The Society for Medical & Biological Engineering S.A. Incorporated

S M.B.E.

PO Box 19, Woodville, SA 5011
http://www.smbe.asn.au
ABN 78 256 253 854

NEWSLETTER NOVEMBER 2004

Affiliations

Australian Federation for Medical and Biological Engineering
International Federation for Medical and Biological Engineering

Christmas Dinner
Tuesday 7 December 2004

The Historian Hotel
18 Coromandel Place
Adelaide

Drinks from 6.00 p.m.
Dinner at 7.00 p.m.
Cost $10.00 per head

Our major social function for the year is with us again. This year we are having a change of venue. The Earl has been an excellent venue but we decided this year to give the Historian a go. We have our own room as at the Earl so it should be a good night as always.

To assist with the catering arrangements, could you please send the following slip to **Kerry at Helicon Technology** (along with a cheque/money order made out to the SMBE (Inc) SA.)

Numbers are limited so get your reply in quick as "first in best dressed" will apply if need be.

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RSVP - Friday 3 December 2004

Name _____ No. attending ____

A cheque / money order for $_____ is enclosed.

Please return to:

Kerry Smith
Helicon Technology
Unit 6 181 Gilles Street
ADELAIDE SA 5000
Ph 82232000
Email: kerry@helicon.com.au

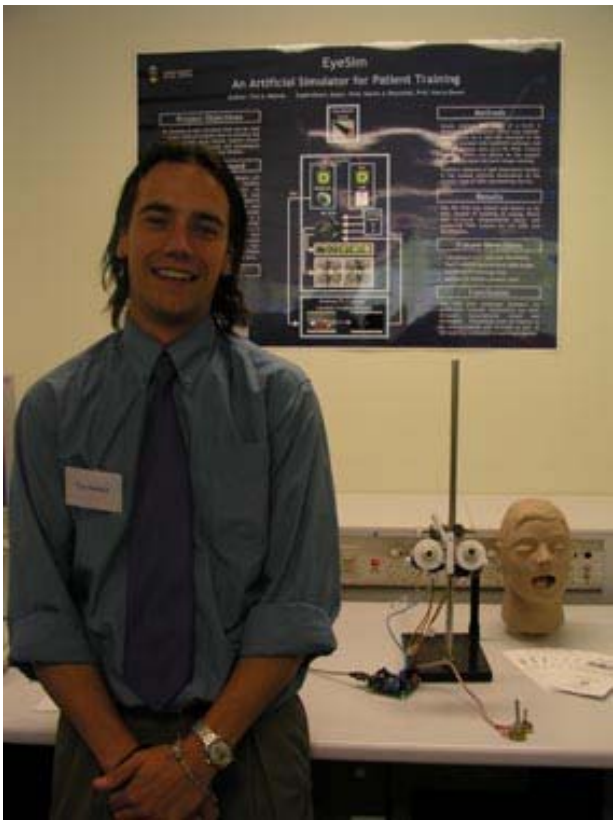
SMBE Honours Student Prize

The award for Outstanding Honours Project in Biomedical Engineering was presented at the 2004 EXPO held at Flinders University on 5 November 2004.

This year the award was won by Tim Nelson for his project "An Artificial Simulator for Patient Training."

Below are some pictures of Tim and a copy of his brochure is included in this newsletter.

The SMBE congratulates Tim on winning this award.



Drager/SMBE(SA) Biomedical Engineering Encouragement Award

Nominations are being sought for this very worthwhile award for 2005. Nomination forms are available from Secretary and nominations close on **a date to be advised.**

PHILOSOPHY

This annual award is to be made as a means of acknowledging and encouraging excellence amongst Biomedical Engineering practitioners.

PROCESS

The recipient shall be selected by the council of the SMBE (SA) and a representative of Drager Australia from amongst candidates who shall:

> *Be nominated by a peer who deems them worthy of such recognition*

THE AWARD

The award shall comprise a funded visit to the annual SMBE (NSW) Technicians seminar.

CONDITIONS

Open to all BME practitioners, from within SA and the NT, be they SMBE members or not. The recipient must be in a position to attend the seminar, in either their own or employer's time. The award may be forfeited if this requirement cannot be fulfilled. The nomination by a peer must give a clear indication or evidence of the nominee's abilities, skills, motivation or commitment that, in their mind, sets them apart and makes them deserving of particular recognition.

