EU FP7-PEOPLE-IRSES Project EYE2E (**269118**) (2011-2015)

EYE2E: Building visual brain for fast human machine interaction

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Final Report

PROJECT SUMMARY

The primary objective of the EYE2E project is to build international capacity and cooperation in the field of biologically inspired visual neural systems, via software simulation and hardware realization, with an application focus on fast human-machine interaction.

Effective computer vision is a major research challenge. Vision plays a critical role in the interaction of most animal species with a dynamic world, and even relatively low order animals have remarkable visual processing capabilities. For example, insects can respond to approaching predators with remarkable speed. Recent research demonstrates that modelling biologically plausible artificial visual neural systems can provide new solutions for computer vision in dynamic environments. In particular, human-machine interaction is a rich domain demanding improved machine perception, with the potential for huge impact in a range of applications, such as intelligent robots, surveillance and video games. However, much research in neural vision has been based upon general computing systems, whereas the powerful parallel computing capacity of visual neural systems can only be fully demonstrated and utilized when realized in Very Large Scale Integrated (VLSI) chips.

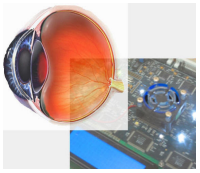
However, realizing biologically plausible visual systems in VLSI chips demands multidisciplinary expertise - in biological system modelling, computer vision and VLSI design. This breadth of expertise is not readily possessed within one institution. Research staff exchange is the best option to bridge neural system modelling and VLSI chip design via knowledge transfer between partner institutions. The staff exchange program is also the best way for the involved partners to build up strong expertise in this exciting multidisciplinary research area.

Focusing on modelling biological visual neural systems and realizing them in chips for human-machine interaction, the research staff exchange programme will bring opportunities for the four partners to work together and complement each others' research strengths via research staff secondments, training seminars, joint workshops and jointly organised conferences, to explore the multidisciplinary research area and to build strong connections between the European institutions and partner institutions in a fast growing economy.

Five work packages (WPs) are designed to achieve the objectives of the project, i.e., WP1 biological plausible visual neural system modelling, WP2 multiple visual neural systems integration, WP3 VLSI neural vision chip design, WP4 biologically plausible vision systems for human-machine interaction, and WP5 management, networking and dissemination.

Since it started from 01/08/2011, most of the planned activities such as secondment activities, workshops, and training seminars have been carried out and the targets have been achieved. During the whole project period, about forty eight researchers have been involved in the project research and seconded to partner institutions for two to twelve months, more than thirty research papers have been published in international journal and conferences. The project milestones and the deliverables have been completed.

Project Images, Logo and Photos



This **image** is used as EYE2E project icon, which is linked to its website and is used in posters as well.

The project logo has been used in all the invitation letters, research posters, and workshop/conference presentations that are relevant to or represents the EYE2E project.

The EYE2E project training workshop held in Lincoln (18/05/2012) where attendees were chip designers, neural system modellers and robotics researchers.

Dr. John Muarry visited Tsinghua University (12/2012-01/2013). The photo shows John and PhD student Farshad Arvin in Tsinghua before John's talk. Farshad Arvin was there in his secondment (09/2012-08/2013).

The workshop held in Lincoln on 11 May 2014 with researchers coming from most of the project partners.

Project Websites

EYE2E project currently has one main web site with all the relevant information and most updated events of the project held at http://www.ciluk.org/eye2e.html.

A less frequently (quarterly) updated web page dedicated to the project can be found at http://webpages.lincoln.ac.uk/syue/details/eye2e.html.

Both of them can be accessed publicly.