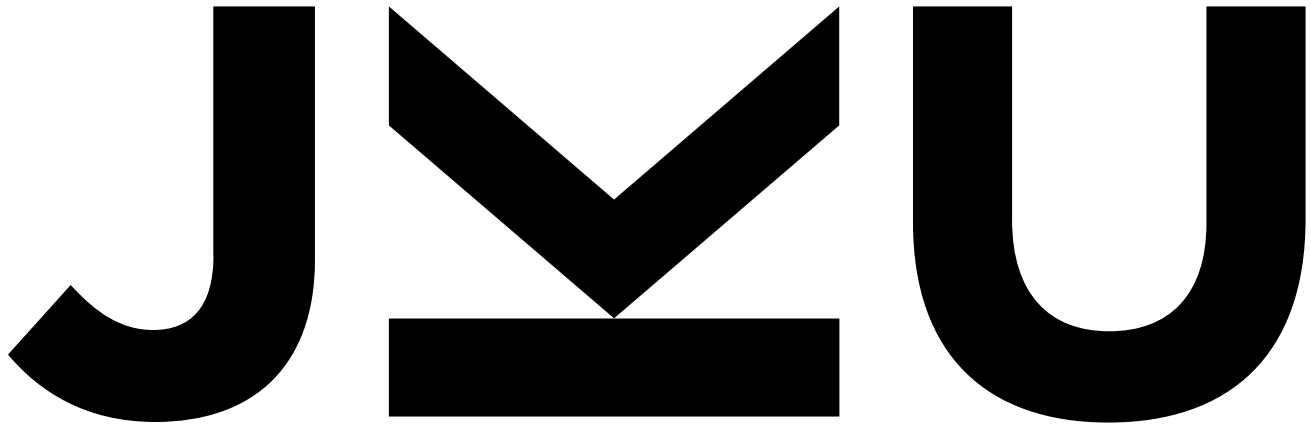
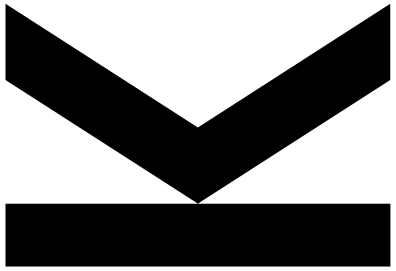


JOHANNES KEPLER
UNIVERSITY LINZ

INITIAL IDEAS AND FIRST TESTS



Team B0:
Philipp Eberstaller
Dominik Heindl
Carson Wittwer

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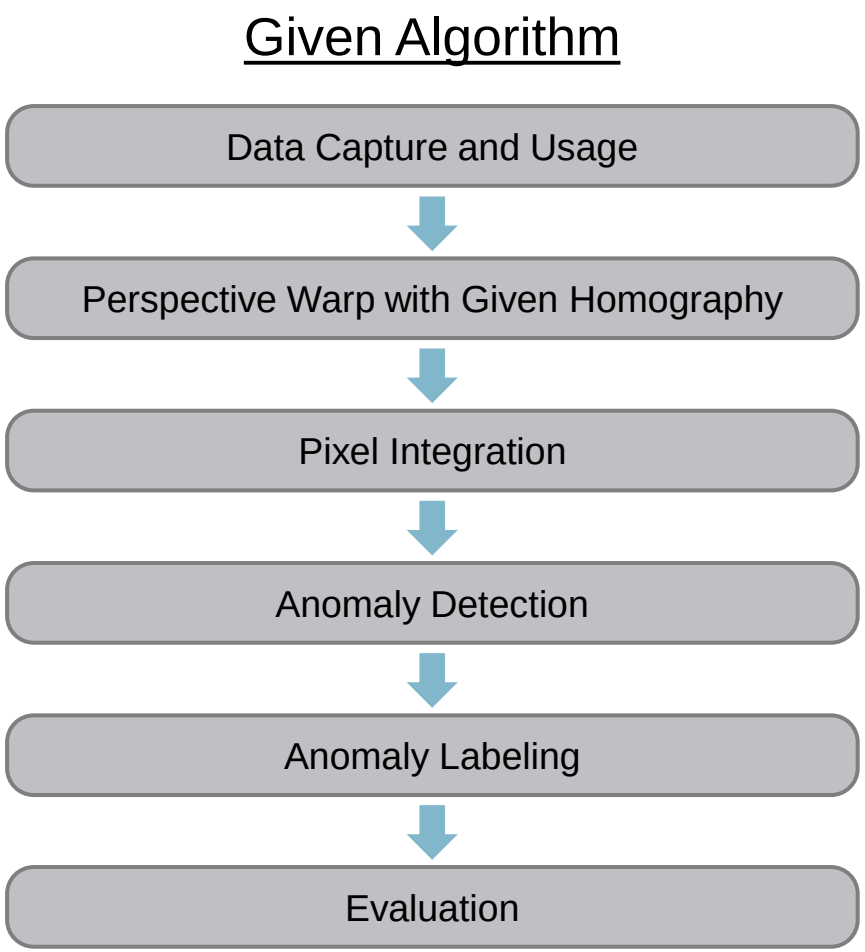
IMPLEMENTATION OF GIVEN SOLUTION