Individuals holding position on the council of the SMBE (SA) at the time of judging are ineligible for consideration.

All entrants are eligible for minor awards of complementary SMBE (SA) membership for a one year period.

The SMBE (SA) council reserves the right to not make the award.

Nominations should be forwarded to:
Robin Woolford, Secretary SMBE
C/- Biomedical Engineering
Flinders Medical Centre, Bedford Park 5042
FAX (08) 8204 5840

Please contact Secretary for nomination form.

E.& O.E.

EyeSim

An Artificial Simulator for Patient Training

Author: Tim S. Nelson Supervisors: Assoc. Prof. Karen J. Reynolds, Prof. Harry Owen

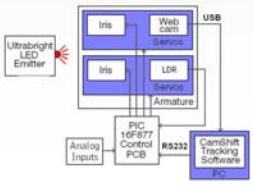
Project Objectives

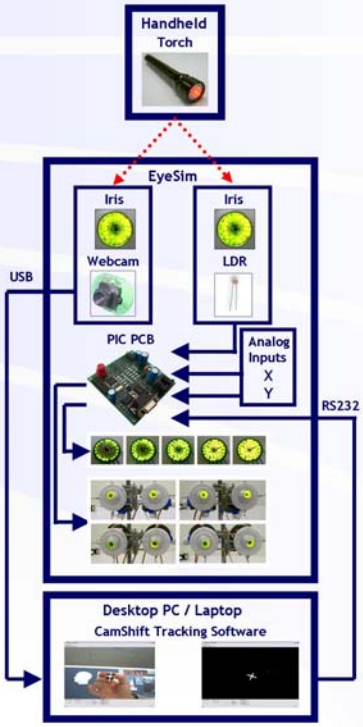
To develop an eye simulator that can be used to teach medical students how to examine the eyes for cranial nerve lesions. EyeSim should be capable of both normal and pathological binocular motion and pupillary dilation.

Project Background

The ophthalmic examination is a simple, yet informative procedure that medical practitioners should be proficient at performing. Ophthalmic examination can provide diagnostic clues to a patient's state of consciousness, cranial nerve condition and possible cause(s) of abnormalities in ocular function. The ophthalmic examination is a challenging skill to learn and present methods are unsatisfactory. The use of simulators in medical training allows students to learn critical thinking skills and to integrate theoretical and clinical assessments in a risk-free environment. EyeSim will facilitate repetitive and realistic training of these skills.

Design





Methods

Ocular motion: The image of a torch is detected by a Webcam within one eyeball. The position of a red LED mounted in the torch is tracked with CamShift software and the coordinates sent to a PIC PCB. Control software drives two servos on the eyeball armature to keep the torch image centred.

Pupillary response: a light dependent resistor in the eyeball controls illumination of the circular rings of LEDs representing the iris.

Results

The PIC PCB was tested and shown to be fully capable of handling all analog, RS232 and in-circuit programming inputs and producing PWM outputs for iris LEDs and servomotors.

Future Directions

- Independent left/right eye movements
- Pupil response derived from video image
- Expansion of pathology base
- Addition of lifelike cosmetic cover

Conclusion

The first ever prototype simulator for ophthalmic response examination has been designed, manufactured, tested and developed. Possibilities exist for EyeSim to be commercialised and included as part of the teaching curriculum in teaching hospitals.

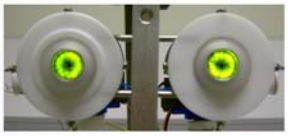
Within Flinders University, the Clinical Skills and Simulation Unit of the School of Medicine utilises numerous commercial simulators alongside many custom simulators that have resulted from previous collaborations with the School of Informatics and Engineering. The EyeSim project represents the most recent of these ventures.

The team identified the need for a simulator capable of replicating the ophthalmic response of patients with typical and a range of atypical neurologies.

At present EyeSim comprises the electrical, electronic and mechanical components that replicate the pupillary response of the iris and the motility of the ocular muscles, a computer for the reception and analysis of a video signal and the micro-controller components, which determine the action of the physical components based on an array of inputs.

This prototype is the first of it's kind and presents Flinders University School of Informatics and Engineering with an valuable opportunity in terms of commercialisation with the medical simulator industry.

EyeSim



An Artificial Simulator for Patient Training

Tim S. Nelson

Supervisors:

Assoc. Prof. Karen J. Reynolds
Prof. Harry Owen