Project 5 Questions

Nomes

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Instructions

- 4 questions.

- Write code where appropriate.

- Feel free to include images or equations.

- **Please use only the space provided and keep the page breaks.** Please do not make new pages, nor remove pages. The document is a template to help grading.

- If you really need extra space, please use new pages at the end of the document and refer us to it in your answers.

Questions

Q1: Supose you have a sequence of N images, and you have computed the $N-1$ homographies between each image pair. Let $I_p \neq I_r$ be two images in the set. Thus, homography H_{rp} transforms image I_p to $I_r = H_{rp}I_p$. How can we relate the transformation from image I_p to image I_r assuming we have image I_q between them. What should we do if we need to transform image I_r to I_p using only the $N-1$ homographies computed?

A1: Podemos relacionar da seguinte forma:

$$Iq = Hqr \cdot Ir$$

$$Ip = Hpq \cdot Iq$$

Substituindo I_q, temos:

$$Ip = Hpq \cdot (Hqr \cdot Ir)$$

$$Ip = (Hpq \cdot Hqr) \cdot Ir$$

Q2:   Using the RANSAC method to fit data to a model is particularly interesting when the data is considerably noisy. Why using RANSAC in project 5 is interesting? Why the number of outliers tend to grow as you add new images to the mosaic?

A2:   Porque mesmo quando há uma quantidade muito grande de falsos positivos ele consegue filtrá-los. Porque quanto mais imagens você adiciona na panorâmica maior ela fica (óbvio), consequentemente maior é a quantidade de outliers.

Q3:   Suppose you are implementing a mosaicing application. Once defined the image that will be the mosaic plane, at the mosaic center, how can we transform the remaning images in only one step, i.e, what we must change in each homography matrix to account for the relative translation?

A3:   Your answer here.

Q4:   If we know the homography matrix H_{rp} that transforms image I_p to I_r, how can we obtain homography H_{pr}?

A4:   Podemos obter a homografia H_{pr} com a inversa da H_{rp}.

$$Ir = Hrp \cdot Ip$$

Multiplicando os dois lados da equação por H_{pr}^{-1}, temos:

$$Ir \cdot Hrp^{-1} = Hrp \cdot Ip \cdot Hrp^{-1}$$

$$Ir \cdot Hrp^{-1} = Ip$$

Multiplicando os dois lados da equação por I_r^{-1}, temos:

$$Ir^{-1} \cdot Ir \cdot Hrp^{-1} = Ip \cdot Ir^{-1}$$

$$Hrp^{-1} = Ip \cdot Ir^{-1}$$

Como H_{pr} é a inversa da H_{rp}, então substituindo temos:

$$Hpr = Ip \cdot Ir^{-1}$$