Most of our recent time has surrounded implementing the given solution.

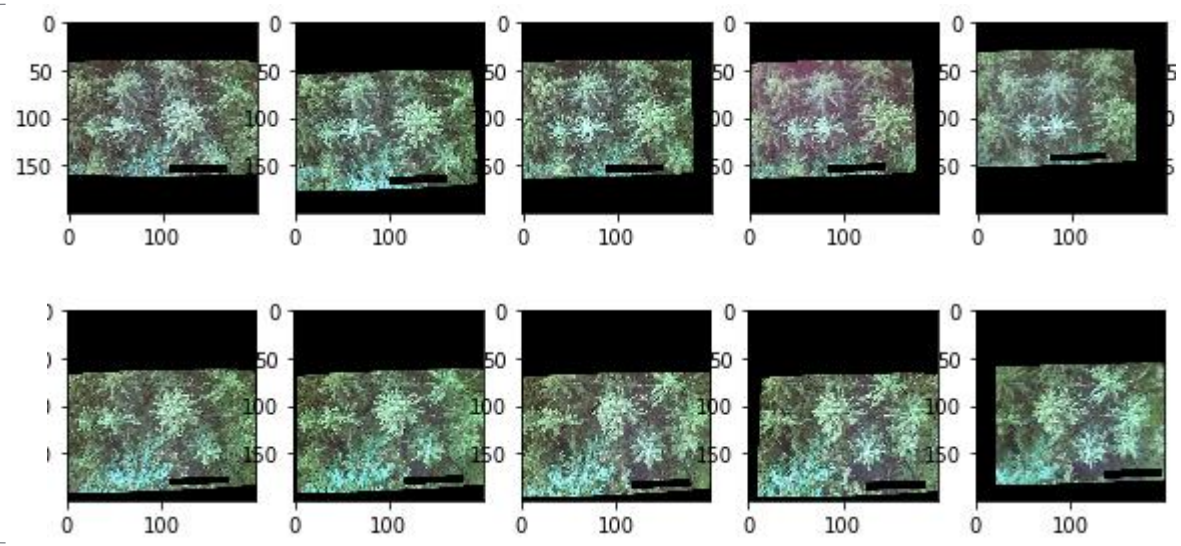
Opportunity to:

- Implement basic functionality e.g. data loading, …
- Understand the structure and flow of the algorithm
- Understand more specifics to what individual functions are doing
- Identify opportunities for improvement
- Identify where our ideas can fit in

IMPLEMENTATION OF GIVEN SOLUTION

Given Algorithm

- Data Capture and Usage
- Perspective Warp with Given Homography
- Pixel Integration
- Anomaly Detection
- Anomaly Labeling
- Evaluation



