


EU FP7-IRSES Project HAZCEPT (project number 318907) (2013-2017)

# HAZCEPT: Towards zero road accidents - nature inspired hazard perception

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## PROJECT SUMMARY

The number of road traffic accident fatalities world-wide has recently reached 1.3 million each year, with between 20 and 50 million injuries being caused by road accidents. In theory, all accidents can be avoided. Studies have shown that more than 90% of road accidents are caused by, or related to, human error. Developing an efficient system that can detect hazardous situations robustly is the key to reducing road accidents.

This HAZCEPT consortium will focus on automatic hazard scene recognition for safe driving. The primary objective of this project is to build international capacity and cooperation in the fields of nature-inspired visual computation, pattern recognition and human behaviour analysis, to explore effective methodologies for hazard perception.

Vision plays a critical role in hazard perception and escape behaviour for most animal species in a dynamic world. Many animal species, such as dung beetles and locusts, have also developed efficient night vision systems that work well in low light conditions. At a higher level, human vision combines cognitive cues such as road markings and signposts to judge hazardous situations robustly. The naturally evolved biological vision systems provide ideal models to develop tireless artificial vision systems for hazard perception. On the other hand, a human driver plays a key role in the safe driving loop, and therefore the status and behaviour of a driver should be constantly monitored and automatically analysed.

Taking the inspiration from biological vision systems, the consortium will bring together neurobiologists, neural system modellers, pattern recognition experts, an autonomous system integrator and a human/robot movement analyst to develop a hazard perception system, whilst also building strong connections between the European institutions and partner institutions in the East of Asia via staff secondments, and jointly organised seminars and workshops.

Five work packages (WPs) are designed to achieve the objectives of the project - WP1: motion sensitive vision systems for hazard perception; WP2: cognitive vision system for road marking and signpost recognition; WP3: human driver behaviour monitoring and analysis; WP4: hazard perception system integration and testing; WP5: project management, dissemination, and exploitation.

The four-year project started on 01/04/2013 and completed on 31/03/2017. During the project time, many of the planned research and secondment activities for the above WPs have been carried out according to the initial plan. Top tier research outputs have been published in IEEE transactions and international journal/conferences with more to be written up and published in the future. The secondment and networking activities supported by this project have significantly consolidated the research collaboration between the partners for new research challenges.

## PROJECT LOGO AND WEBSITE

The project logo is on the top right of this page. The project logo has been used on all the websites, invitation letters, research posters, and workshop/conference presentations that are relevant to the project.

The project website is on http://www.ciluk.org/hazcept.html