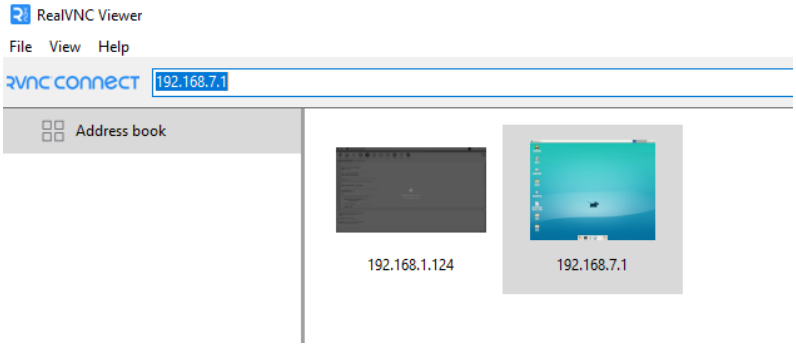
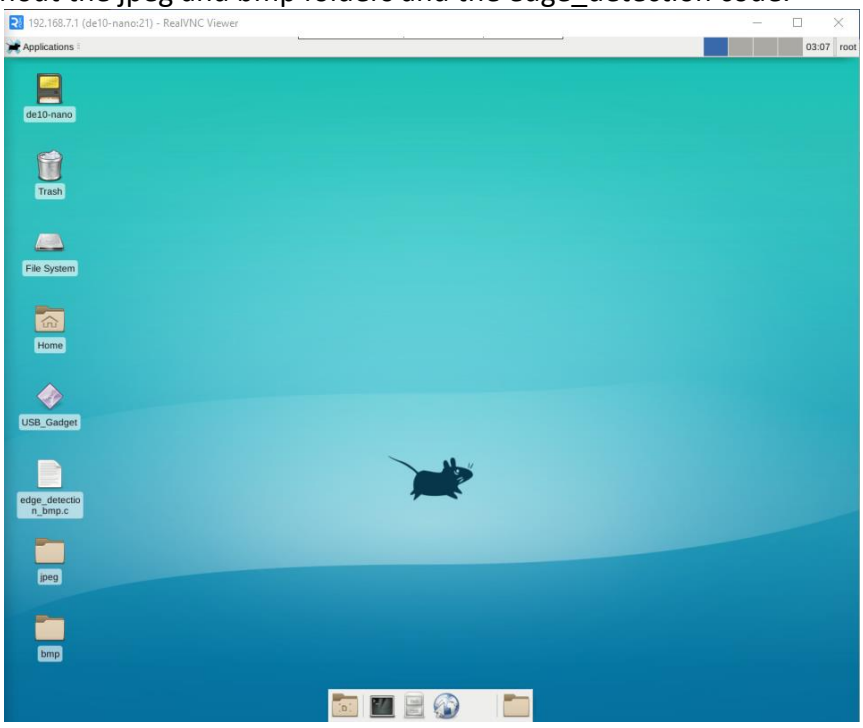
Edge Detection on the FPGA using SSH and VNC

Secure Socket Shell (SSH)
Virtual Network Computing (VNC)

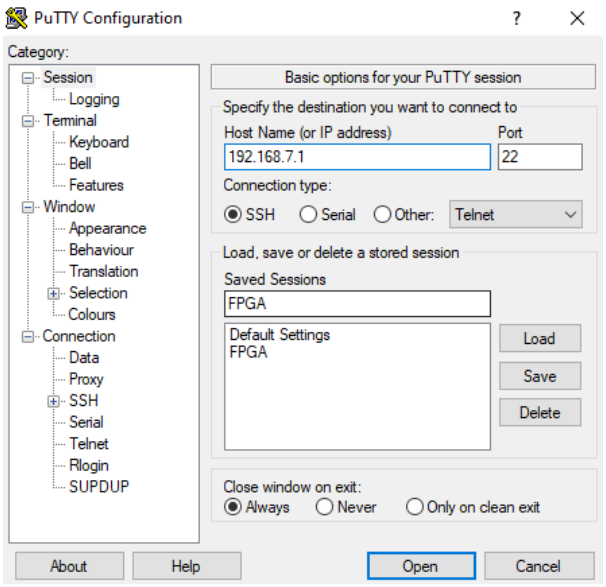
1. Download Real VNC, if you are using VNC Viewer, this is the outdated version of Real VNC.
2. Download PuTTY using this link
3. Open Real VNC and enter the IP address of **192.168.7.1**



