

Talking Compass project

Greco Naomi - Martelli Lapo – Rivera Khristian

The Talking Compass project deals with the design and implementation of an electronic guidance system that blind people can use in navigation.

In 2008 in Florence, the leaders of the Italian Navy League (LNI) organized a course to help affected by Down Syndrome or visual and auditory impairment to navigate sailboats.

During the practical course and time at sea, the tactile compass proved to be unreliable for visual impaired children. In fact, while reading and touching the compass, evidence showed that the needle could be moved from the North reference, thus providing incorrect data.

Since this experience was however positive and exciting for blind students, both the managers and directors of the Italian Blind Union (UIC) and the leaders of the LNI, came up with the idea to allow blind and visually-impaired people to navigate autonomously in sailboats through vocal instructions of the route given by an electronic control system.

In 2009 the students of the Mechanic, Electronic, and Photography courses of the "Leonardo da Vinci" High School of Florence along with the blind students from the Nicolodi telephonist training school, developed the "Talking Compass" project with the aim of finding a system that could meet the requirements of UIC and the LNI.

Once the specifications were defined, we moved on to the phase of design and implementation.

The electronic students, coordinated by their teachers, created an electronic compass using the CMPS10 module which, through the link to Beagle Board, makes it possible to obtain, with an appropriate software, vocal synthesis of data necessary to maintain the navigation route.

The mechanical engineering students have designed two systems in order to verify the accuracy of the Compass: a rotating speaker to control the direction and a sailing Simulator. The navigation simulator consists of a sail boat, made of glass-resin bodywork by students of the Mechanic sector while the students of photography developed a windrose, at the base of the mechanical structure.

The movements of the Simulator were obtained using three types of electronically controlled engines through software developed in LabVIEW environment. The change of direction is shown by the compass rose to make the comparison with the values supplied by the talking compass aboard the same boat.

Together with the theoretical work of design and practical construction, students attended sailing lessons organised by the LNI of Florence, followed by navigation in a sailboat.

Then the compass was tested by the blind students of the "Nicolodi" High School, who proposed amendments to be made to the system, both in terms of hardware and software, in order to improve its functioning and use.

The project will be developed in such a way as to be transformed from a laboratory prototype to a system that can be actually used aboard a sailboat, with appropriate reliability and moisture characteristics.

The project was awarded the first prize at the national competition "Fabbricando 12", promoted by Acciaierie Bertoli Safau; the award ceremony was held at the Palazzo della Regione Friuli Venezia Giulia in Udine on 5/26/2012. On the same occasion it was awarded the bronze medal from the President of the Italian Republic Giorgio Napolitano.

The project received the first prize in the national competition "Orientascienza 2012", sponsored by MIUR, the Italian Ministry of Education; the award ceremony took place in the Auditorium Luca Giordano of Palazzo Medici Riccardi in Florence on 11/15/2012.