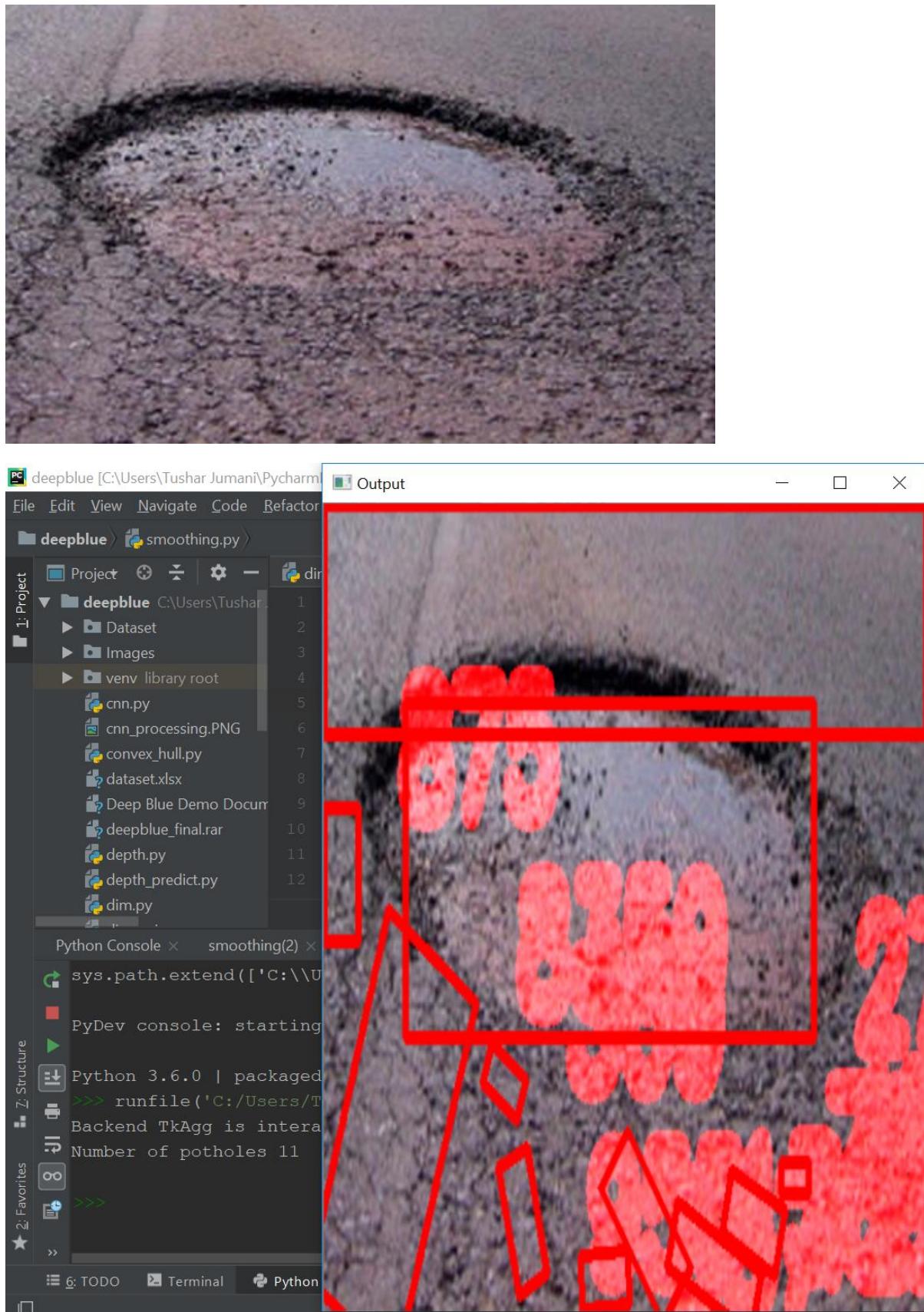
The screenshot displays the PyCharm IDE interface. The left sidebar shows the 'Project' structure under 'deepblue', including a 'Dataset' folder, 'Images' folder, and a 'venv library root' containing several Python files: cnn.py, cnn_processing.PNG, convex_hull.py, dataset.xlsx, Deep Blue Demo Docum, deepblue_final.rar, depth.py, depth_predict.py, and dim.py. The 'Output' tab is active, showing a grayscale image of a road surface with three potholes highlighted in red. The Python Console tab shows the following output:

```
Python Console × smoothing(2) ×
sys.path.extend(['C:\\\\U
PyDev console: starting
Python 3.6.0 | packaged
>>> runfile('C:/Users/T
Backend TkAgg is intera
Number of potholes 3
>>>
>>>
```

P5



P6



P7



deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

1: Project

deepblue C:\Users\Tushar Juman\Pycharm\deepblue

- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Docum...
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

Python Console x smoothing(2) x

```
Python 3.6.0 | packaged by conda-forge | (default, Mar 29 2018, 13:32:45)
[PyDev console: starting]
>>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/smoothing.py', 1)
Backend TkAgg is interactive
Number of potholes 4
```

6: TODO Terminal Python

Output

A screenshot of the PyCharm IDE showing the 'Output' window. The window displays the results of running the 'smoothing.py' script. It shows the Python environment details, the command run, and the output of the script which states 'Number of potholes 4'. Below the output window is a photograph of a paved surface with four potholes highlighted by red rectangular boxes. The entire output window area is also outlined with a thick red border.

P8



PC deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

Output

deepblue > smoothing.py

Project

- 1: Project
- deepblue C:\Users\Tushar Juman\Pycharm\deepblue
- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Document
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

Python Console x smoothing(2) x

```
sys.path.extend(['C:\\Users\\Tushar Juman\\Pycharm\\deepblue'])  
PyDev console: starting  
Python 3.6.0 | packaged by conda  
>>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/smoothing.py', w  
Backend TkAgg is interactive  
Number of potholes 8  
>>>  
>>>
```

Structure

2: Favorites

6: TODO Terminal Python

A screenshot of the PyCharm IDE. The left side shows the project structure with files like cnn.py, dataset.xlsx, and depth_predict.py. The right side shows a photograph of a paved surface with four potholes highlighted by red squares and labeled with red numbers: 7130, 1113, 1201, and 849. The PyCharm interface includes a Project tree, a Python Console, and various toolbars.

P9



deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

- deepblue C:\Users\Tushar Juman\Pycharm\deepblue
- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Document
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

Output

A grayscale image with red outlines highlighting detected potholes. The outlines are thick and irregular, indicating the locations of potholes identified by the algorithm. The background is dark, and the potholes appear as bright, textured areas.

Python Console x smoothing(2) x

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\Pycharm\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages'])  
PyDev console: starting  
Python 3.6.0 | packaged by conda  
>>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/depth_predict.py', wdir='C:/Users/Tushar Juman/Pycharm/deepblue')  
Backend TkAgg is interactive  
Number of potholes 5  
>>>
```

Structure

Favorites

6: TODO Terminal Python

P10



deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

deepblue smoothing.py

Project

1: Project

deepblue C:\Users\Tushar Juman\Pycharm\deepblue

- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Docum
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

smoothing(10) x