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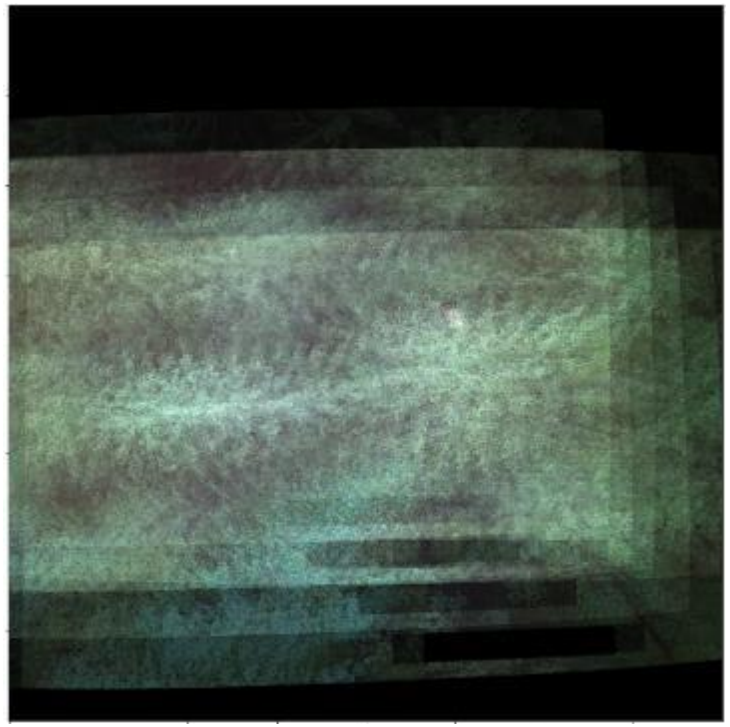

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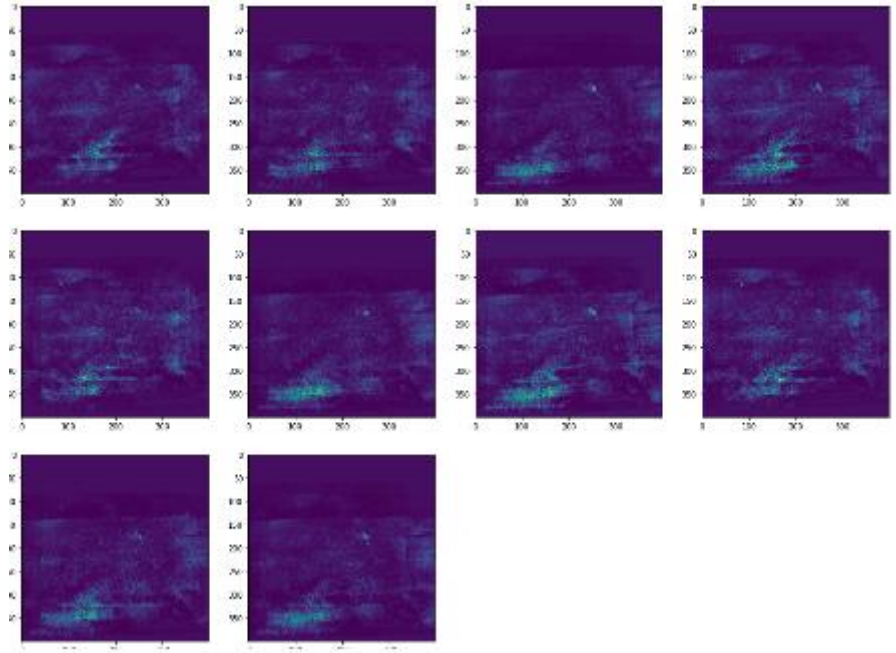

