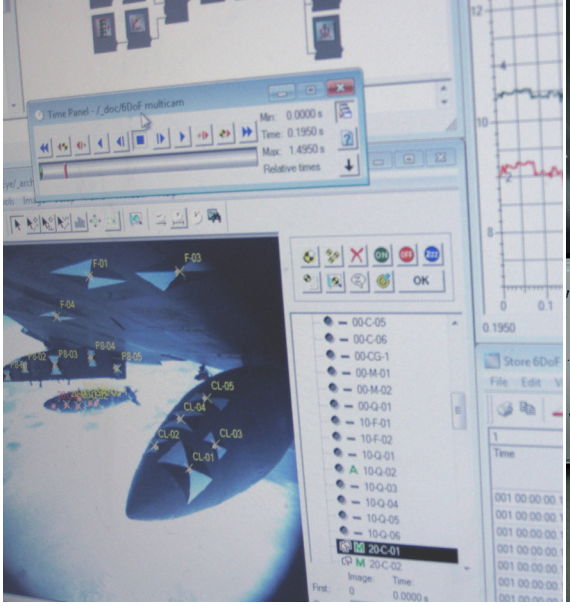




DEGREE PROJECTS

This list of degree projects shows a set of relevant project examples that could be ran in tight cooperation with Image Systems Motion Analysis, and would be suitable for degree projects. Other topics related to image analysis algorithms may also be interesting. Please contact us to discuss your ideas!

MOTION BLUR COMPENSATION IN DYNAMIC CAMERAS

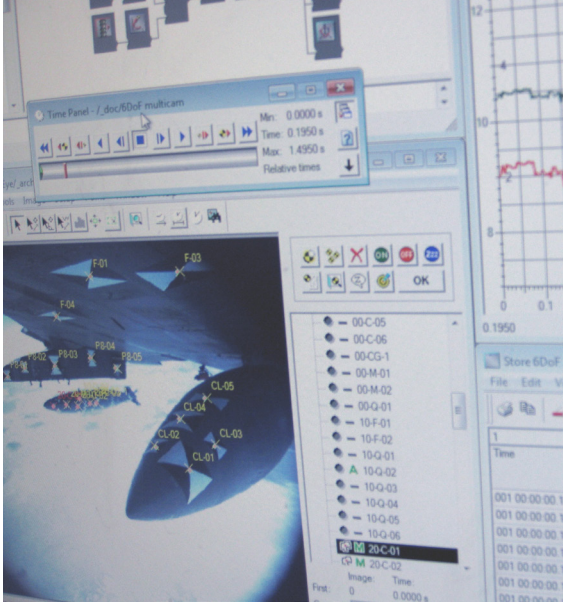
While recording images and videos, motion in the scene or of the camera might introduce blur. In a single frame, the light is integrated in the sensor during the exposure time, and if motion occurs during this time the moving image features will get blurred. For our measurements we sometimes have a-priori information about the camera movement, from the camera platform, which may make it possible to compensate for the motion blur effect. There are also other ways of detecting and decreasing the effect of motion in images, without a-priori knowledge, such as using Wiener deconvolution.

This goal of this master thesis is to study, implement and evaluate methods to compensate for the motion blur. A basic level would be to use Wiener deconvolution, but potential improvements could include using a-priori information to increase the performance.

SUPER RESOLUTION USING DYNAMIC CAMERAS

Super resolution is a number of techniques that enhance the resolution of an imaging system. The main concept is to use two or more frames of data with different sampling grids, and to interpolate into higher sampling density, to increase the resolution. For our high speed imaging applications, the motion itself could cause the varying sampling grid. Currently we are tracking features at sub pixel resolution, but we would like to exploit super resolution to investigate potential performance increase. There are a number of aspects in our system setup that might affect the performance.

The goal of this master thesis is to study, implement and evaluate methods for super resolution.



INVESTIGATE AND OPTIMIZE A TRACKING ALGORITHM FOR FINDING SYMMETRIC FEATURES

Today we have a proprietary tracking algorithm that can find symmetric features in an image sequence using pattern recognition techniques. This algorithm performs well, but due to overall improvements in available software and hardware we expect that it could be improved.

The algorithm is based on a doctoral thesis from 1988 but is poorly documented and it is not obvious exactly how the C++ code is derived from the published theory.

This thesis project could be formulated in several ways depending on the interest and competence of the student. One approach would be the theoretical approach, which would focus on relating the theory from the original thesis to the C++ algorithm and would result in a theoretical description of how it works. It could also involve potential improvements or generalization of the algorithm, and to identify an accuracy measure. Another approach would focus on optimizing the implementation, possibly by using GPU programming (in OpenCL or CUDA).

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