```
sys.path.extend(['C:\\\\U\\\\PyCharm2020.1\\lib\\'))  
PyDev console: starting  
Python 3.6.0 | packaged by conda-forge  
>>> runfile('C:/Users/Tushar Juman/PycharmProjects/deepblue/deepblue.py', 1)  
Backend TkAgg is interactive  
Number of potholes 11  
>>>  
>>>
```

Output

The screenshot shows a PyCharm interface with a project named 'deepblue'. The 'Project' tool window on the left displays the directory structure and files, including 'cnn.py', 'depth.py', and 'dim.py'. The 'Output' tool window at the bottom shows the results of running the code, specifically the output of the 'smoothing(10)' function and the detection of 11 potholes. The main window shows a photograph of a pothole filled with gravel and leaves, with several red rectangular boxes overlaid on the image, indicating the locations of detected potholes or features.

P11

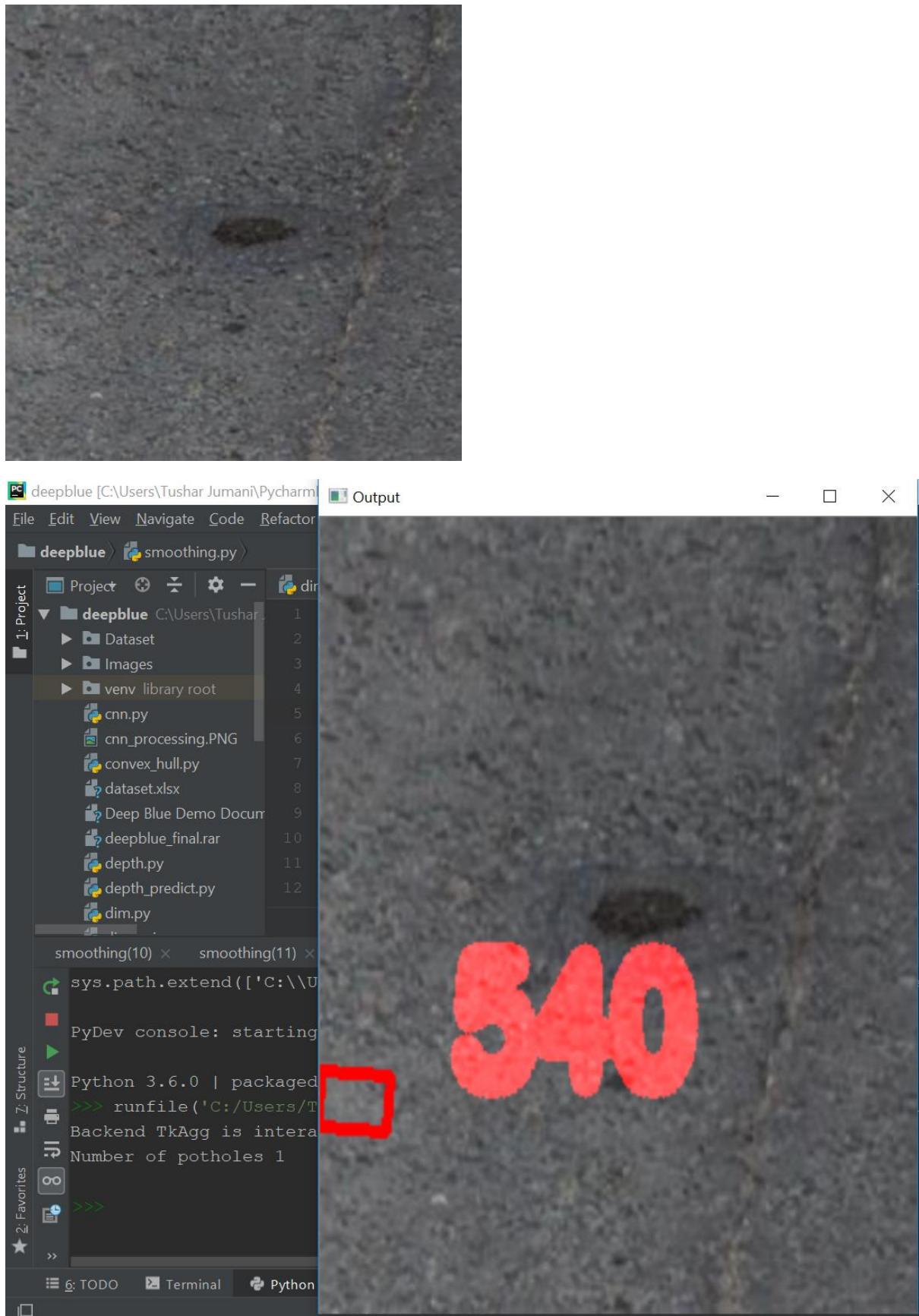


The screenshot shows the PyCharm IDE interface with the following details:

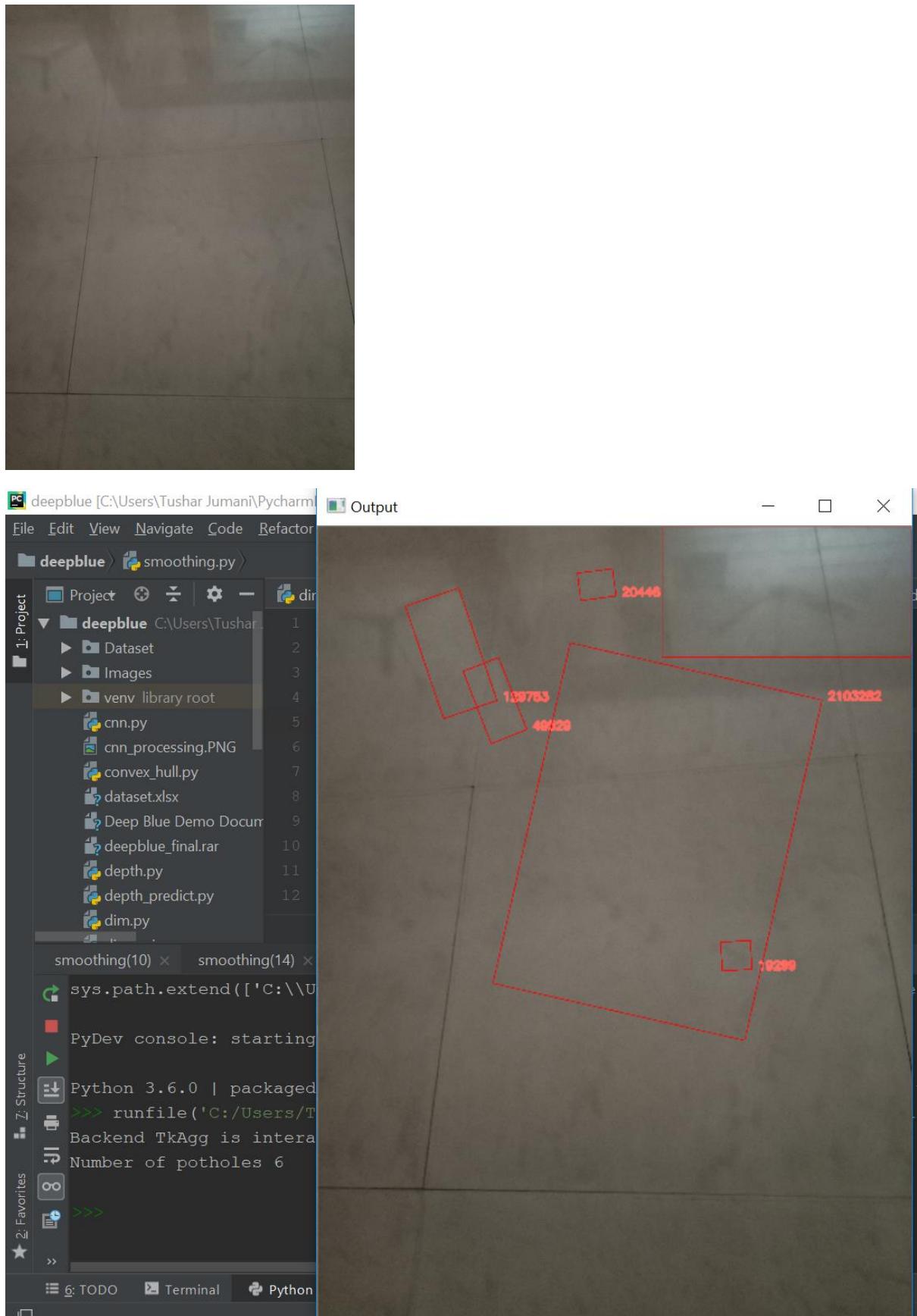
- Project:** deepblue [C:\Users\Tushar Jumani\PycharmProjects\deepblue]
- File Structure:** deepblue (root folder)
 - Dataset
 - Images
 - venv library root
 - cnn.py
 - cnn_processing.PNG
 - convex_hull.py
 - dataset.xlsx
 - Deep Blue Demo Document.pdf
 - deepblue_final.rar
 - depth.py
 - depth_predict.py
 - dim.py
- Output Window:** Shows the results of running the smoothing.py script.

