



GTA V Self Driving Car



# What You Need

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STEP 1 OF 5

# What You Need

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1. A PC (preferably with a modern CPU and graphics card)
2. A copy of GTA V. Preferably you've completed the storyline already so you can freely drive Los Santos without distractions. **NOTE: Play GTA V is single-player story mode ONLY.** Do NOT collect data while driving in multiplayer.
3. Anaconda – a Python environment for Jupyter notebooks <https://www.anaconda.com/>
4. [Optional] OpenIV – a GTA V modding tool (for turning off cops or random encounters)
5. WinExplorer – a free tool for resizing windows frames <https://www.nirsoft.net/utils/winexp.html>
6. The YOLO trained model from Kaggle. It's the last link to download, the file is 237MB. Please **DO NOT DOWNLOAD THE 117GB RAW UNTRAINED MODEL.**  
Link: <https://www.kaggle.com/lavanyashukla01/yolov3-lyft-dataset/?select=model.h5>



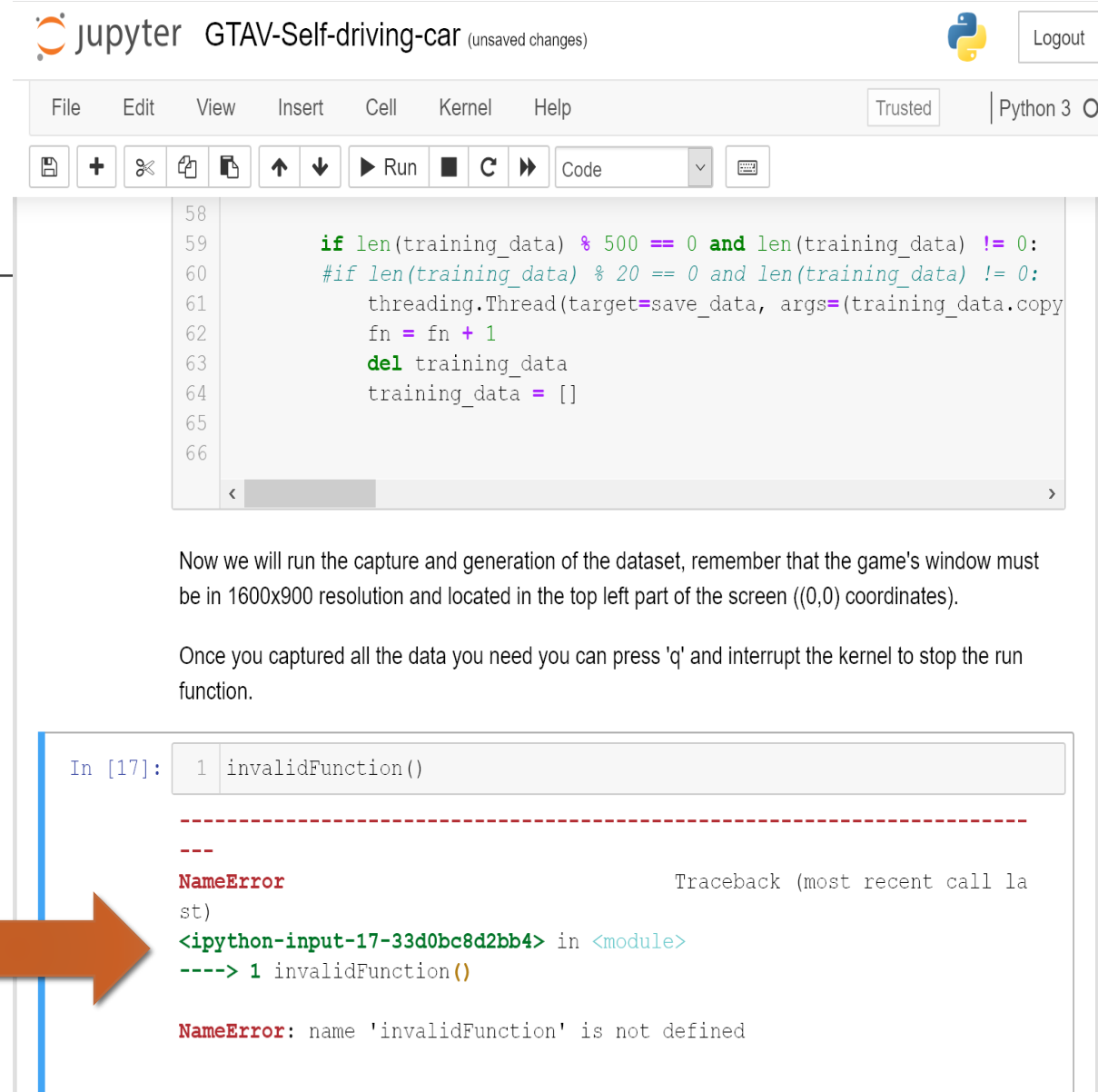
# Code & Anaconda

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STEP 2 OF 5

# Getting The Code

1. Download repo from github  
[https://github.com/asmalex/GTA\\_V\\_SelfDriving\\_Car](https://github.com/asmalex/GTA_V_SelfDriving_Car)
2. Start Anaconda and spawn Jupyter notebooks.
3. Make sure you have Python v3.8 installed. If you don't you can install it via your Anaconda environment.
4. Navigate to the repo and open GTAV-Self-driving-car
5. Run cells 1-17. Check the output for errors. There maybe warnings, but there shouldn't be any errors. Errors appear in red like on the right



The screenshot shows a Jupyter Notebook window titled "GTAV-Self-driving-car (unsaved changes)". The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Help), a toolbar with icons for file operations and execution, and a code editor. The code editor contains Python code with line numbers 58 to 66. Below the code editor, there is a text area with instructions: "Now we will run the capture and generation of the dataset, remember that the game's window must be in 1600x900 resolution and located in the top left part of the screen ((0,0) coordinates). Once you captured all the data you need you can press 'q' and interrupt the kernel to stop the run function." Below this, a code cell shows the input "1 invalidFunction()" and the resulting error output: "NameError: name 'invalidFunction' is not defined". A large orange arrow points from the text in step 5 of the list to the error message in the screenshot.

