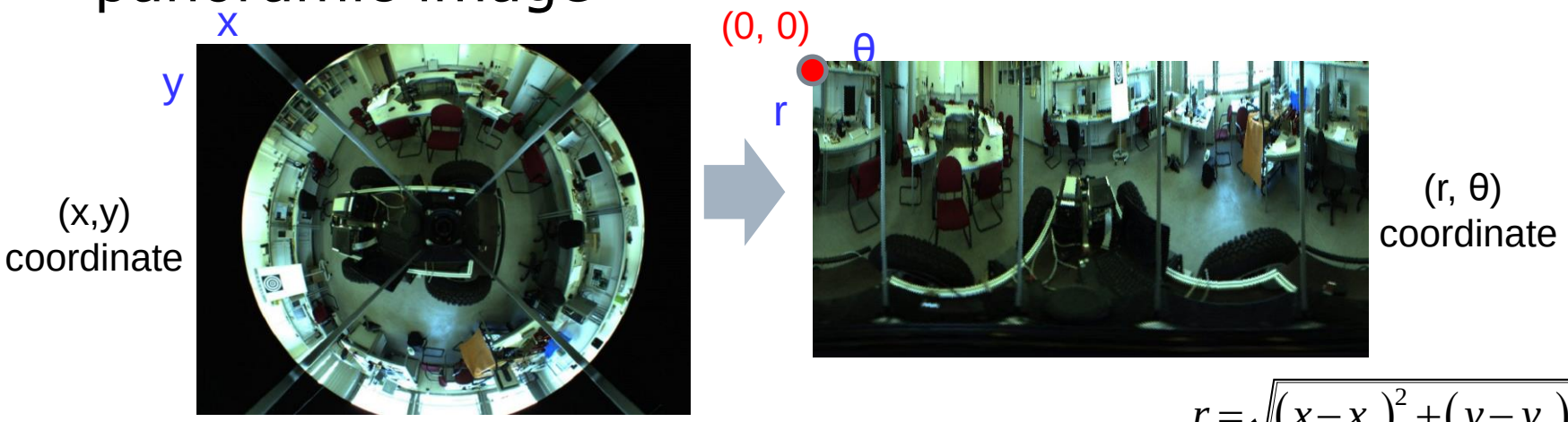
HW3

- Due on 12/8, pm 11:59
- Rectify the image of omnidirectional camera to a panoramic image



- Input image size: 1024*768
  - $(x_c, y_c) = (512, 384)$
- Output image size: 720*384
  - 1 pixel of θ = 2π/720 rad.

forward warping (x,y) to (r, θ)

$$r = \sqrt{(x - x_c)^2 + (y - y_c)^2}$$

$$\theta = \tan^{-1}\left(\frac{y - y_c}{x - x_c}\right)$$

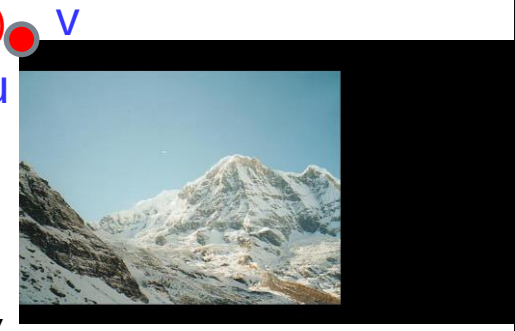
inverse warping (r, θ) to (x,y)

$$x = r\cos\theta + x_c$$

$$y = r\sin\theta + y_c$$

HW3

- Image stitching with the projective transform
  - Refer to "Projective mappings for image warping,pdf"
    - Create an image with size 900*480
    - Paste the left image at [80:449, 0:509]
    - Evaluate the transformation matrix M by Eq.(3) or Eq.(4)
      - Set $(x_0,y_0)=(130,250)$, $(x_1,y_1)=(470,310)$, $(x_2,y_2)=(475,900)$, $(x_3,y_3)=(0,770)$
    - Use inverse warping ($P_s=P_dM_{ds}$) to transfer the original (u,v) coordinate to the desired (x,y) coordinate
      - Hint: i=1, w=1, (u,v)=(u'/q,v'/q)



left image

right image

HW3

- Image stitching by OpenCV
  - Extract feature points
  - Find corresponding pairs
  - Compute transformations
  - Warp image
  - Blend color within overlap
  - Or use images stitching functions

left image

right image

HW3

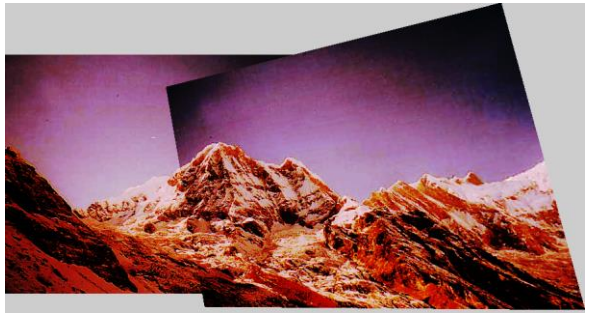
- Bonus
  - Image style transfer
    - Use histogram matching to transfer the histogram of input images to the histogram of style image

left image

right image

style image

    - Stitch the transferred images



HW3

- Requirements
  - Programs
    - C or C++ source code with .exe file (You are NOT allowed to use any library, such as OpenCV)
    - VC++ project by using OpenCV (Image stitching)
  - Report
    - Describe the employed source code editor and how to execute your program (input/interface/output)
    - Introduce your work, method, and discussions
    - With all of the images or results
  - Upload to i-school Plus
  - You are NOT allowed to use any library, such as OpenCV
    - Except the R/W image and the Bonus
    - You can also use .raw to complete your work