```
smoothing(10) x smoothing(11) x
sys.path.extend(['C:\\\\U\\
PyDev console: starting
Python 3.6.0 | packaged
>>> runfile('C:/Users/T
Backend TkAgg is intera
Number of potholes 10
>>>
>>>
```

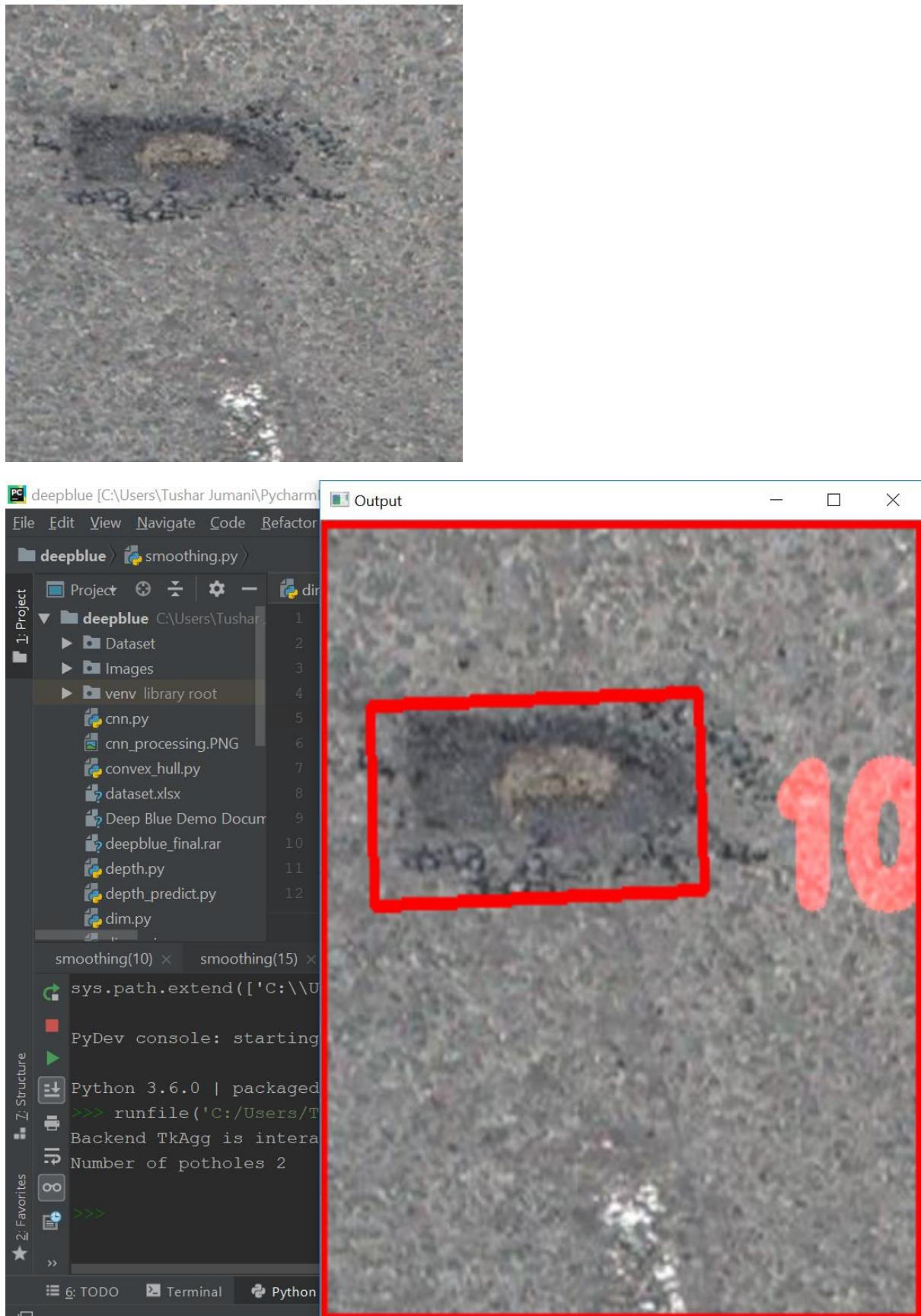
P12



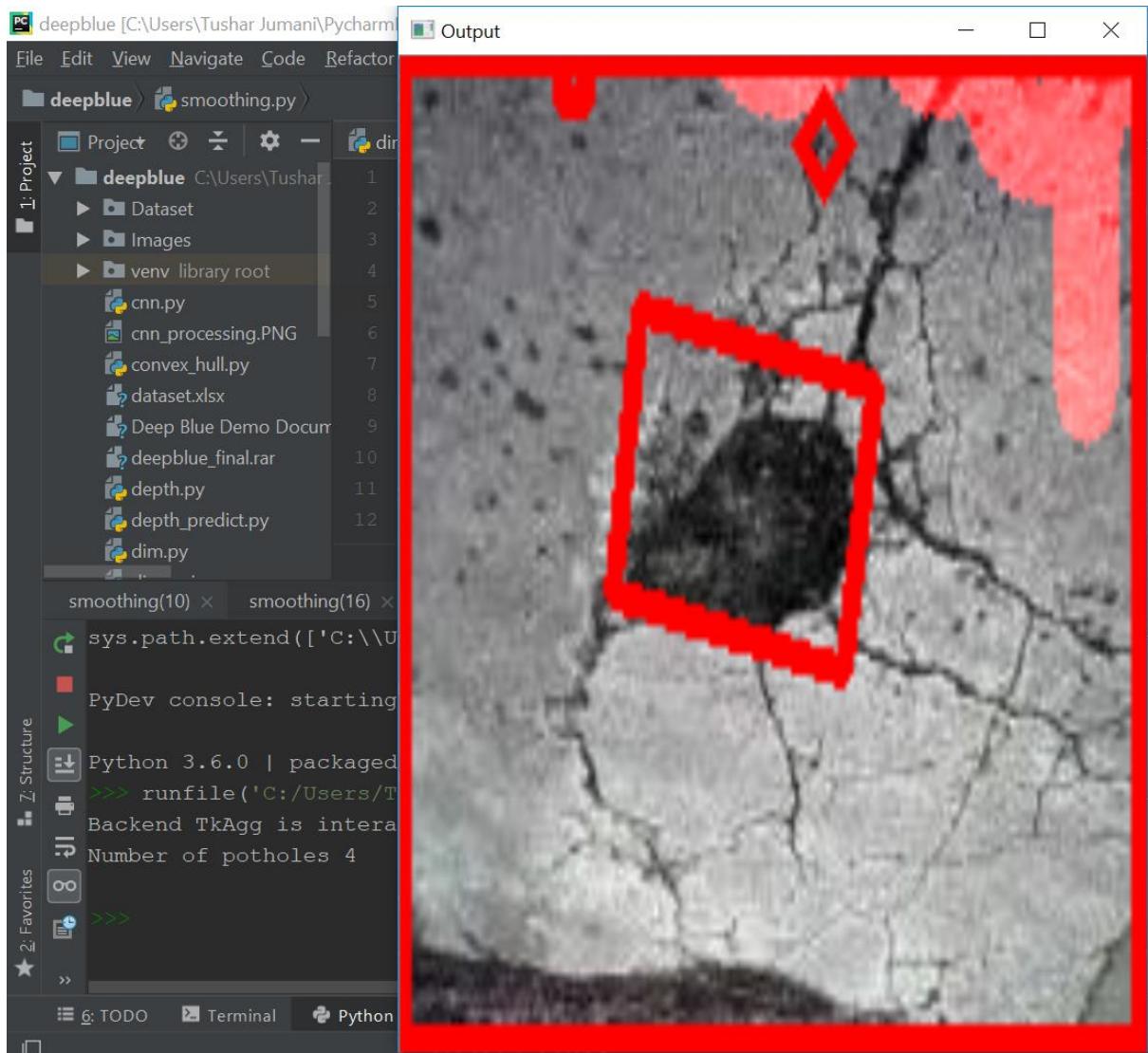
P13



P14



P15



P16



PC deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

- deepblue C:\Users\Tushar Juman\Pycharm\deepblue
- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Document
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

smoothing(10) x smoothing(16) x

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\Pycharm\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\', 'C:\\\\Users\\\\Tushar Juman\\\\Pycharm\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\pandas\\\\_libs\\\\', 'C:\\\\Users\\\\Tushar Juman\\\\Pycharm\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\pandas\\\\_libs\\\\ tslib\\\\', 'C:\\\\Users\\\\Tushar Juman\\\\Pycharm\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\pandas\\\\_libs\\\\libtsb\\\\'])
```

