Reverse engineering as a teaching tool. The corneal topographer

ABSTRACT

Reverse engineering is the process of discovering the technological principles of a device, object or system through analysis of its structure, function, and operation from a device used in clinical practice, as the corneal topographer, reverse engineering will be used to infer physical principles and laws.

The initial knowledge of the application and usefulness of the device provides a motivation that, together with the combination of theory and practice, will help the students to understand and learn concepts studied in different subjects in the Optics and Optometry degree.

These subjects belong to both the core and compulsory subjects of the syllabus of first and second year of the degree. Furthermore, the experimental practice is used as transverse axis that relates theoretical concepts, technology transfer and research.

We are able to transform a standard videokeratometer into a fully customizable device. We propose a similar procedure and applying reverse engineering.

The used videokeratometer was a non-operative unit Humphrey Atlas 995 from Zeiss Meditec.

All the imaging and electronic parts were dismounted and reassembled with our own video camera and computer.

Corneal images are processed through our software responsible for processing, calibrating and converting captured images. This stage can be divided in the following phases:
- Capture
- Rings extraction
- Rings classification & calibration
- Test & modification

Reverse engineering is not taught formally in the universities and it is confused with a piracy practice. It is a methodology used to obtain technical information from an object and provides information from the geometry, dimensions and materials and, so, it may have a huge usefulness when applied it to the didactic methods.