```
58
59     if len(training_data) % 500 == 0 and len(training_data) != 0:
60         #if len(training_data) % 20 == 0 and len(training_data) != 0:
61             threading.Thread(target=save_data, args=(training_data.copy
62                 fn = fn + 1
63                 del training_data
64                 training_data = []
65
66
```

Now we will run the capture and generation of the dataset, remember that the game's window must be in 1600x900 resolution and located in the top left part of the screen ((0,0) coordinates).

Once you captured all the data you need you can press 'q' and interrupt the kernel to stop the run function.

```
In [17]: 1 invalidFunction()

-----
NameError                                Traceback (most recent call la
st)
<ipython-input-17-33d0bc8d2bb4> in <module>
----> 1 invalidFunction()

NameError: name 'invalidFunction' is not defined
```



# GTA V

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STEP 3 OF 5

# GTA V Settings

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<b>5:4</b> Computer Displays	<b>4:3</b> SDTV / Video Computer Displays	<b>3:2</b> 35mm Film DSLR Cameras Smartphones	<b>16:10</b> Widescreen Computer Displays Smartphones
<b>16:9</b> HDTV Widescreen SDTV Smartphones	<b>1.85:1</b> Cinema Film (US)	<b>2.35:1</b> Cinemascope	

1. Change the **resolution to 1280x1024**. The in-game aspect ratio should be 5:4
2. You must run at this resolution, otherwise there will be Windows scaling issues
3. You should be in **Window** mode, not fullscreen
4. Use the next slide to **enter director mode**
5. Find a car with good visibility.
6. Run all code above cell 18. Wait for it to finish
7. Run cell 18, wait 5 seconds and start driving.
8. When you are done (more than 500 buffers), Press 'j' to stop recording

# GTA V Director Mode Details

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Disable HUD, radar, and notifications (screen should be empty except game)

