Abstract

This thesis presents the development of a prototype system for the acquisition of the 3D mandibular movement.

In Dental Medicine, the study of the mandibular movement is very important in the development of oral rehabilitation treatments because it allows to determine if exists or not pathologies in the temporomandibular joints, allows the diagnostic and the elaboration of adequate treatment plans.

In this project, in an early stage, it was made a study about dental anatomy and the functioning of the temporomandibular joint to better understand the problem. Were also identified some of the existing systems for the acquisition of the mandibular movement to know there advantages and limitations.

Finally, it was chosen to adapt a common facial arc in Dental Medicine to use electromagnetic sensors to acquire the movement. Some parts of the facial arc were redesigned in order to ensure the comfort of the patients during the exams and it was developed a specific support for the sensors.

To visualise and analyse the 3D movement acquired in a personal computer it was developed a computational application in LabVIEW. To transform in cartesian coordinates the electrical signal obtained by the electromagnetic sensors it was created the “algorithm of the nearest point” and were also used neural networks.

To develop this prototype system it was adopted a structured product development process: the costumer needs, the product specifications, the concept and the product architecture were defined and prototypes were created and tested. It were also estimated the production costs of the developed prototype.