The alignment is necessary since the camera is hand held and the iris moves.
In the aligned video the iris will appear in the same location and size.
Based on minimizing differences in intensities in an area surrounding the iris:

\[
C(H) = \sum_{x \in \text{ROI}} (I(x) - I_{LM}(x))^2
\]

The images of interest are those between two consecutive blinks, defined as a sequence. Based on 3 main steps:
- Detection of the iris in each frame
- Alignment of the images
- Finding the dry areas and the BUT

- Computing Image Alignment
  - The alignment is necessary since the camera is hand held and the iris moves.
  - In the aligned video the iris will appear in the same location and size.
- Based on minimizing differences in intensities in an area surrounding the iris:

The change in intensity of each pixel is examined.
- A confidence map of the thinning of the tear film over the corneal area is built.
- The BUT is defined as the time when a pixel has no further decrease in intensity.

We captured over 100 videos of more than 30 different patients (Sep 2007) varying from having a very dry eye to no visible dryness.
- Our results were compared with hand segmented results of a clinician.
- In terms of area segmented, we had 91% accuracy ranging from 84% to 96%.

- Over 5% of Americans aged 50+ suffer from moderate to severe dry eyes.
- Symptoms: itchiness, discomfort and damage to the corneal surface.
- It is the most common complication of contact lens wearers.
- Fluorescein Break Up Time (F BUT) is the test most commonly used by clinicians.
- Break Up Time (BUT): time passed after a blink until dry areas appear.
- The location, shape, progression and depth of the break determine what treatment to choose.
- This is not possible with current clinical routines or any automated method.
- The EyeScan system videos the front of the eye.

The imagination driving Australia’s ICT future.