Artificial Underwater Images Streams

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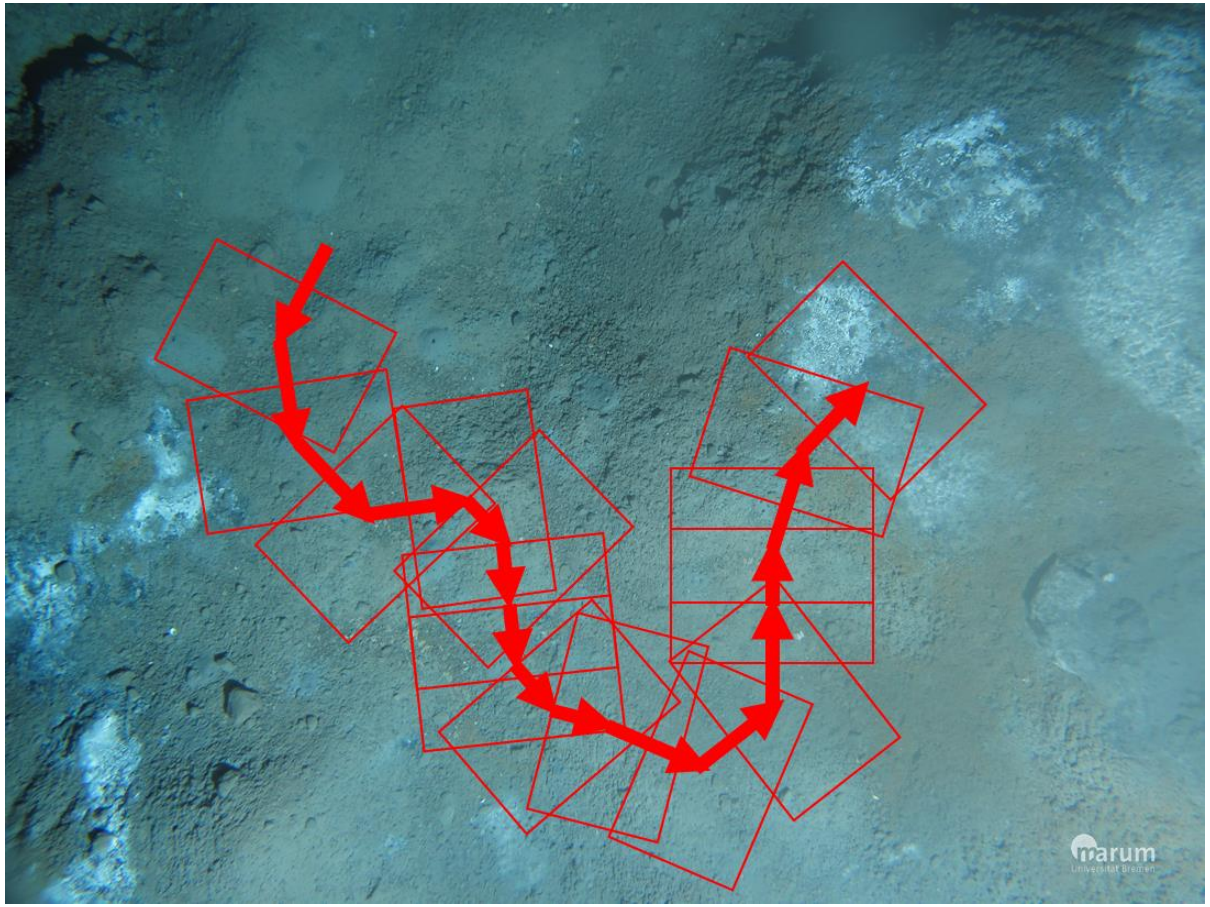
Context:
generate artificial image streams
as a test tool for underwater
mapping algorithms

i.e., simulate the images from a
down-looking underwater camera
based on its (virtual) trajectory
over a large real image