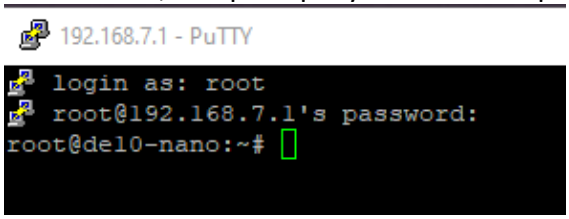
4. This is the Linux environment of the FPGA. Your desktop should be similar to this, just without the jpeg and bmp folders and the edge_detection code.



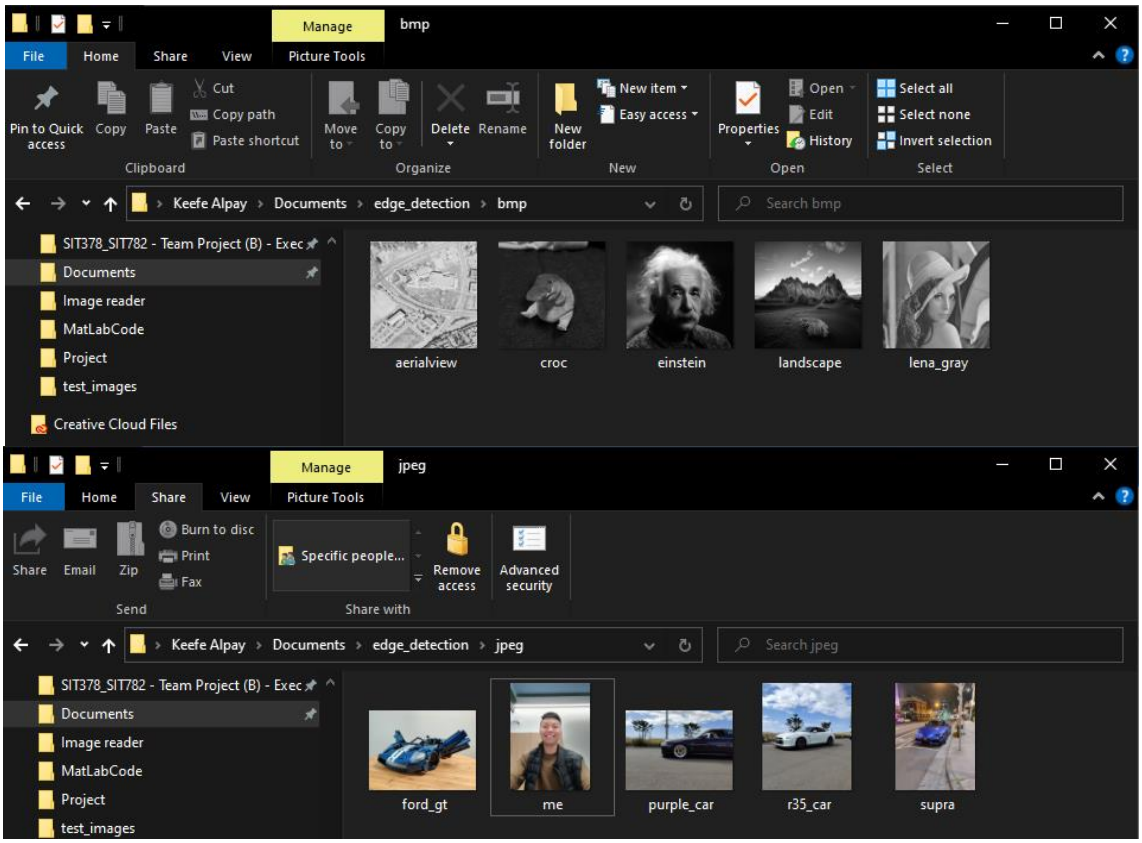
5. Launch Putty and under Session on the left hand side, the Host Name should be 192.168.7.1, click on **Save** and click **Open**. **OR** you can use the Terminal on the FPGA after you VNC into the device, both work fine.