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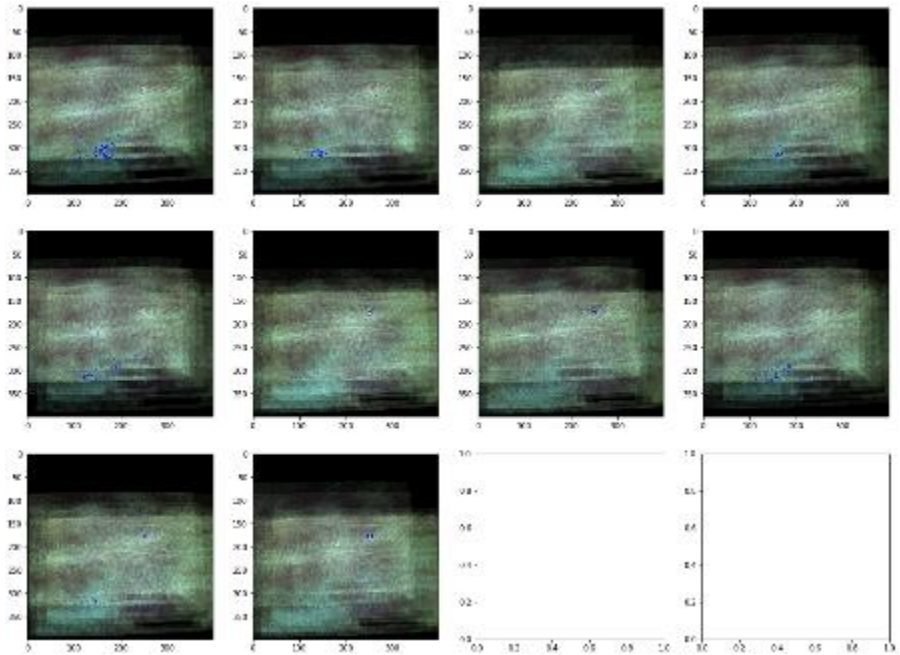

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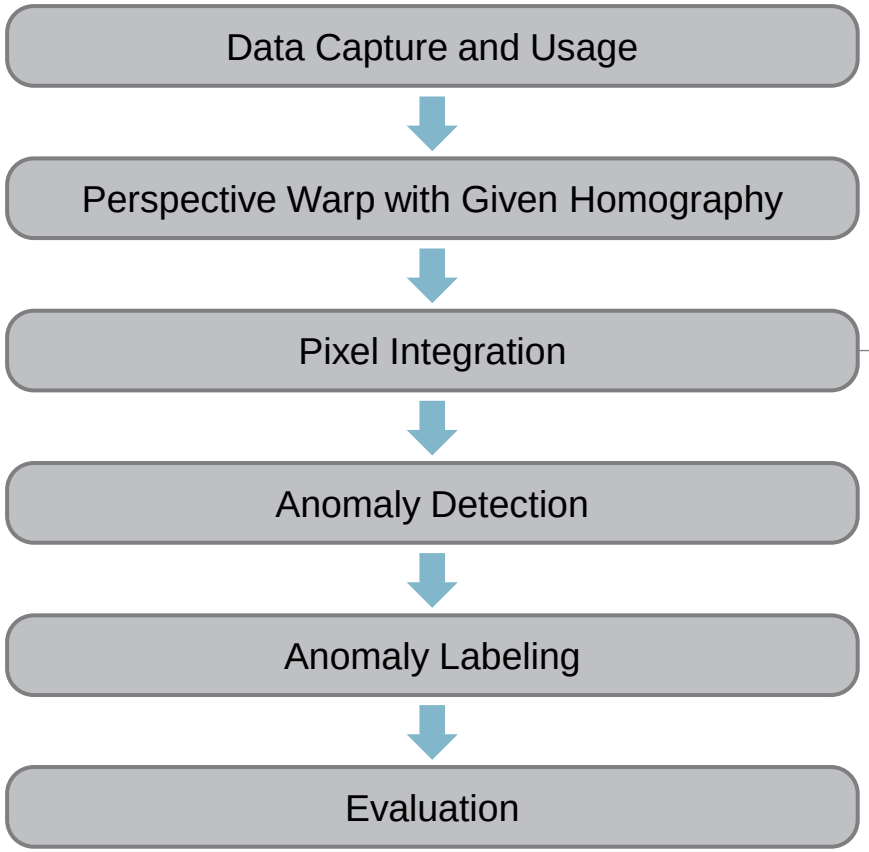
IDEA TESTING