PyDev console: starting

```
>>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/smoothing.py', wdir='C:/Users/Tushar Juman/Pycharm/deepblue')
```

Backend TkAgg is interactive

Number of potholes 3

>>>

6: TODO Terminal Python

A screenshot of the PyCharm IDE interface. The left sidebar shows a project structure with files like cnn.py, dataset.xlsx, and depth.py. The main window shows an image of a paved surface with two red rectangular boxes highlighting potholes. The 'Output' tab at the bottom shows the command-line output of running the smoothing.py script, which detects 3 potholes.

P17



deepblue [C:\Users\Tushar Juman\PycharmProjects]

File Edit View Navigate Code Refactor Run

deepblue smoothing.py

Project

- deepblue C:\Users\Tushar Juman\PycharmProjects\deepblue
- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Document
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

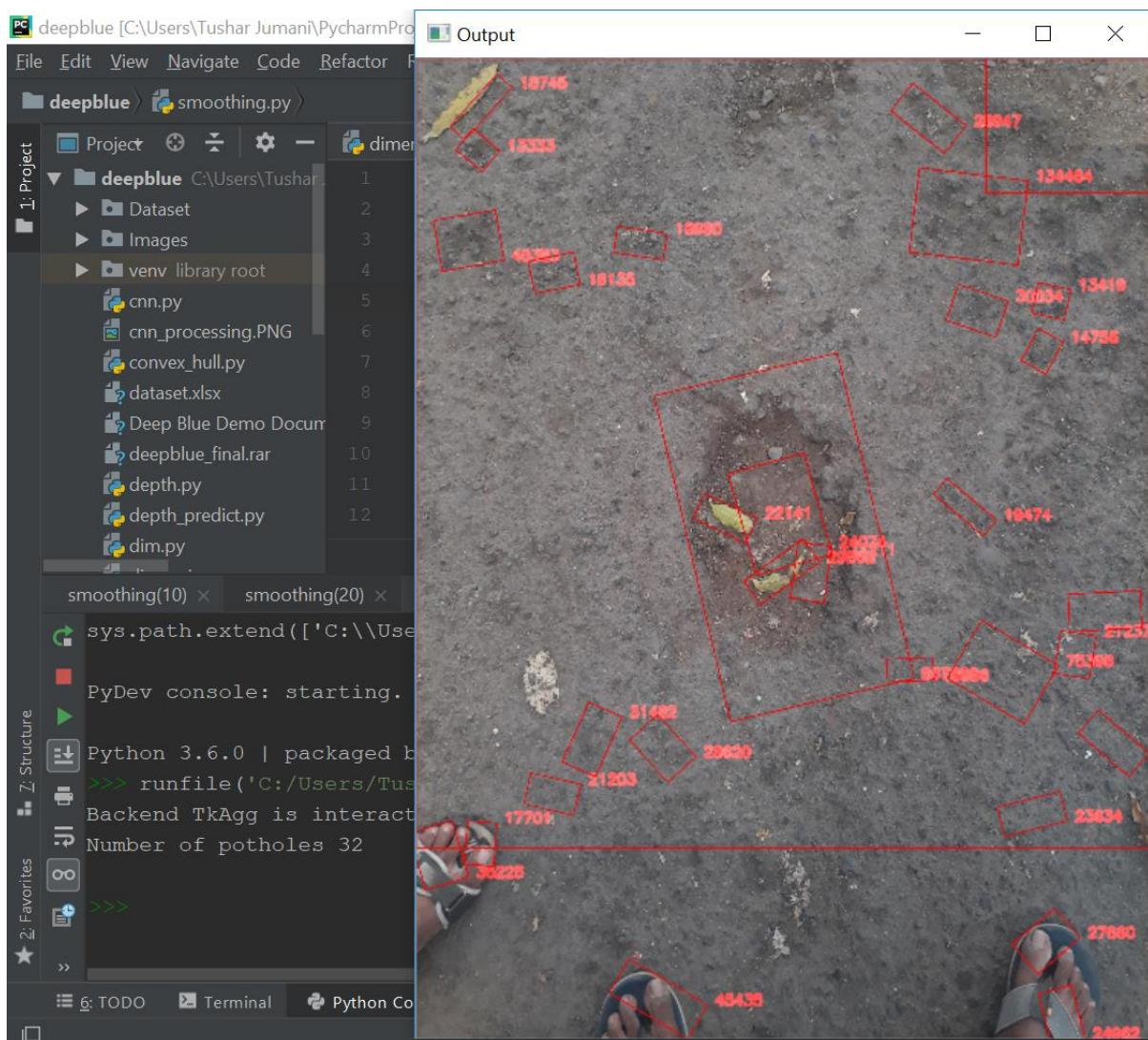
smoothing(10) × smoothing(16) ×

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\PycharmProjects\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages'])  
PyDev console: starting.  
Python 3.6.0 | packaged by conda-forge | (default, Mar 29 2018, 13:32:45)  
>>> runfile('C:/Users/Tushar Juman/PycharmProjects/deepblue/venv/lib/python3.6/site-packages')  
Backend TkAgg is interactive  
Number of potholes 1  
>>>  
>>
```

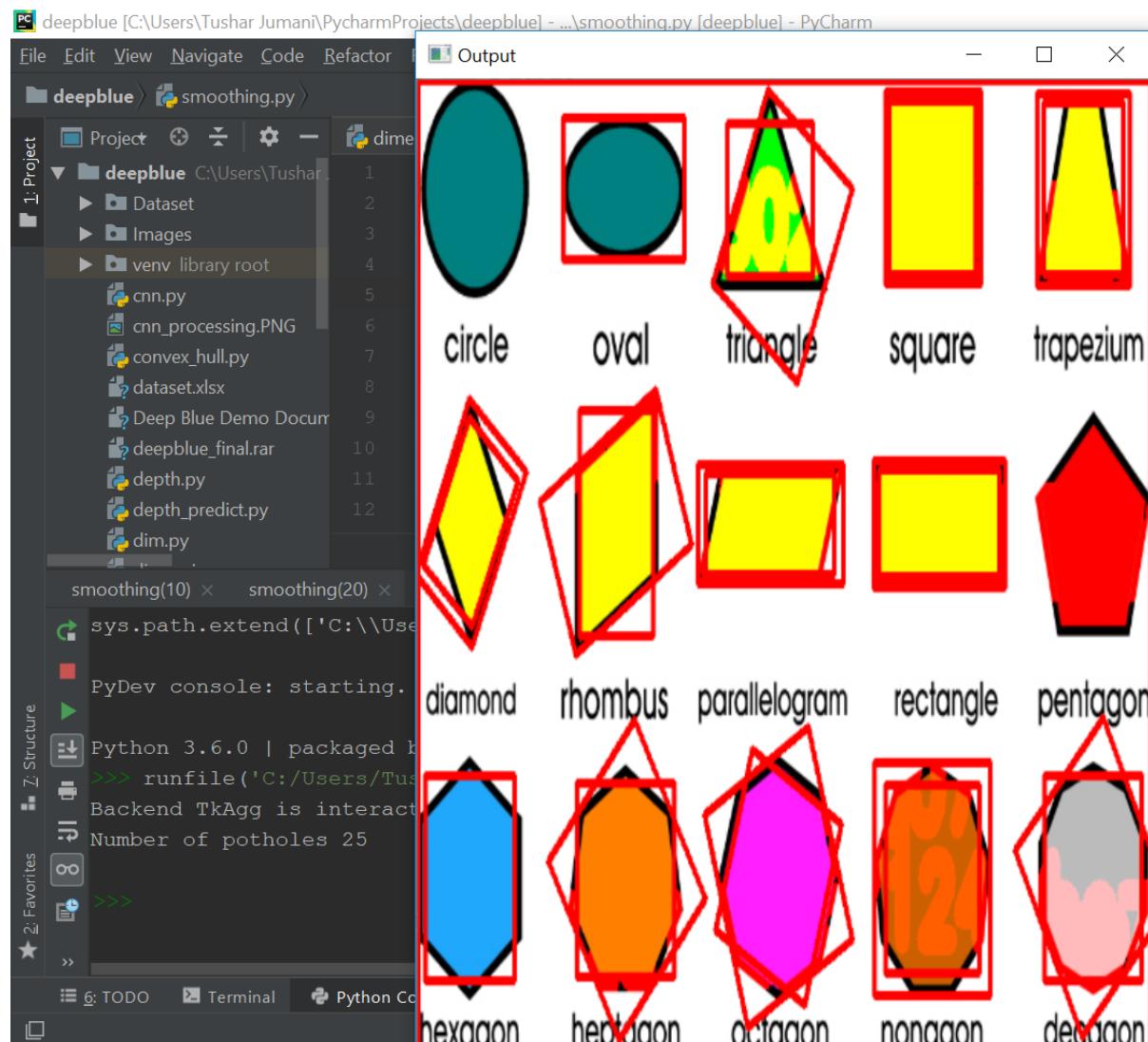
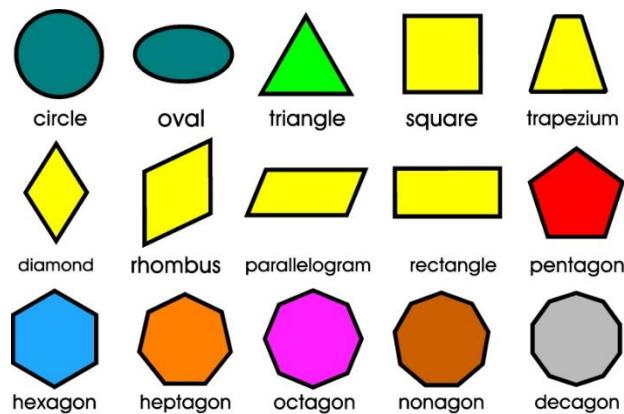