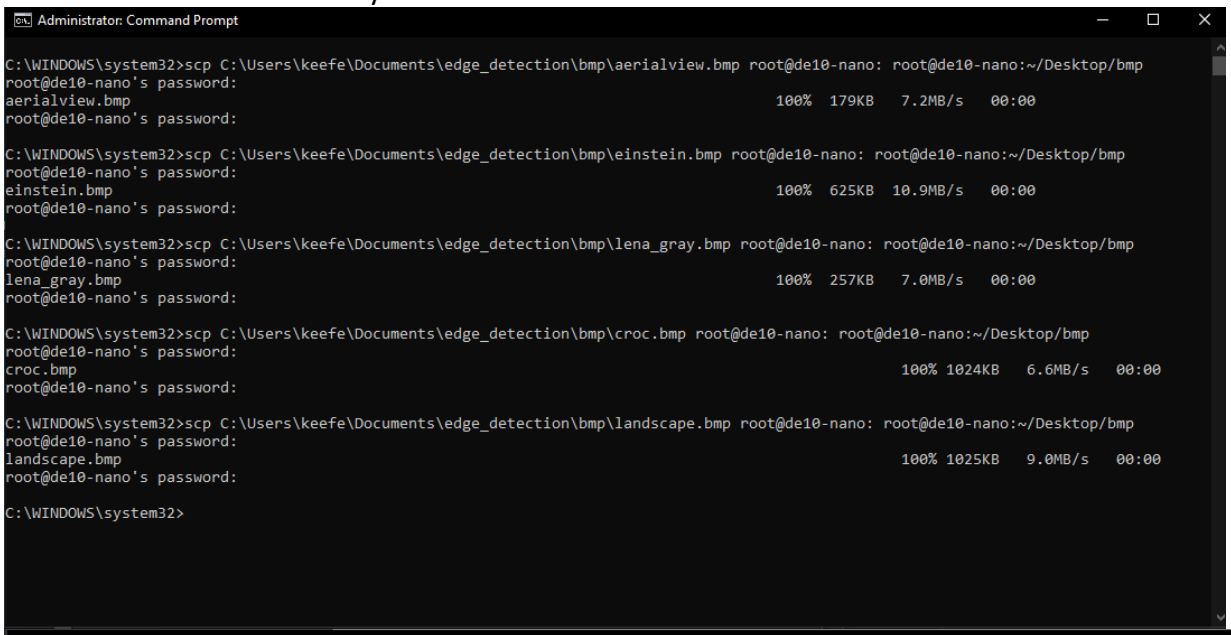
6. Login with the username **root**, and your password. If you do not have a password enter **passwd** to the terminal, this prompts you to enter a password.