2) Set up auto centering of camera while in vehicle (this will activate once you start driving)

3) Enter Director Mode from the Interaction Menu by pressing M

4) Change Settings

- a) Set time of day to morning.
- b) Set Weather to clear
- c) Set Wanted status to Disabled
- d) Set pedestrian and vehicle density to High

e) Turn Invincibility on

f) Turn everything else in the Settings tab off

5) Make sure your actor is a main character so that you can enter first person mode

6) Change your location to Golf Club and go around the building to pick up a golf caddy

7) Driving tips

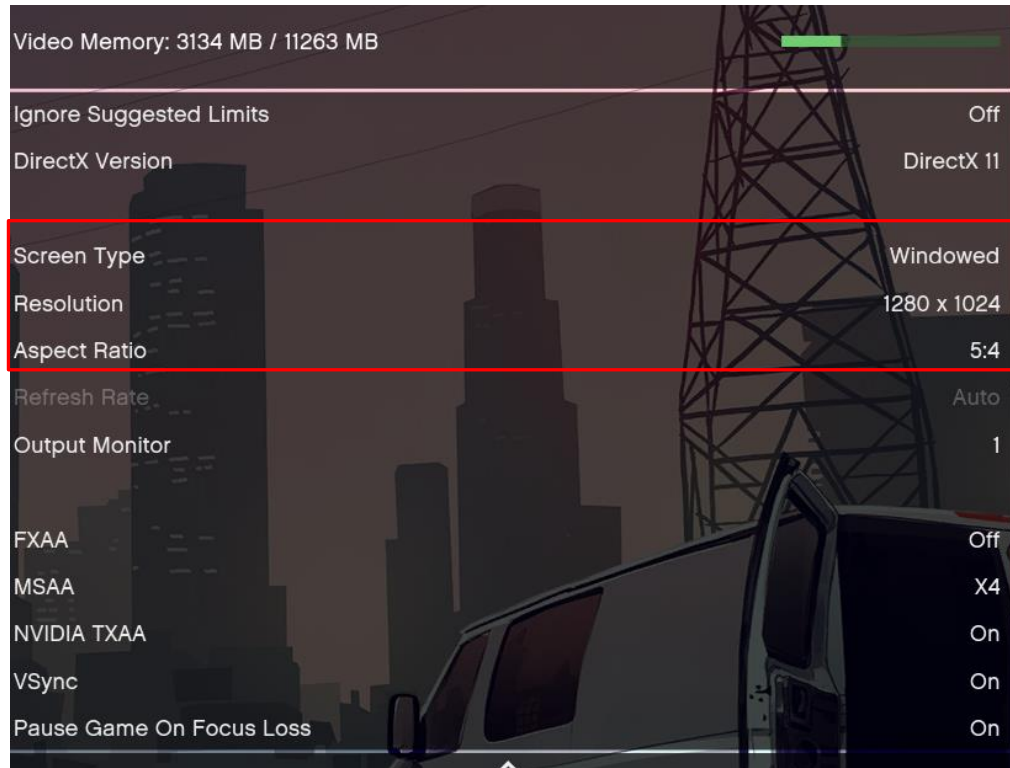
- a) Record only once you enter the main road
- b) Try to stay on the road and avoid crashing into cars or people
- c) Go as fast as you can manage without crashing
- d) Stay on the main roads. Only go places where a pedestrian would drive



