CS-663 Assignment-1 Report

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1 Question-2

1.1 Relation

Given $u_{ij} \in \mathbb{R}^2$ so it is (t_x, t_y) i.e translation distance in both directions.Let $u_{12} = (a, b)$,$u_{23} = (c, d)$, $u_{13} = (e, f)$
(x, y) in image1 is corresponding to $(x + a, y + b)$ in image2 $\forall\, x, y$.
(x, y) in image2 is corresponding to $(x + c, y + d)$ in image3 $\forall\, x, y$.
$\implies$ $(x + a, y + b)$ in image2 is corresponding to $(x + a + c, y + b + d)$ in image3 $\forall\, x, y$.
$\implies$ (x, y) in image1 is corresponding to $(x + a + c, y + b + d)$ in image3 $\forall\, x, y$.
But we know (x, y) in image1 is corresponding to $(x + e, y + f)$ in image3 $\forall\, x, y$.
$\implies$ $a + c = e$ and $b + d = f$.
$\implies$ $u_{12} + u_{23} = u_{13}$

So the final relation is $u_{12} + u_{23} = u_{13}$

1.2 Practical differences

- **Noises** in images may lead to differences in the values obtained from translation motion model and because of this we may not get actual values.
- When you consider a non ideal case the values of shift **may not be integers perfectly** in that case the u values obtained are just approminate for best fit so there might be a slight difference between sums and value obtained because of **errors due to rounding**.

$\implies$ $u_{12} + u_{23} \approx u_{13}$.