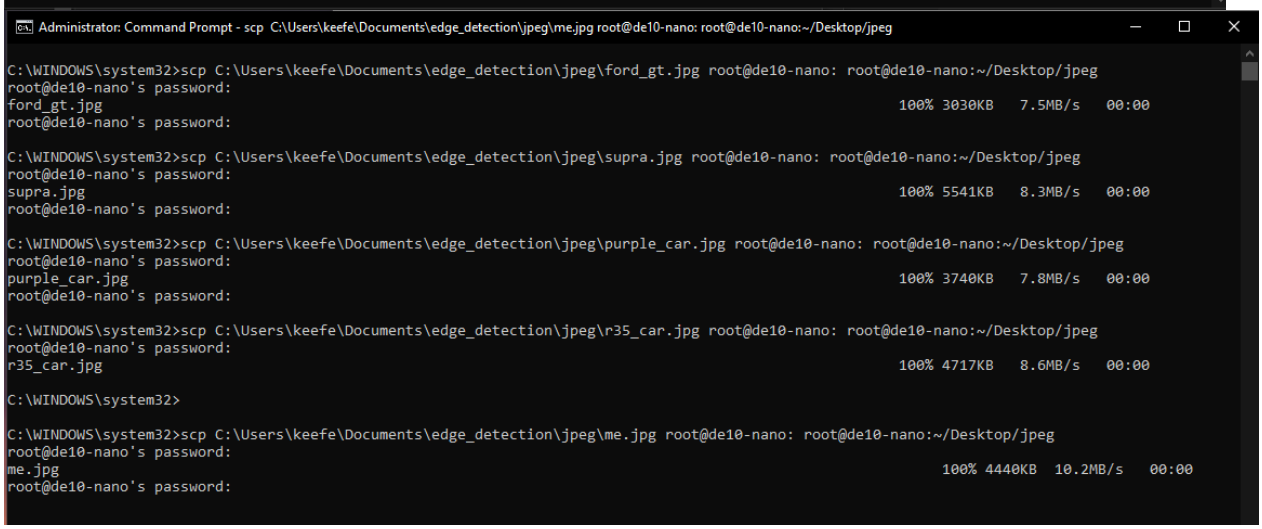


7. Store all the images you want in your Desktop of your laptop/PC, or your Documents. We found that storing your images in a OneDrive path does not work.



8. Open the CMD terminal in Windows and use the secure copy protocol (SCP) command to transfer the images to the FPGA. More information including the syntax usage can be found with this link. Send through all the images to the FPGA. Create a folder named **bmp and jpeg** in the FPGA desktop, you will be using SCP to send the files into the folders you created.

