COMPUTER VISION CHALLENGE: TOUR INTO PICTURE

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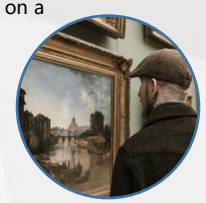
Motivation

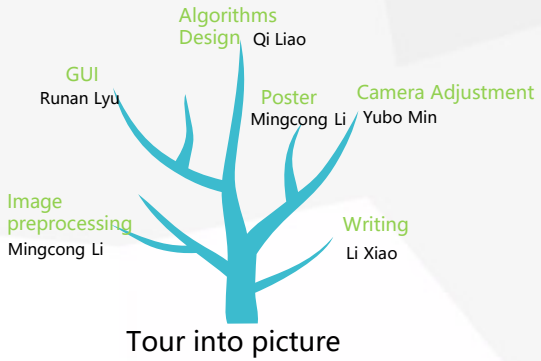
Trompe-l'œil (French for "deceive the eye"), originates with the artist Louis-Léopold Boilly. In ancient painting this meant creating the illusion of the third dimension on a two-dimensional surface with shading and perspective.



We can just use a painting to depict the 3d world so why can't we create an algorithm to reconstruct a 3D scene models from a lone image?

Now we will introduce you to our ideas in this poster and let us go into the Picture!

Division of work



Algorithms

Preprocessing:

Choosing foreground

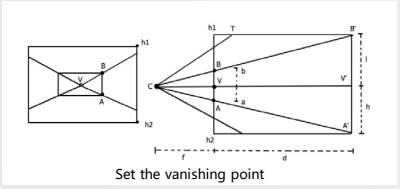
Filling the missing part

This procedure aims to extract the foreground from the image and fills the missing part

Theory:

1.Set a rectangle as the main image and the vanishing point in the original image

2. get the vanishing point's location and the lengths of a and b in pixels



Set the vanishing point

3. In best case: the relationship of I_1 and I_2 is R= $\frac{I_1}{I_2} = \frac{l_{BA}}{l+h} = \frac{l_{BA}}{l_{B'A'}}$. ($I_1$: Rectangle side length, I_2: Length between 2 intersections)

4. Focal length: F=R$*$ 1500 (rule of thumb)

5. Depth of the box: D= $\frac{(F-R*F)}{R}$

6. We calculate step 3, 4, 5 for top, bottom, left and right side 4 times

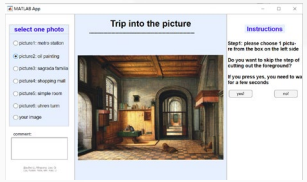
7. Maximum depth selected.

Camera Adjustment:

After the box is formed, adding control function allows the user to control the camera position, camera angle and take screenshots through the keyboard

GUI:

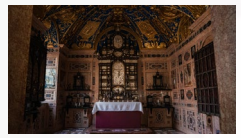
Design the layout of the app to make sure everything can perfectly work together



The GUI interface

Gallery

Samples:



Reconstruction:

Problems

Preprocessing:

1. Cannot choose multi foreground
2. In the progress of choosing the foreground, cannot delete the wrong-choosed point

Camera Adjustment:

When the user adjusts the camera angle, there will be a problem that the edge of the box blocks the view. It has been improved using camva statement

GUI:

1. When no foreground, the function of generating foreground is be used, but this method will take a lot of time.
2. It is very hard to directly use ginput in the appdesigner.

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