ARTS ET MÉTIERS ParisTech
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Meeting for next steps

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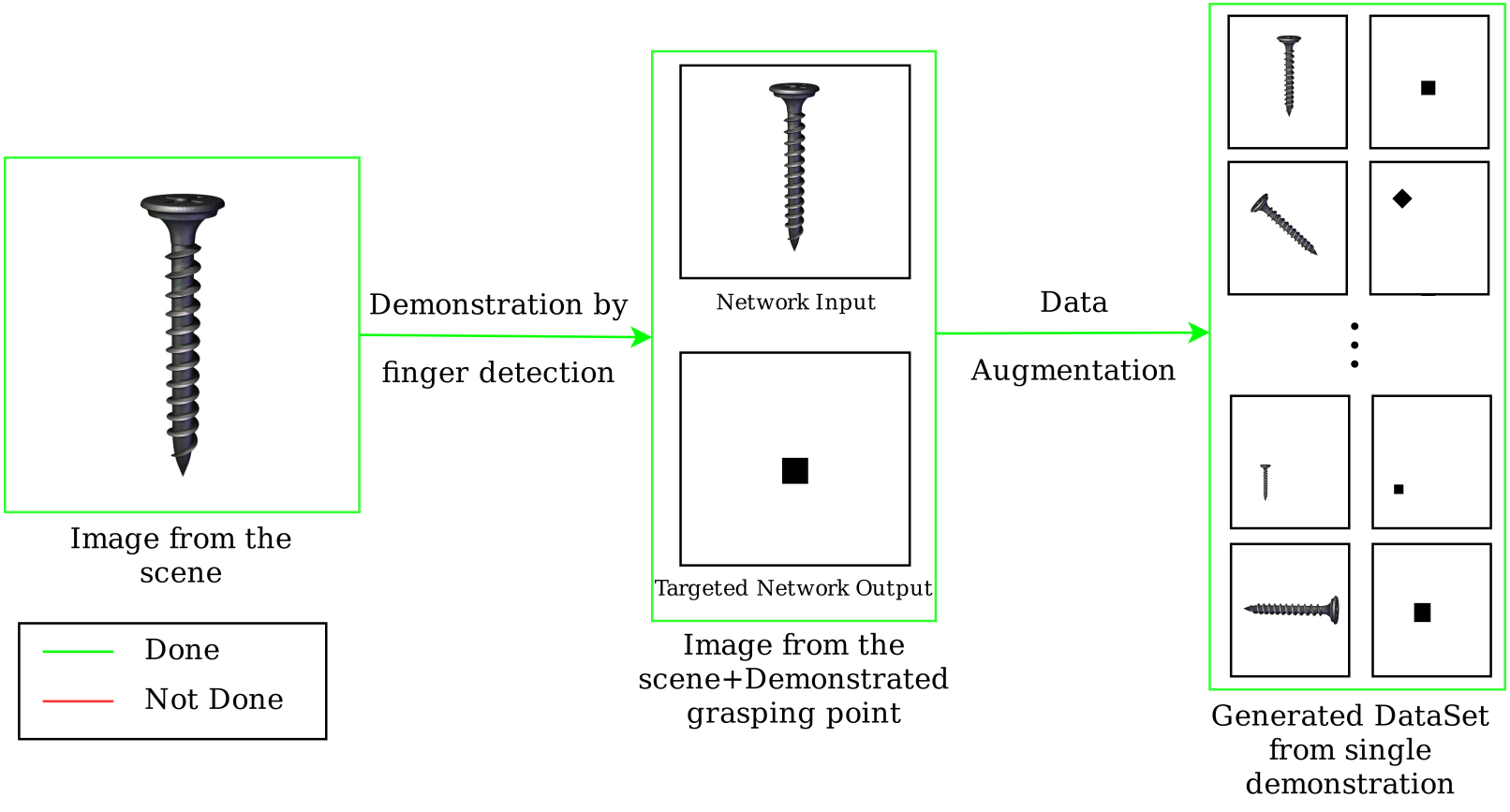
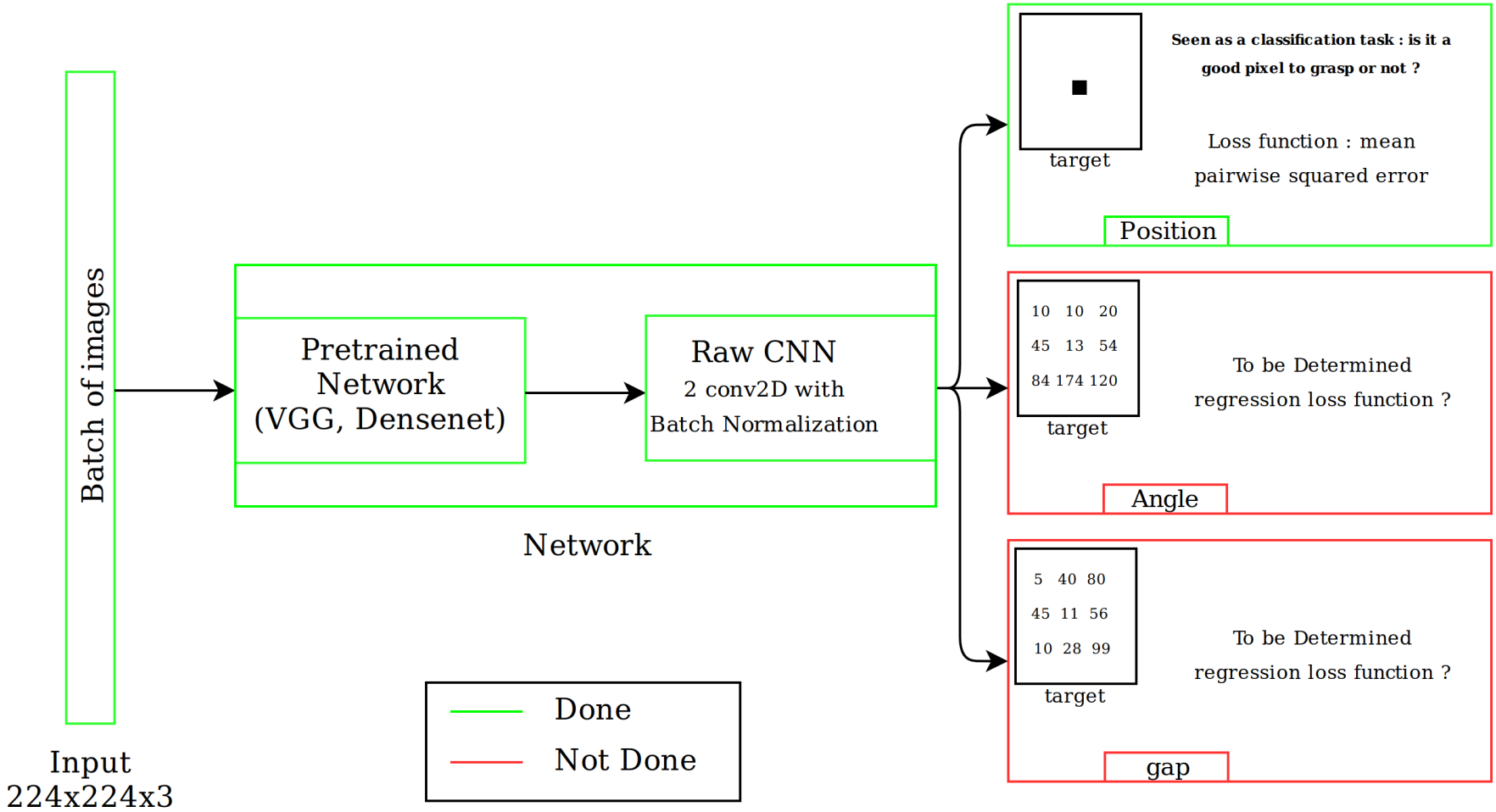
Data Augmentation