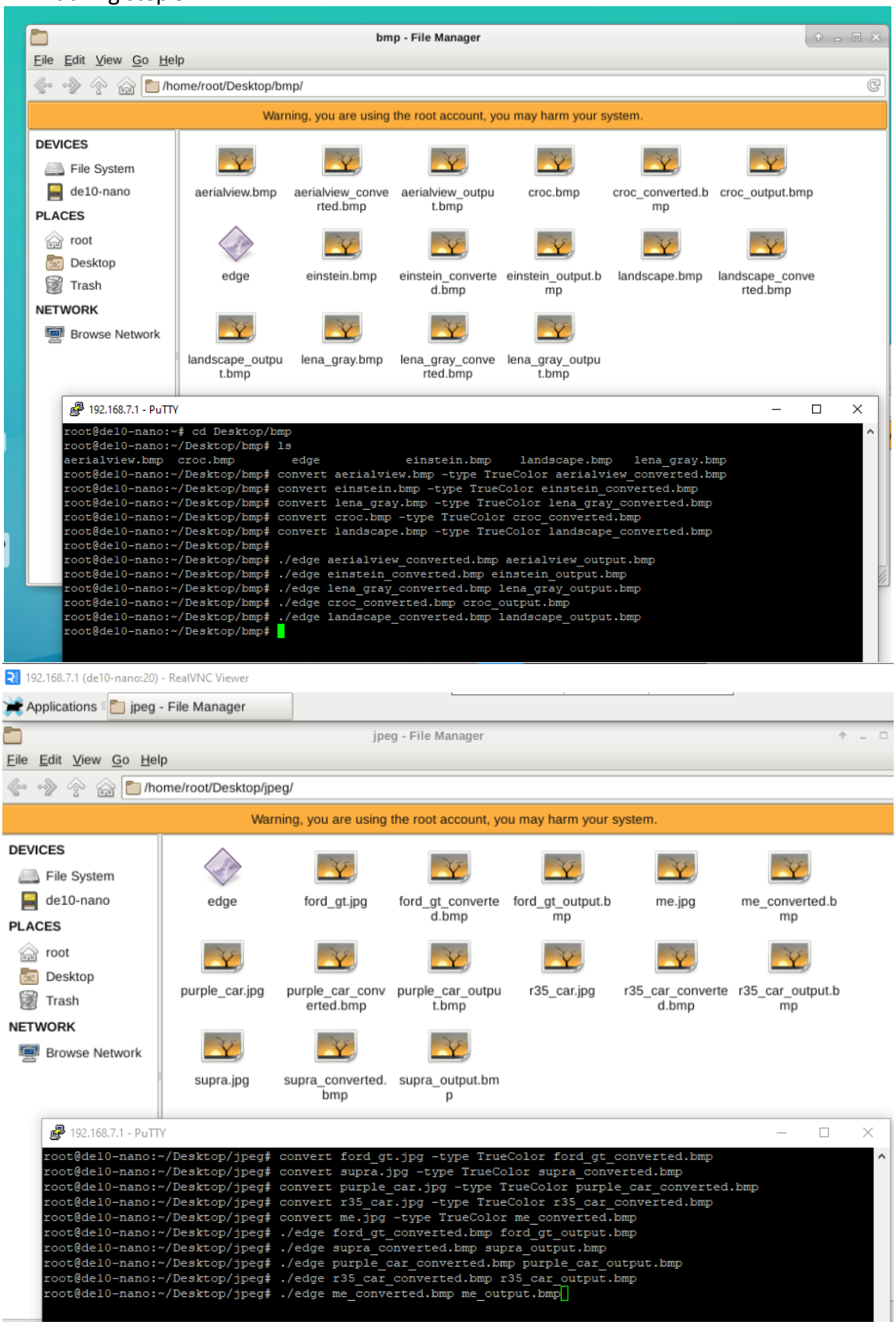




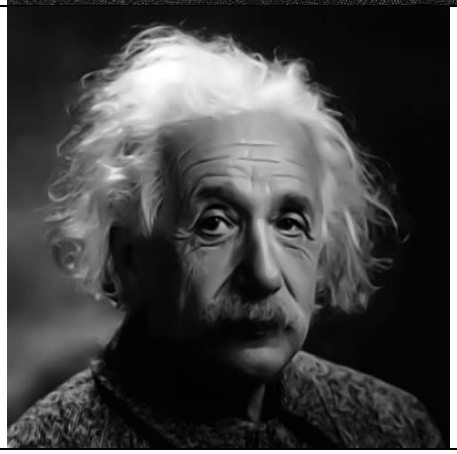
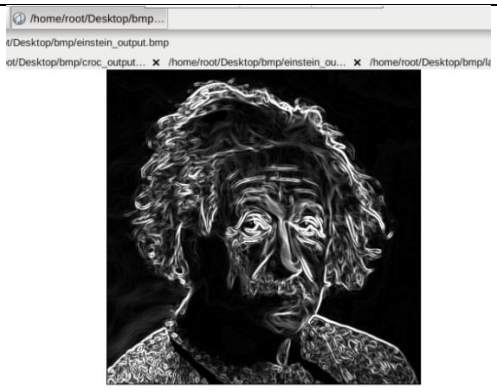
9. Download the Edge Detection code in this GitHub repository with this link. Move the compiled C code using the SCP command to the desired folder in the FPGA. Step 10 has the edge code in both the bmp and jpeg folders.

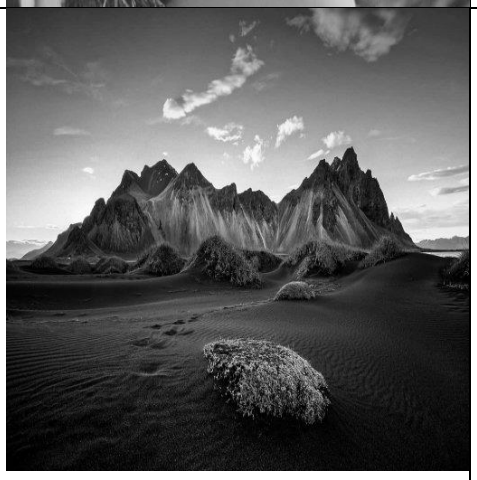
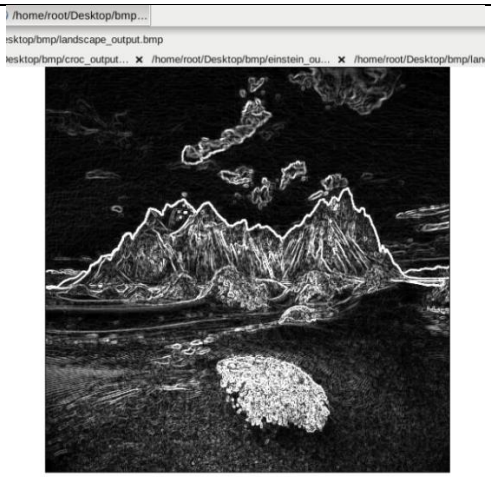
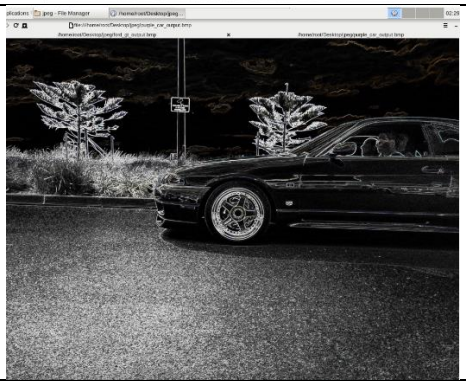
   Example (Run the SCP command in your **Windows Terminal** opened as **Admin**):
   scp C:\Users\keefe\Documents\C_code\edge root@de10-nano: root@de10-nano:~/Desktop/bmp