6: TODO Terminal Python Console

This screenshot shows a PyCharm IDE interface. The top navigation bar includes File, Edit, View, Navigate, Code, Refactor, and Run. Below the bar, the project structure is displayed under the 'deepblue' folder, which contains subfolders Dataset, Images, and venv library root, along with several Python files like cnn.py, dataset.xlsx, and depth_predict.py. A status message at the bottom of the project tree indicates 'Number of potholes 1'. The main code editor window shows a script named 'smoothing.py' with two function definitions: 'smoothing(10)' and 'smoothing(16)'. The PyDev console window below the editor shows the Python interpreter environment, starting with 'PyDev console: starting.' and then listing the Python version and site packages. The terminal and Python console tabs are also visible at the bottom of the interface.

P18



P19



P20



deepblue [C:\Users\Tushar Juman\PycharmProjects\deepblue] - ...smoothing.py [deepblue] - PyCharm

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project deepblue C:\Users\Tushar Juman\PycharmProjects\deepblue

- 1: Project
- 2: deepblue
- 3: Dataset
- 4: Images
- 5: venv library root
- 6: cnn.py
- 7: cnn_processing.PNG
- 8: convex_hull.py
- 9: dataset.xlsx
- 10: Deep Blue Demo Document
- 11: deepblue_final.rar
- 12: depth.py
- 13: depth_predict.py
- 14: dim.py
- 15: .

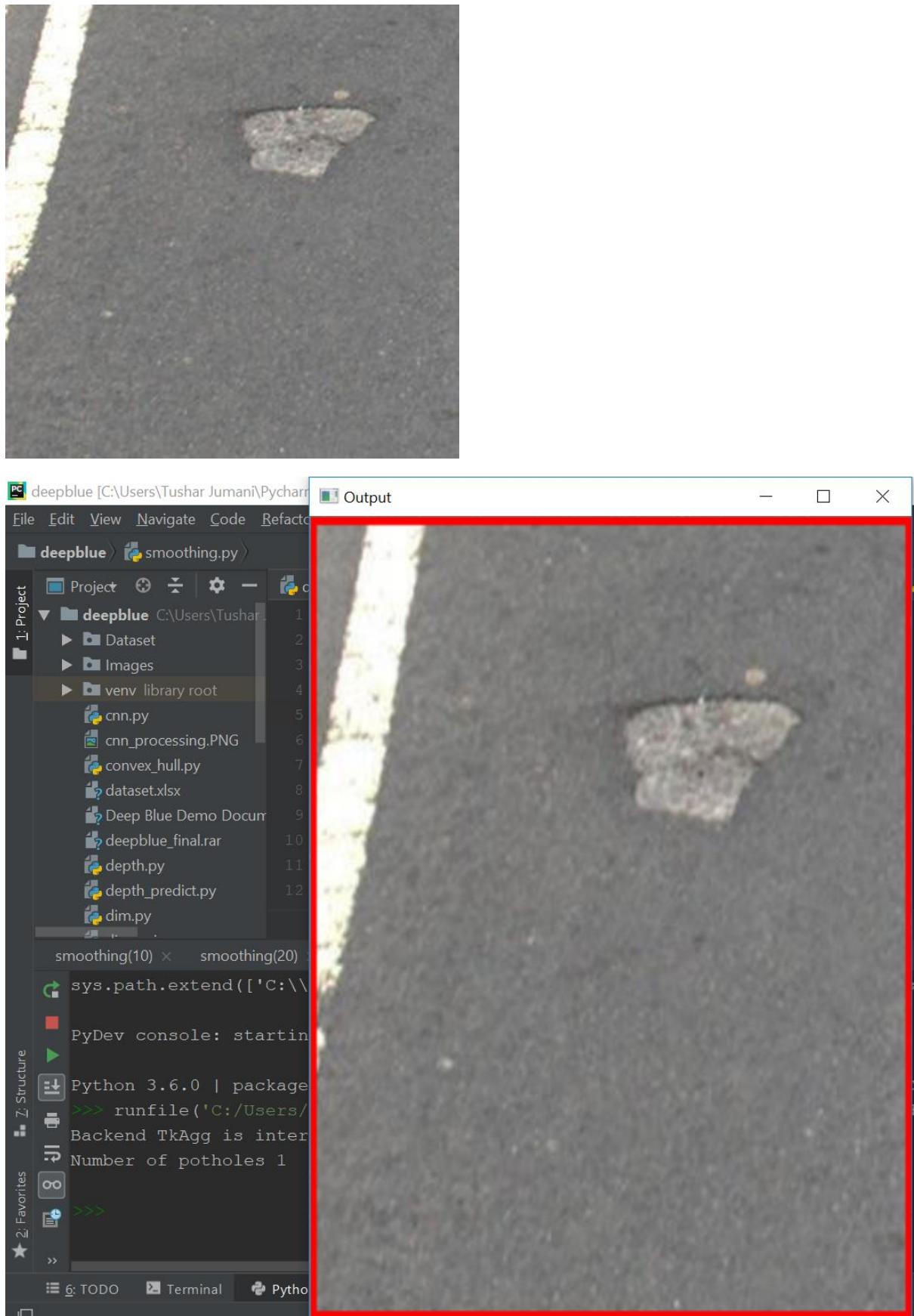
smoothing(10) x smoothing(20) x