# GTA V Settings Details

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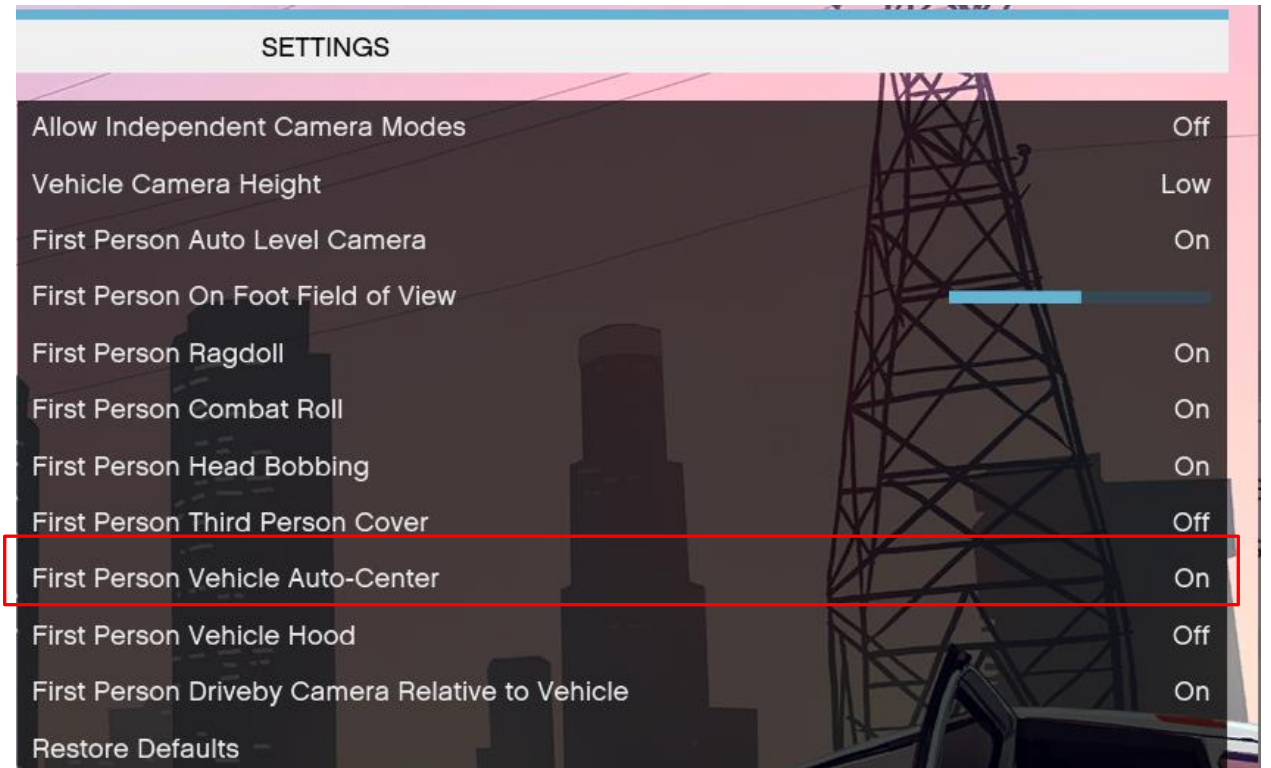
## Resolution / Window Settings



Video Memory: 3134 MB / 11263 MB

Ignore Suggested Limits	Off
DirectX Version	DirectX 11
Screen Type	Windowed
Resolution	1280 x 1024
Aspect Ratio	5:4
Refresh Rate	Auto
Output Monitor	1
FXAA	Off
MSAA	X4
NVIDIA TXAA	On
VSync	On
Pause Game On Focus Loss	On

## First Person Settings



SETTINGS

Allow Independent Camera Modes	Off
Vehicle Camera Height	Low
First Person Auto Level Camera	On
First Person On Foot Field of View	
First Person Ragdoll	On
First Person Combat Roll	On
First Person Head Bobbing	On
First Person Third Person Cover	Off
First Person Vehicle Auto-Center	On
First Person Vehicle Hood	Off
First Person Driveby Camera Relative to Vehicle	On
Restore Defaults	

# GTA V Cars

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Blista



“Coil”

Golf Cart (cheat Code HOLEIN1)



Cheat Code Sites:

<https://www.vg247.com/2019/12/20/gta-5-cheats-ps4-xbox-pc-cheat-codes/>

<https://www.eurogamer.net/articles/2019-05-15-gta-5-cheats-cheat-codes-ps4-ps3-xbox-one-xbox-360-pc-5115#section-2>

# GTA Terrain



Please keep your driving within the inner-city.