Given Algorithm



Pseudocode for Pixel Labeling Via Energy Minimization

Algorithm Labeling-based Synthetic Aperture Imaging

Warp using homography using Eq.(1);

For *depth range* $l = 0$ **to** k

Shift each reference plane camera image to depth l *using Eq.(3);*

For *each pixel* m *of each camera view*

Compute E_m *and set* f_m *using Eq.(9,13,15);*

End

Shift back each camera image to the reference plane using Eq.(16);

End

For *camera view* $i = 1$ **to** N

Merge each labeled camera view on the reference plane together using Eq.(17);

End

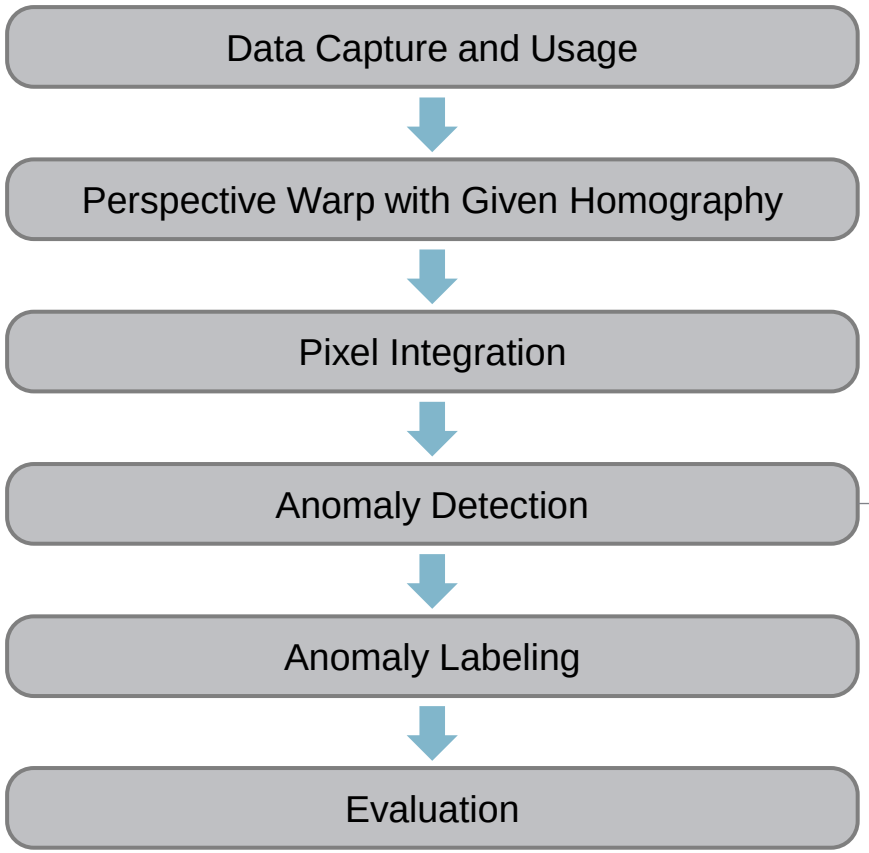
Shift the labeled camera view from the reference plane to the desired focal plane using Eq.(3).