```
sys.path.extend(['C:\\Users\\Tushar Juman\\PycharmProjects\\deepblue'])
PyDev console: starting.
Python 3.6.0 | packaged by conda-forge | (default, Mar 29 2018, 13:32:45)
Backend TkAgg is interactive
Number of potholes 3
>>>
```

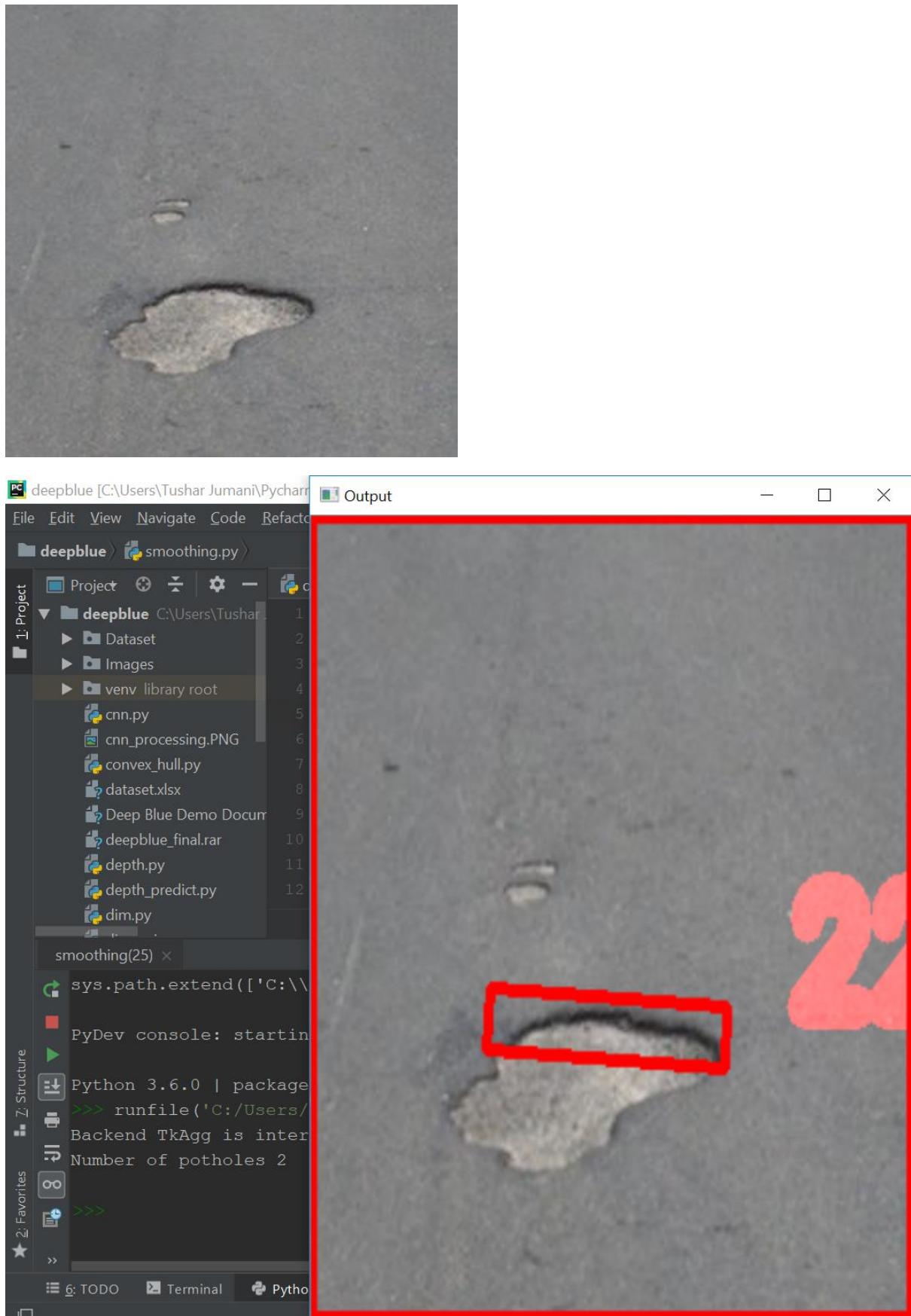
Output

A screenshot of the PyCharm IDE interface. On the left, the project structure shows a folder named 'deepblue' containing various Python files and a 'dataset.xlsx' file. In the center, there is a large image of a road surface with several potholes. Two specific potholes are highlighted with red rectangular boxes. On the right, the 'Output' window displays the results of running a script named 'smoothing.py', which includes code to extend the system path and a message indicating that three potholes were detected.

P21



P22



P23



PC deepblue [C:\Users\Tushar Juman\Pycharm]

File Edit View Navigate Code Refactor Output

deepblue > smoothing.py

Project deepblue C:\Users\Tushar Juman\Pycharm\deepblue
 Dataset
 Images
 venv library root
 cnn.py
 cnn_processing.PNG
 convex_hull.py
 dataset.xlsx
 Deep Blue Demo Docum
 deepblue_final.rar
 depth.py
 depth_predict.py
 dim.py

smoothing(25) x smoothing(26)

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\Pycharm\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\'])  
PyDev console: starting  
Python 3.6.0 | package  
>>> runfile('C:/Users/Tushar Juman/Pycharm/deepblue/venv/lib/python3.6/site-packages/tkinter.pyw', 1)  
Backend TkAgg is inter  
Number of potholes 2  
>>>  
>>>
```

2 Favorites

6: TODO Terminal Python

A screenshot of the PyCharm IDE interface. The left sidebar shows a project structure for 'deepblue' containing 'Dataset', 'Images', and a 'venv library root' folder with various Python files. The 'Output' tab at the bottom shows a terminal window with Python code running, specifically a script to count potholes in images. The output shows 'Number of potholes 2'. Above the terminal, a preview window displays a road image with two potholes highlighted by red rectangles. One pothole is clearly visible in the foreground, and another is partially visible behind it.

P24



deepblue [C:\Users\Tushar Juman\PycharmProjects\deepblue] Output

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project 1: deepblue C:\Users\Tushar Juman\PycharmProjects\deepblue

- Dataset
- Images
- venv library root
 - cnn.py
 - cnn_processing.PNG
 - convex_hull.py
 - dataset.xlsx
 - Deep Blue Demo Docum...
 - deepblue_final.rar
 - depth.py
 - depth_predict.py
 - dim.py

smoothing(25) × smoothing(26)