# GTA V Tips

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You must use “W-A-S-D”  
to drive.

Don't use space for the  
parking brake, use W.  
Keep the camera  
looking forward. No  
joysticks or controllers.

Press 'j' to  
end  
recording

Press V to enter first  
person view

Watch out!  
Pressing 'DD' in  
Jupyter will  
delete a cell!



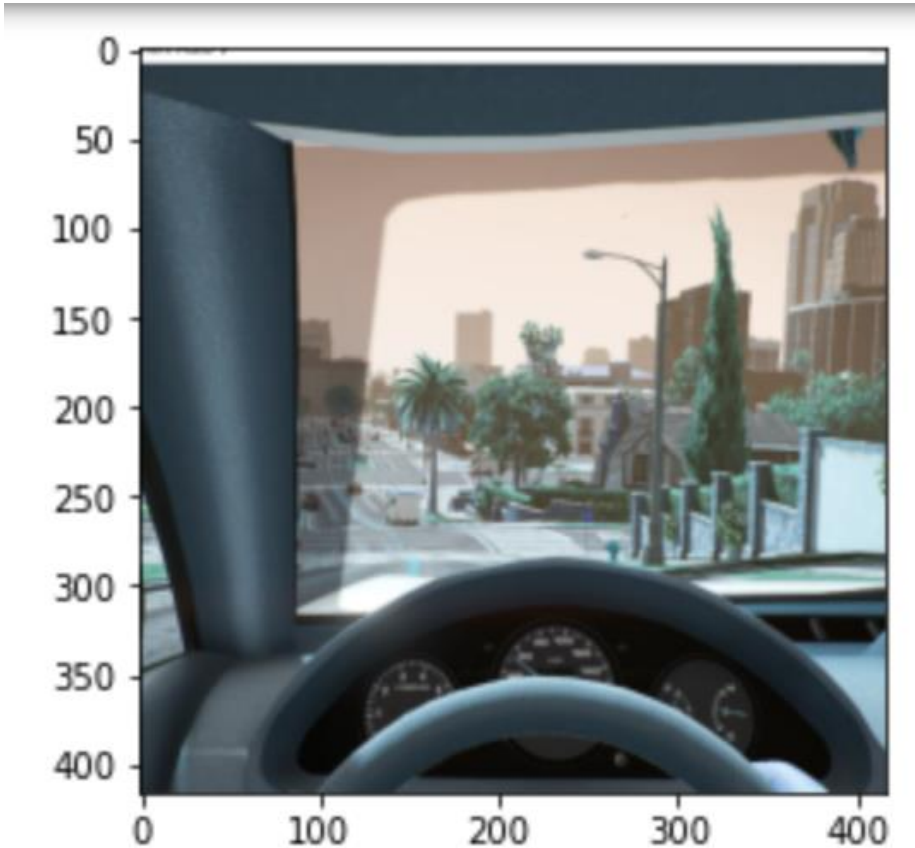
# Testing

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STEP 4 OF 5

# GTA V Settings

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1. Run line 19
  1. Look at the images being captured. Are you in the car driving? If yes, then great!
  2. Change line 7 (load file) from 'Data\\training\_data0.npz' to ...\_data1.npz, then ...\_data2.npz
2. Check the images are clean for all samples. The camera view should be looking straight.



# Submit

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STEP 5 OF 5

# Submit .npz

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1. Name file to LastName\_(CarType)\_TrainingData\_(Safe/Normal/Bad)\_xx\_.npz, where xx corresponds with the data in series, and (Safe/Normal/Bad) corresponds to whether you drove slow and safe, normally (like in real life) or really bad. And (Cartype) corresponds to the car you drove (like golf cart or 'coil' or 'mustang' or... You'll find this in the \Data folder.
2. [Optional] Name your shadowplay or OBS capture file LastName\_CPS498\_S21\_zzz, where zzz is the name of the car you drove in GTA V.
3. Upload your submission to blackboard as a single zip file.
4. This extra credit is worth 3% of your final grade