**Photogrammetry**

Photogrammetry means taking measurements in photographs. Enough images from different viewpoints allow recovery of 3D structure. Thanks to digital photography and the internet, photos are abundantly and cheaply available. Accordingly, photogrammetry applications can exhibit enormous variety.

Existing software is often either closed source or tailored toward specific use cases, making it difficult to reason about algorithmic details or make structural modifications. In this diploma thesis, we present a library for creating photogrammetry pipelines through function composition, emphasising modularity and clean design to support rapid scientific experimentation.

### Image Features

Features describe objects in an image. Different features work well for different things: Points, lines, rectangles, etc. We identify the same feature in two images. Features must look and move similarly across viewpoints.

### Feature Matching

We identify the same feature in two images. Features must look and move similarly across viewpoints.

### Pose Recovery

Obtain the camera motion between two photos through matching features. Repeat iteratively to create a Photo Network.

### Functions...

Every component is implemented as pure function. Sequential computation through function composition.

### ... and Composition

Statically enforced conventions ease changing implementations, increasing code reusability. Conclusions

A pure functional implementation facilitates reasoning about behaviour. Immutable data structures promote structural changes, such as recursion or parallelisation.

Code at https://github.com/aardvark-platform/aardvark.mondo