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\PycharmProjects\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\'])  
PyDev console: starting  
Python 3.6.0 | package  
>>> runfile('C:/Users/Tushar Juman/PycharmProjects/deepblue/venv/lib/python3.6/site-packages/tkinter', 1)  
Backend TkAgg is inter  
Number of potholes 8  
>>>  
>>>
```

Structure

Favorites

6: TODO Terminal Python

A screenshot of the PyCharm IDE interface. On the left, the Project and Structure panes are visible, showing a directory structure for a project named 'deepblue' containing files like 'cnn.py', 'convex_hull.py', and 'depth.py'. The main editor pane on the right displays an image of a road surface with several potholes highlighted by a thick red rectangular box. Below the image, the code for the 'smoothing' function is shown in the 'smoothing.py' file. The code uses the 'cv2' library to process the image and find potholes. A terminal window at the bottom shows the output of running the script, indicating 8 potholes found.

P25



deepblue [C:\Users\Tushar Juman\PycharmProjects\deepblue]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

- deepblue C:\Users\Tushar Juman\PycharmProjects\deepblue
- Dataset
- Images
- venv library root
 - cnn.py
 - cnn_processing.PNG
 - convex_hull.py
 - dataset.xlsx
 - Deep Blue Demo Document.pdf
 - deepblue_final.rar
 - depth.py
 - depth_predict.py
 - dim.py

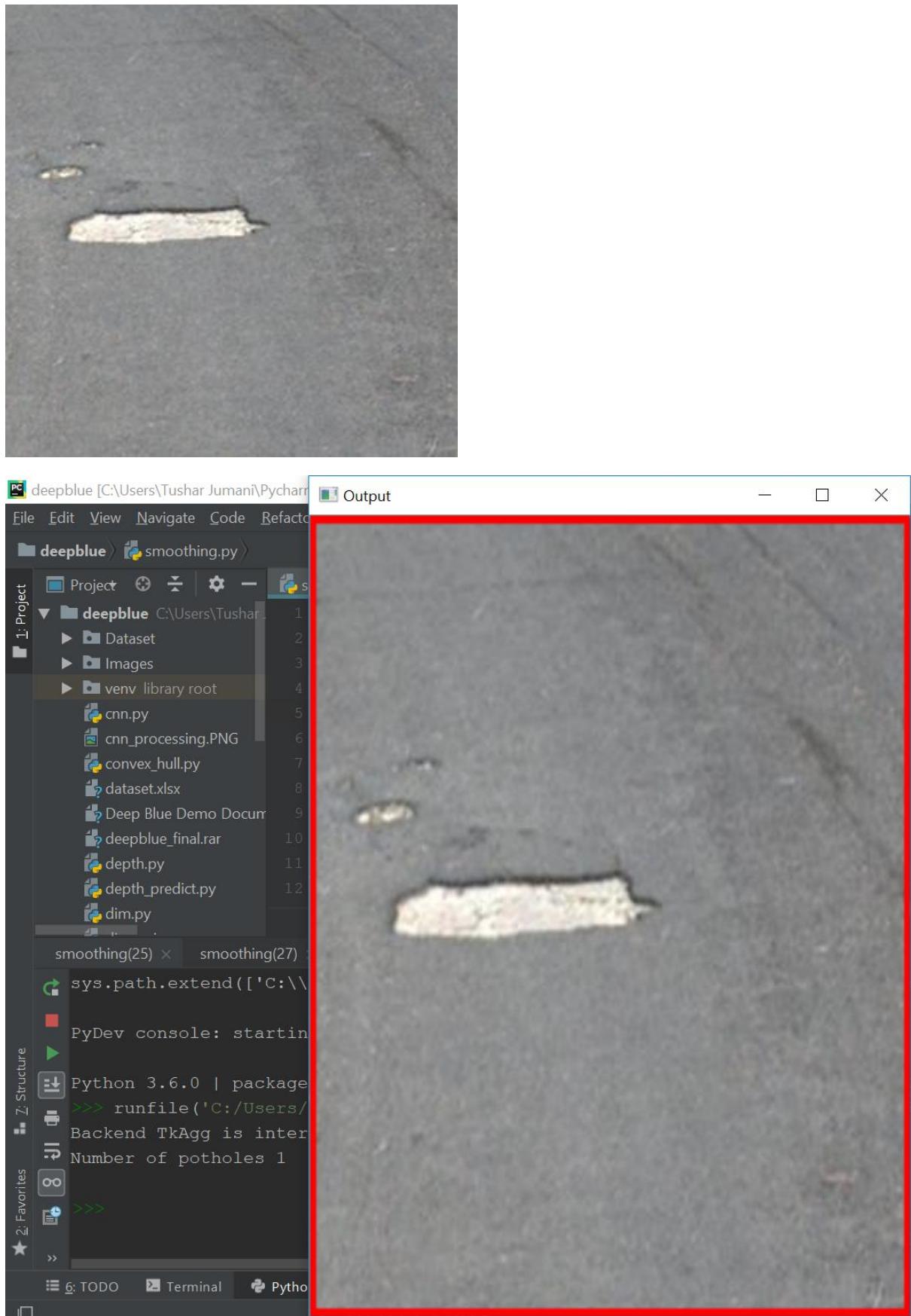
smoothing(25) × smoothing(26)

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\PycharmProjects\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\'])  
PyDev console: starting  
Python 3.6.0 | package  
>>> runfile('C:/Users/Tushar Juman/PycharmProjects/deepblue/venv/lib/python3.6/site-packages/','Backend TkAgg is interactive')  
Number of potholes 3  
>>>  
>>>
```

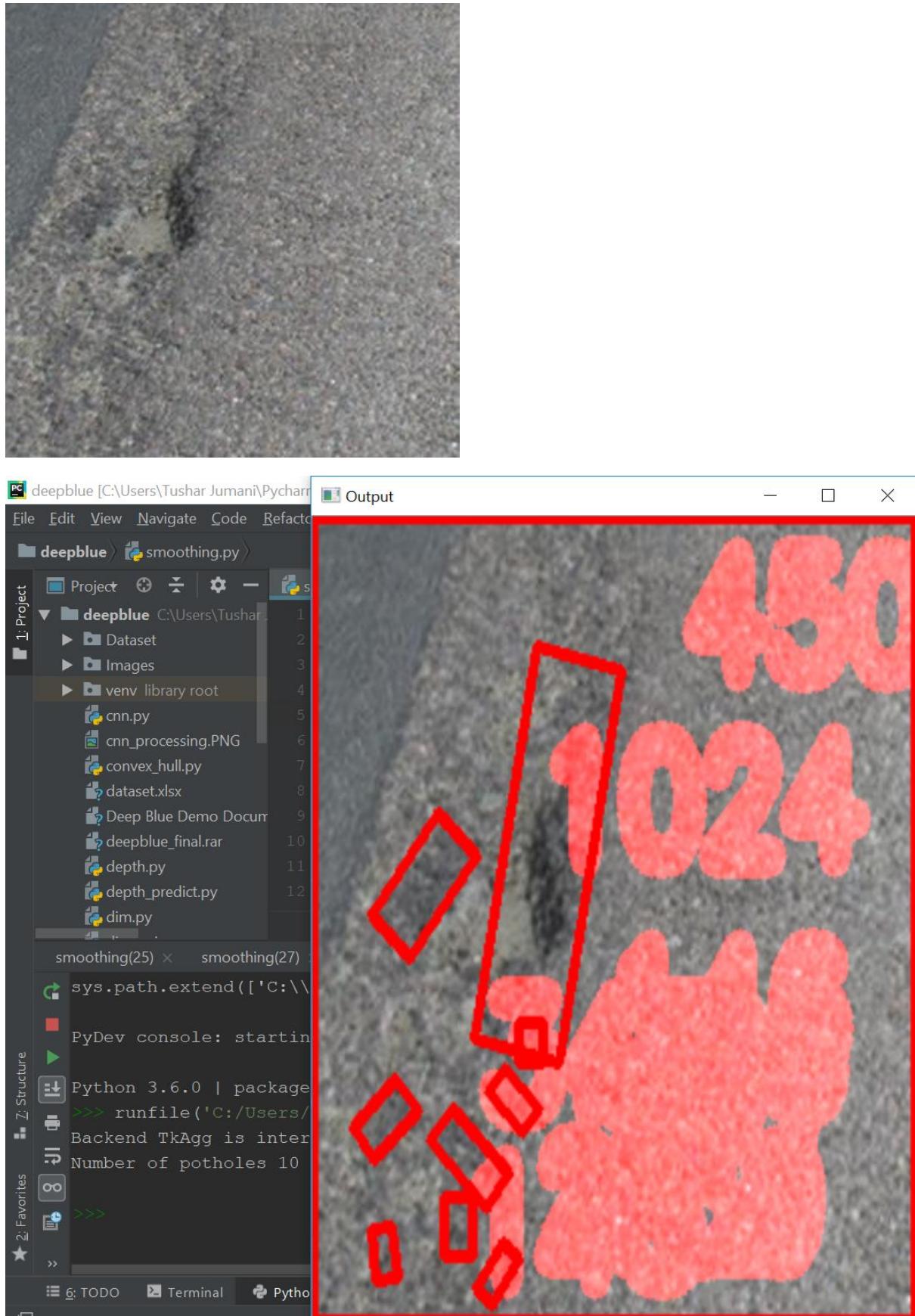
Output

The PyCharm interface shows the project structure on the left and the output window on the right. The output window displays the command-line results of running the 'smoothing' script. The final line of output is 'Number of potholes 3', which is highlighted with a large red rectangular box. The background of the output window is also highlighted with a red rectangle.