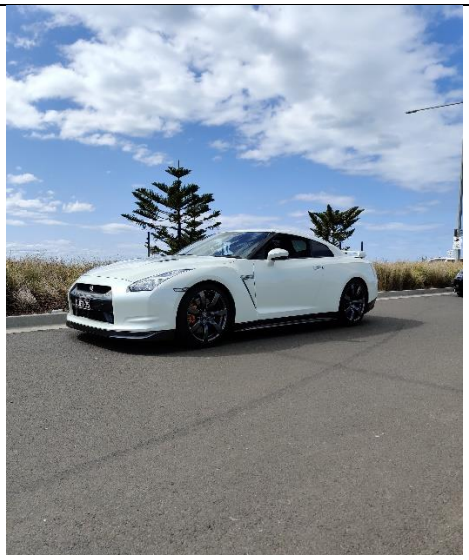
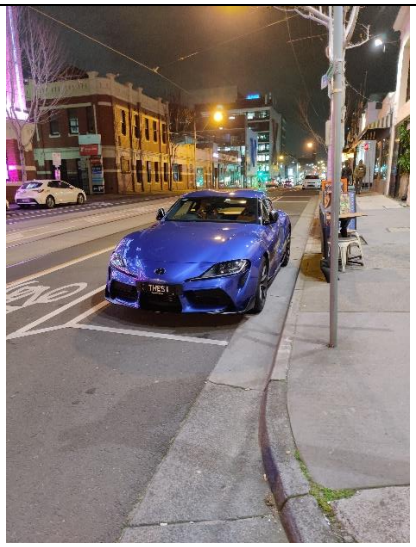
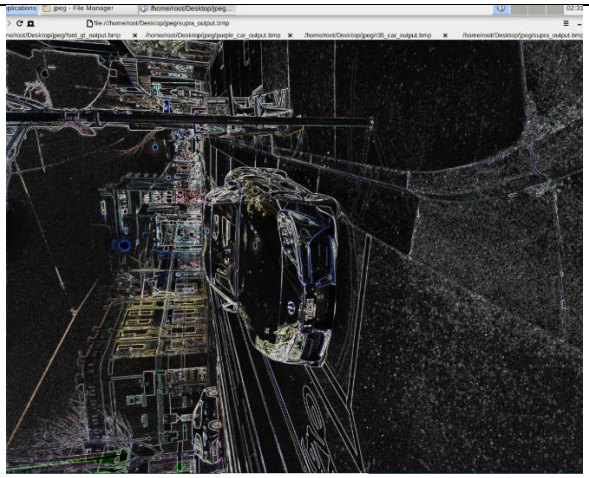
10. Once the BMP files are in the designated folders, use the convert command to convert all images to bmp. The last step is to run the edge code we transferred during step 9.



11. These are all the image I have edge detected.

Aerial view		
Croc		
Einstein		

Lena gray		
landscape		
Purple car		

R35		
supra		
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