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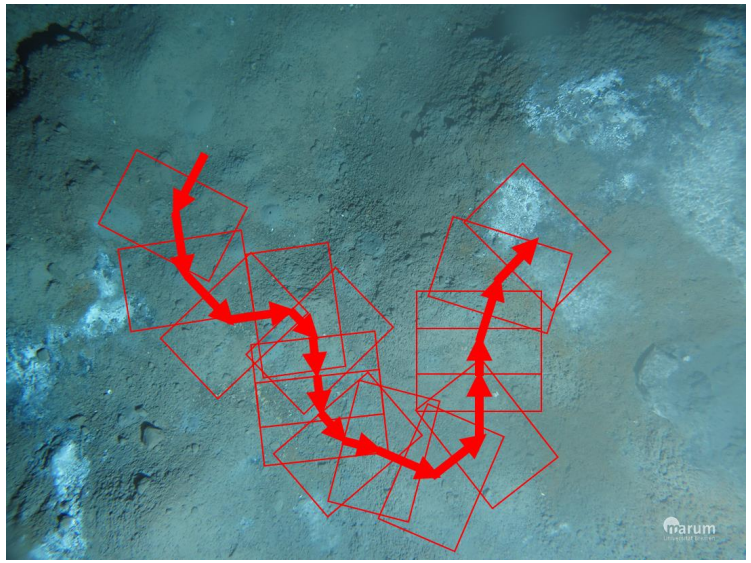
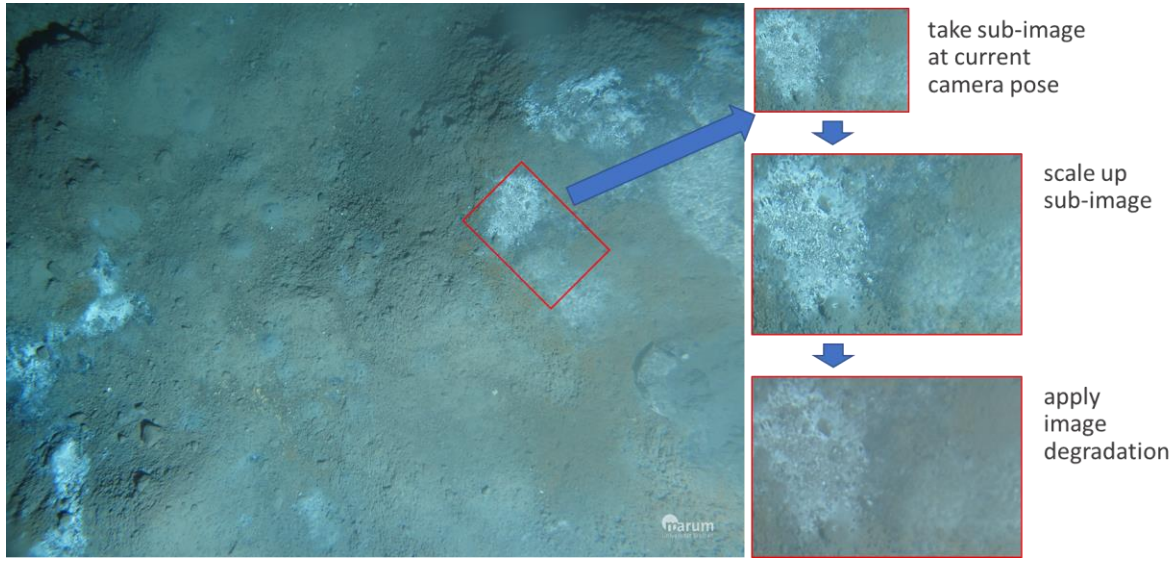
Tasks:

- given a large underwater image
  - e.g., 5000 x 4000 pixel
- generate trajectories
  - i.e., sequences of 2D motion vectors (rotation & translation)
  - e.g., lawn-mower exploration,
  - as ground truth for robot poses
- take a virtual camera image at each pose
  - i.e., compute a (much) smaller sub-image (e.g., 300 x 200 pixel) according to the pose
  - scale it up (given a scale parameter)
  - add parameterized artificial degradations, e.g., image blur (with a Gaussian filter) or salt-and-pepper noise

=> sequence of images & ground truth poses
(that can be used by others to test algorithms)



- background picture: large underwater image
- trajectory with motion vectors (red arrows)
- sub-images at each pose (red rectangles)



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Topics for the Literature Survey (State of the Art) Part

- Underwater Visual Mapping aka Mosaicking
- Evaluation Methods for Visual Simultaneous Localization and Mapping (vSLAM) and the challenges for ground truth in underwater environments
- Underwater Image Formation & Underwater Vision

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Data-Sets

http://robotics.jacobs-university.de/TMP/BScTheses/data/UnderwaterImageStreams/

several larger underwater images that can be used to generate test images