

INTRODUCTION

Before we illustrate our project it is necessary to explain the set up of our school and how our team works. We attend the Salesian Scientific Secondary School Rainerum, in which laboratories are offered during curricular lessons. The students have to choose one laboratory of two lessons a week they then attend for the whole school year. The Robotics Laboratory counts 16 students, five of which form the team that has been working on this project since May 2006. Assembling the most complex construction, the robot, two other students of the laboratory were involved and we thank them for their help.

The idea for project “Cicero” was born discussing issues linked to tourism in our home town. Our initial question was which aids a tourist might need to visit the old town of Bolzano easily and get to know and appreciate its artistic beauties?

This initial quest led to further questions:

Which instrument would be best to communicate the information?

Which information should be given and in which sequence?

Which instrument can offer a rapid orientation in the centre of Bolzano?

We thought of an “intelligent apparatus” which could function as assistant and tourist guide. To conceive an intelligent apparatus of this kind we had to face a series of decisions:

Which kind of intelligent system is the most suitable for our goal?

Which functions does it have to offer?

Which type of structure is most suitable to contain the intelligent system?

We created a system consisting of a PC laptop to acquire (and elaborate) the data from:

a GPS module which exclusively delivers the local coordinates (mapping the city centre was done by our team);

a micro-controller that communicates to the PC the data detected by distance sensors that permit the system to automatically recognize and signal the presence of obstacles along the way;

a microphone directly connected to the sound card which directly acquires voice samples and analyzes them in order to equip the apparatus with an interface for vocal commands created by us to facilitate an immediate utility for the person using it;

two video cameras, one colored and one black and white, which are the “eyes” that make the apparatus completely autonomous in its movements through the streets of Bolzano.

All software was conceived and elaborated by our team. We applied these instruments on two different structures:

A caterpillar trolley, that is completely autonomous in its movements through the streets of Bolzano, which operates as a robot tourist guide thanks to its cameras. Its batteries can be recharged with the help of a photovoltaic panel situated on top for minimum environmental impact;

A Segway, a new ecological means of transport handy in pedestrian areas which equipped with our instruments guides and carries the tourist through the city center indicating the artistic itineraries and giving information about the sights, when the GPS system traces them near. The tourist interacts with the system using voice commands like “Go”, “Stop”, “Search bar” etc...

The system also includes an audio guide which activates when the apparatus detects a sight of historical or artistic interest in the neighborhood via GPS.

The audio guide is another product of the school, which was created by our fellow students during a seminar held by the Italian and the Arts teacher.

We are very thankful for the permission to use it and for having modified it in order to make it more suitable for our purpose.