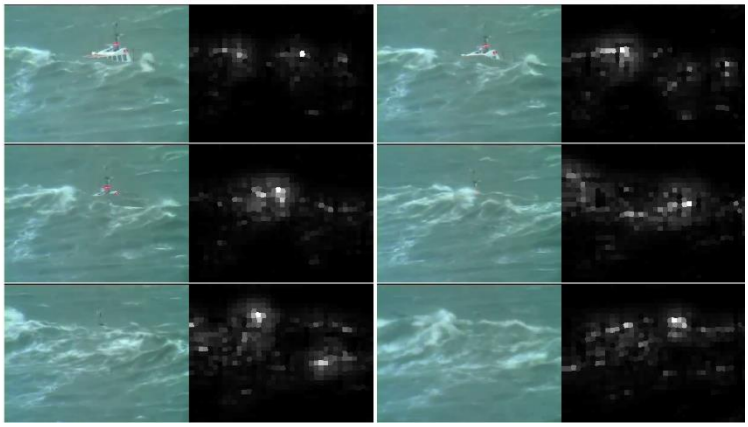
Modeling the Mechanisms of Human Visual Attention towards Objects of Interest

Abstract: This project aims to model the mechanisms of human visual attention (bottom-up and top-down) towards objects of interest within the framework of inspection operations. To that end, this project shall exploit specialized glasses that capture the human gaze and localize where it points on a camera frame. By building a dataset appropriate for supervised learning a computational approach to model how inspectors attend and assess objects and structures of interest shall be developed.



Tasks:

- Study the mechanisms of human attention and the corresponding visual saliency models for 2D images or static camera video.
- Identify the recent niche literature on visual saliency for moving cameras.
- Study the mechanisms of human attention when navigating in indoor and/or outdoor environments with the goal to attend to known classes of objects of interest.
- Propose a novel computational model that captures the behavior of human visual attention to objects of interest.
- Implement such a model algorithmically and deploy it on data coming from a camera for which its odometry in the environment is known.

Literature:

[1] Li, G. and Yu, Y., 2015. Visual saliency based on multiscale deep features. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 5455-5463).

[2] Liu, N., Zhang, N., Wan, K., Shao, L. and Han, J., 2021. Visual saliency transformer. In Proceedings of the IEEE/CVF international conference on computer vision (pp. 4722-4732).

[3] Wan, P., Feng, Y., Cheung, G., Bajić, I.V., Au, O.C. and Ji, Y., 2013, May. 3D motion in visual saliency modeling. In *2013 IEEE International Conference on Acoustics, Speech and Signal Processing* (pp. 1831-1835). IEEE.

[4] Kim, H., Lee, S. and Bovik, A.C., 2014. Saliency prediction on stereoscopic videos. IEEE Transactions on Image Processing, 23(4), pp.1476-1490.

Relevant Funded Project:

- **Title:** ROI
- **Funding Agency:** Research Council of Norway

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