History of AHS in Italy and future issues

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Invited Talk

I. INTRODUCTION

The invited talk presents the activities carried out in Italy
in the last two decades related to AHS topics and in particular
dealing with intelligent driverless vehicles.

The presentation discusses about the history of the projects
on driverless vehicles in Italy and Europe, and presents the
most important results, some of which became worldwide
milestones in vehicular robotics.

II. THE EARLY DAYS

Starting from the PROMETHEUS Project, which involved
more than 20 car manufacturers in Europe, some italian
research centers begun their activity in the field of perception
for vehicles. Among these, the CRF (FIAT Research Center)
and the University of Parma developed some early prototypes
which demonstrated the viability of perception technologies
like artificial vision.

Fig. 1.   The MOBLAB vehicle developed within the Prometheus Project

III. THE ARGO PROJECT

As a result of the PROMETHEUS European Project, the
University of Parma challenged itself in a self-funded project
named ARGO, whose ultimate target was the development
of an autonomous vehicle to be tested on a 2000+ km tour
around Italy. It was called the "MilleMiglia in Automatico",
and the tour was a real success and got the attention of the
scientific community. The ARGO vehicle was equipped with
low cost cameras and a off-the-shelf PC, and was able to stay
inside the lane, overtake slower traffic, and detect obstacles
on the path. It soon became a milestone in vehicular robotics.

Fig. 2.   The ARGO vehicle

IV. THE DARPA CHALLENGES

The University of Parma's laboratory for Artificial Vision
and Intelliget Systems, currently known as VisLab, was then
engaged in other challenges regarding driverless vehicles,
some of which were organized and run by DARPA (the
Grand Challenge in 2004 and 2005, and the Urban Challenge
in 2007), others were just defined, such as the driving of
autonomous boats in the Mediterranean sea.

The robotic vehicles developed by VisLab and partners
for these challenges (all named TerraMax) were the only
vehicles that were using artificial vision as primary sensor.
The very posittive results (reached the finish line of the
DARPA Grand Challenge in 2005 and succesfully qualified
for the DARPA Urbann Challenge in 2007) granted VisLab
an even greater visibility in the automotive world.

Fig. 3.   The TerraMax vehicle in 2007

V. FUTURE ISSUES

The current and future plans are to investigate the possibil-
ities and great opportunities offered by x-by-wire technology,

and in particular to integrate the perception systems developed so far in order to provide the vehicle with a complete sensing capability that could be used to act on the final decision making strategy. Specifically, x-by-wire technology will be used to study possible applications in which vehicle control may play an important role and close the loop also on commercial vehicles.

Fig. 4. The current VisLab test vehicle

The presentation addresses the main results in these challenges, including the DARPA Challenges, and discusses future trends in the field and possible future applications of these results on mass production vehicles, with special emphasis to agricultural, military, and road construction applications.

12