P26



P27



P28



PC deepblue [C:\Users\Tushar Juman\PycharmProjects\deepblue]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

- deepblue C:\Users\Tushar Juman\PycharmProjects\deepblue
- Dataset
- Images
- venv library root
- cnn.py
- cnn_processing.PNG
- convex_hull.py
- dataset.xlsx
- Deep Blue Demo Docum...
- deepblue_final.rar
- depth.py
- depth_predict.py
- dim.py

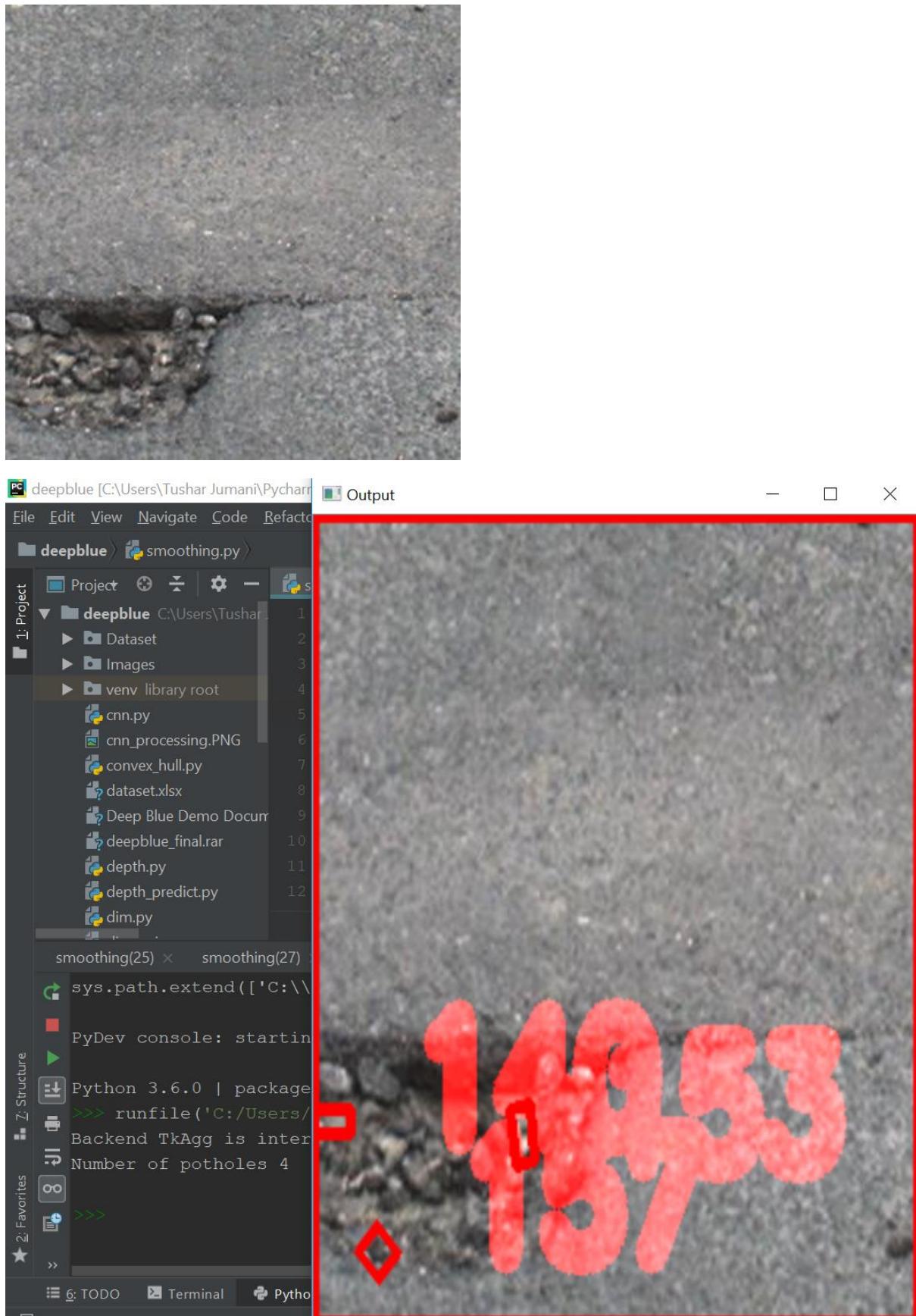
smoothing(25) × smoothing(27)

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\PycharmProjects\\\\deepblue\\\\'])  
PyDev console: starting  
Python 3.6.0 | package  
>>> runfile('C:/Users/Tushar Juman/PycharmProjects/deepblue/deepblue.py', 1)  
Backend TkAgg is inter  
Number of potholes 10  
>>>
```

Output

The screenshot shows the PyCharm IDE interface. On the left, the Project panel displays a file structure for a 'deepblue' project containing files like 'cnn.py', 'dataset.xlsx', and 'dim.py'. The 'smoothing.py' file is currently selected. The main window shows a grayscale image of a road surface with several potholes. Red rectangular boxes highlight specific features: one large red box covers the area around a prominent pothole in the upper right, and another large red box covers a cluster of potholes in the lower right. A smaller red box highlights a single pothole in the lower center. The PyCharm interface includes toolbars, status bars, and a terminal window at the bottom.

P29



P30



PC deepblue [C:\Users\Tushar Juman\PycharmProjects\deepblue]

File Edit View Navigate Code Refactor

deepblue > smoothing.py

Project

1: Project

deepblue C:\Users\Tushar Juman\PycharmProjects\deepblue

- Dataset
- Images
- venv library root
 - cnn.py
 - cnn_processing.PNG
 - convex_hull.py
 - dataset.xlsx
 - Deep Blue Demo Document
 - deepblue_final.rar
 - depth.py
 - depth_predict.py
 - dim.py

smoothing(31) x

```
sys.path.extend(['C:\\\\Users\\\\Tushar Juman\\\\PycharmProjects\\\\deepblue\\\\venv\\\\lib\\\\python3.6\\\\site-packages\\\\'])
```

PyDev console: starting

Python 3.6.0 | package

>>> runfile('C:/Users/Tushar Juman/PycharmProjects/deepblue/depth_predict.py', wdir='C:/Users/Tushar Juman/PycharmProjects/deepblue')

Backend TkAgg is interactive

Number of potholes 13

>>>

6: TODO Terminal Python

Output

A screenshot of the PyCharm IDE interface. On the left, the project structure shows a folder named 'deepblue' containing various files like 'cnn.py', 'dataset.xlsx', and 'depth_predict.py'. The 'smoothing(31)' file is currently selected. The 'Output' tab on the right displays a processed image of a road surface. The image is overlaid with numerous red rectangular boxes, each containing a red numerical label such as '221', '11047', '1818', '284', '1144', and '28107'. These labels likely represent the coordinates or indices of detected potholes. The overall interface includes standard PyCharm toolbars and status bars at the bottom.