Note: Research Thesis

This is a thesis topic that is designed as an opportunity for excellent students who are interested in getting a first dive into research.

For this topic, there is a very high risk of failure!!!

Please note that this only make sense if
a) you understand the topic presented in the slides,
b) you are willing to work yourself into the topic and to read some background material,
c) you have excellent theoretical skills, and
d) you are willing and capable to work independently on a challenging topic.

As a **reward**, there is a **high likelihood** that a **scientific publication** is the outcome.

Machine Recognition of "Interesting" Underwater Video Sequences

Context:

- especially underwater video streams often contain longer sequences of "uninteresting" data

- e.g., robot is in the open water column, thrusters generate sediment plumes, etc.
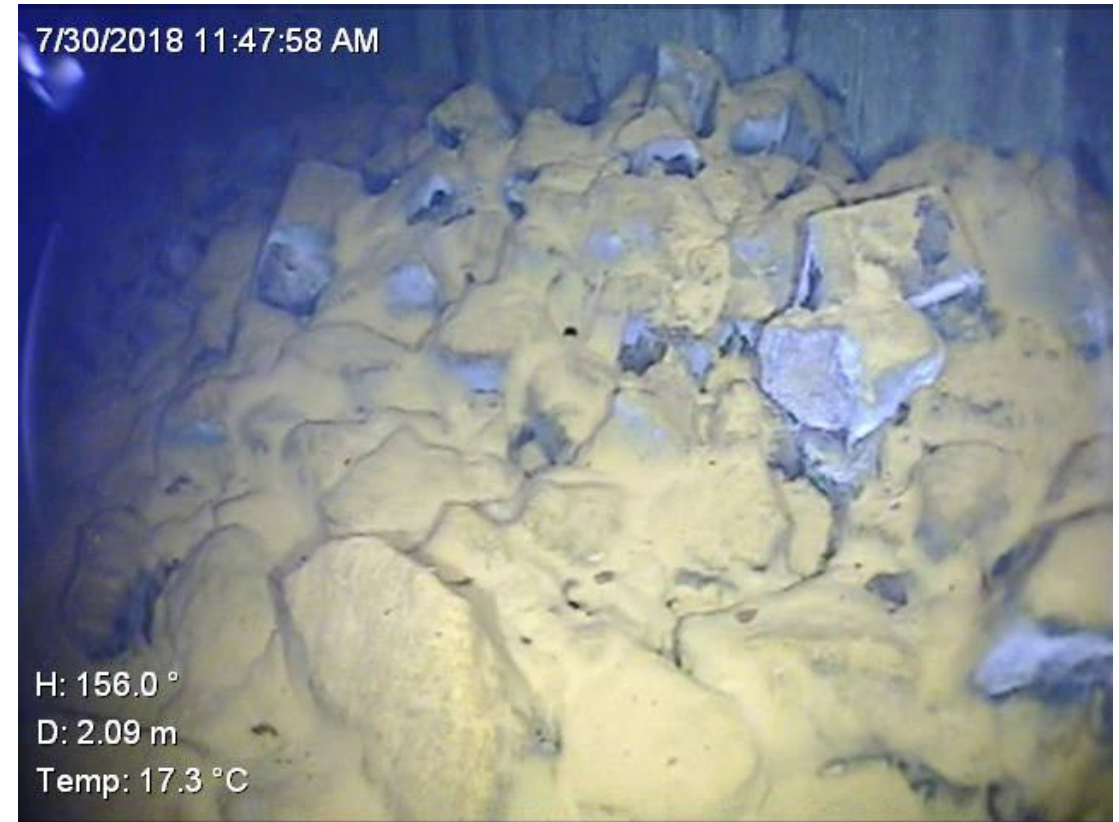
- that need to be manually removed

Machine Recognition of "Interesting" Underwater Video Sequences

Robotics — JACOBS UNIVERSITY

"uninteresting"
as there is "nothing to see"

"interesting"
due to multiple "things to see"

10/21/2020 1:26:48 PM

H: 266.9 °
D: 0.05 m
Temp: 19.0 °C

7/30/2018 11:47:58 AM

H: 156.0 °
D: 2.09 m
Temp: 17.3 °C

Machine Recognition of "Interesting" Underwater Video Sequences

Tasks:

- derive methods for machine recognition of "interesting" images, respectively image-sequences by investigating

- (A) measures for image complexity, e.g., Local Radius Index (LRI) to assess texture complexity

- (B) Deep Learning, e.g., semantic segmentation with, e.g., a DeepLabV3 RESNET-50 architecture

Machine Recognition of "Interesting" Underwater Video Sequences

Note:

- typically the whole image is interesting or not,
- i.e., segmentation of the image itself into interesting/not-interesting sub-parts is not necessarily needed

this can play a role when selecting a suited Deep Learning method

Machine Recognition of "Interesting" Underwater Video Sequences

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

- Underwater Vision and its Applications

- Image "complexity" measures (e.g., Image Entropy, Anisotropy, etc.)

- Deep Learning for image classification and semantic segmentation

video data that can be used for generating training & testing data-sets:

http://robotics.jacobs-university.de/TMP/BScTheses/data/Underwater-Valentin3D/