

AI & Robotics: Research

Exercise 3

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1 Read the PoseRBPF paper

Find the paper here:

– <https://arxiv.org/abs/1905.09304>

The paper from RSS 2019 is a great example for state-of-the-art approaches to object tracking combining classical formulations (Rao-Blackwellized Particle Filter) with neural networks.

For each of the following items, be able to give a brief report (ca. 4mins each):

- a) List and explain what the authors claim the contributions are, i.e., what precisely is beyond previous work in this paper
- b) Summarize the different areas of related work. Lookup at least one paper from each of the two paragraphs of section II. “Lookup” means: Find the paper and read the abstract, perhaps glimpse at the results.
- c) Be able to explain Figure 1 of the paper (I find the figure a bit cursorily.)
- d) Be able to explain Eq (1) and how the translation and orientation are handled differently in this approach.
- e) Be able to explain roughly what a particle filter is – esp. the main ingredients: a predictive model, likelihood models, a resampling scheme. What are these in this paper?
- f) Be able to explain Figure 5 of the paper
- g) Be able to explain how an auto-encoder is used to model likelihoods for the orientation (Figures 2 & 3)
- h) Be able to talk through the accompanying video (What are the cyan/red boxes at the top, and the things in the bottom?)
- i) Be able to explain the two test datasets and briefly the baseline methods (esp. PoseCNN)
- j) Be able to talk through Tables I and II
- k) What do the combinations PoseRBPF++, and RetinaNet+PoseRBPF mean?