Adding the images together without the labeled occlusion parts using Eq.(18);

Get the labeling-based synthetic aperture image on the desired focal plane;

IDEA TESTING

Given Algorithm



Pseudocode for Part of Detecting Anomalies in Noise Signal

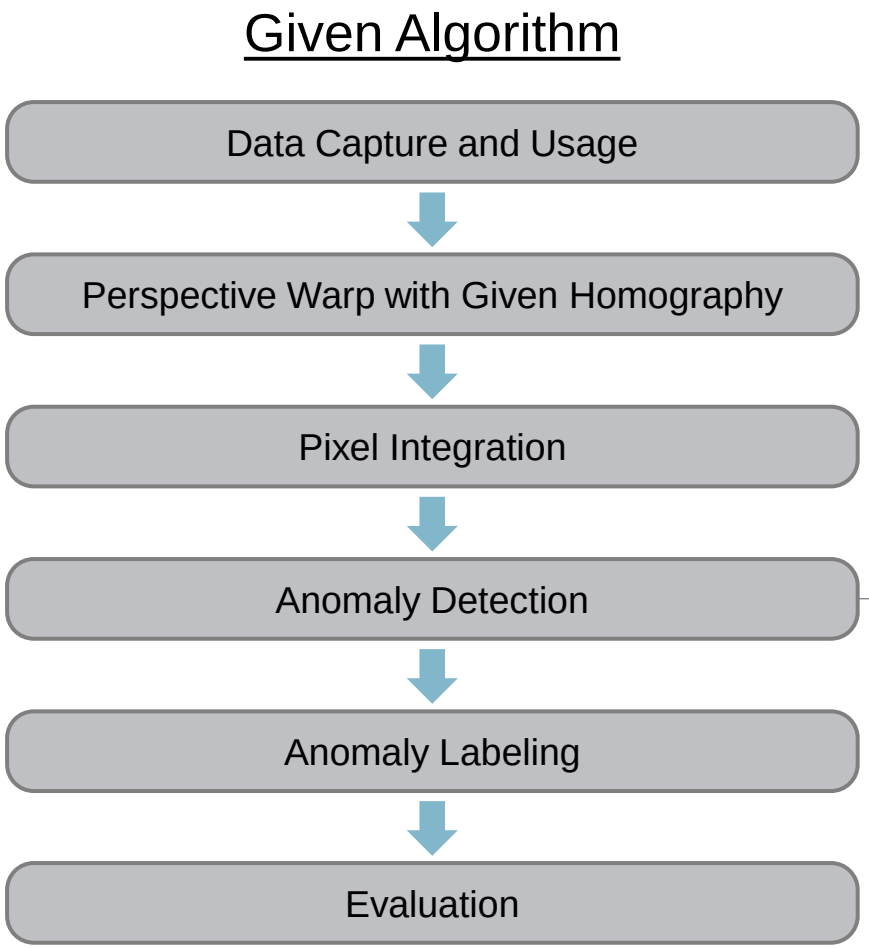
Algorithm 1 Computation of the unstructured residual

Require: Multichannel Image u, n the number of nearest neighbors
Ensure: Model $\hat{u}$ of u based on $\mathcal{D}$, residual $r(u) = \hat{u} - u$.

1: **for all** Multichannel patch P of u **do**
2: Compute n near.neigh. $\{P_i\}$ of P **(outside square region)**.
3: Reconstruct the patch (using (1))
4: **for all** pixels j in u **do**
5: $\hat{u}(j) = \frac{\sum_{i \in \{s | j \in W_s, s \in [\![1,N]\!]\}} \hat{P}_i(j)}{\#\{s | j \in W_s, s \in [\![1,N]\!]\}}$

Notation convention. W_s : set of pixels in the patch centered at s.
$\hat{P}_i(j)$: value at pixel j of the reconstructed patch centered at i.

IDEA TESTING



Distinguish between anomalies → detect people

- use temporal data
- Check if anomalies are „moving“
  - Compare the location on different frames
- Stationary anomalies more likely to be non-human

QUESTIONS?