Model Architecture / Pretraining

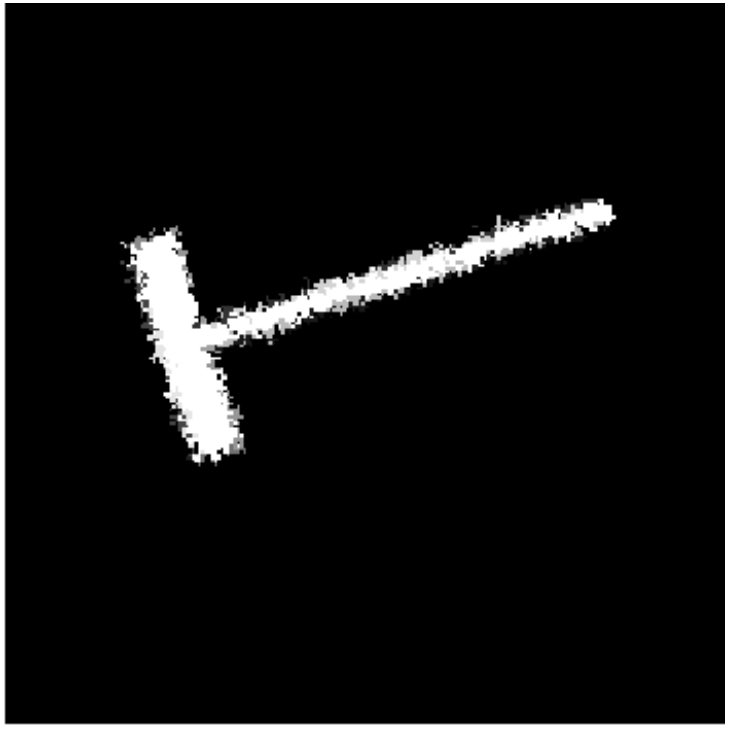


Deep Q-learning phase

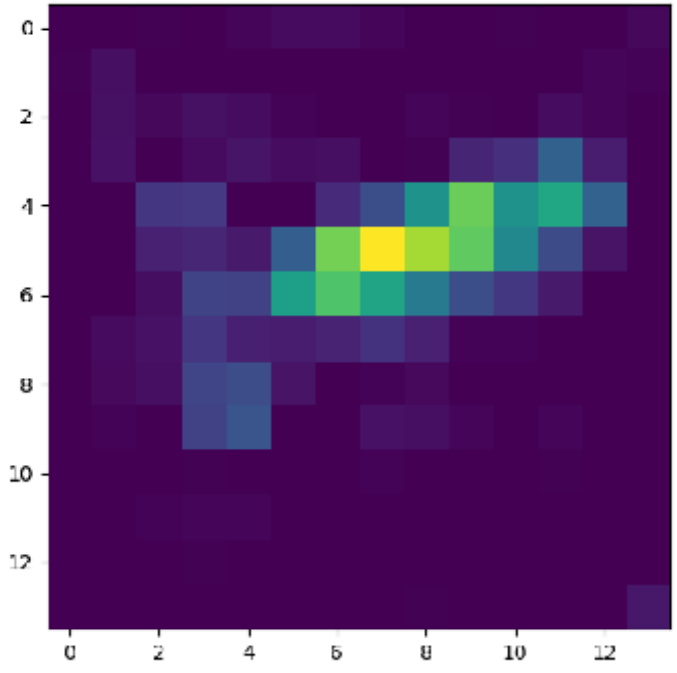
- Determine the good ratio between demonstrated and experience datas with an experience replay mechanism.[1] (Give more importance to experience with high difference between predicted and actual outputs without overfitting)
- Determine a good loss function that can be composed on several ones (Q-learning loss, classification loss) [2]
- Adding a negative reward for forbidden grasping location

[1] Prioritized Experience Replay - Tom Schalu et al. - 2016
[2] Deep Q-learning from demonstrations - Google DeepMind - 2017

Intermediate results - from one demonstration (450 generated images)



(a) Input - Depth image of the scene scaled between 0 and 1



(b) Output - Grasping best location prediction

Future possible orientation

To increase interactions between the learner and the teacher, we could introduce a ”missing demonstration generator” that would generate relevant images that the network needs to learn. The **exact methodology is to be found**, however Generative Adversarial Networks seem to be a good starting point.

Kuka IIWA python remote control

Based on the KST-Kuka-Sunrise-Toolbox we can now control the IIWA with python. A java client run on the Kuka computer and connects to a server on the remote computer. A python interface was developped based on the matlab implementation.
We can do the following actions :

- PTP motion in cartesian and joint space
- Realtime control in joint space
- Realtime control in joint space with compliance
- Getting joints positions and torques