A Cambridge Wireless Event

Location Based Systems/Services SIG

"Is Inertial Technology the Missing Link for Location Systems?"

14th September 2010

Supported by: 'Discovering Start-Ups Project', an EEDA funded project

Discovering Start-Ups

EEDA East of England Development Agency

east of england

This project is supported by the East of England Development Agency

Championed by David Bartlett of Omnisense and Nigel Wall of Shadow Creek Consulting

Venue – The Vivien Stewart Room, Murray Edwards College, Huntingdon Road, Cambridge, CB3 0DF

AGENDA

12:30	**Registration over Lunch**
13:30	**Introduction to the Location Based Systems/Services SIG from David Bartlett, SIG Champion**
13:35	**Welcome by Kevin Coleman, Project Director of 'Discovering Start-Ups', an EEDA funded project**

Session 1: Chaired by David Bartlett of Omnisense

13:45 **"Tracking Using Low Cost Inertial Sensors"**

David Dungate, Tessella

The availability of small, low cost, low power inertial sensors opens up the possibility for use in human and other tracking applications, in particular where other technologies such as GPS are unavailable or unreliable. This applies for cases such as tracking individuals indoors. However, the difficulty lies in achieving acceptable performance - errors from various sources grow rapidly over time, even with the use of algorithms that exploit data redundancy to perform some error calibration. The key to the use of this technology is the intelligent use of the data in tandem with other application-specific information that together can limit the error growth. The presentation will review a number of these based on previous Tessella projects to illustrate what can be achieved.

Examples include:

- Exploiting bandwidth limitations in the appropriate system model for the problem
- Use of footfall detection to feedback velocity information into the estimator
- Use of mapping data combined with IN sensing using particle filtering techniques

An introduction to some other areas of interest currently undergoing research in Tessella will also be presented.

14:05 **Q&A**

14:10 **"Accurate Real-Time Navigation Techniques"**

Charles Forsberg, Forsberg Services

The presentation addresses the increasing need for precision navigation, the challenges and a selection of worked examples. As GPS use becomes widespread, there are an increasing number of fertile minds thinking out new applications. New applications invariably mean stretching navigation technology and ultimately a compromise between performance and price. The attendee will see examples of what's possible, what's involved and at around what price level. The examples will include examples from motor sport, aerobatics, simulators and 3D mapping with industry leaders.

14:30 **Q&A**

14:35 **Coffee Break**

Session 2: Chaired by Nigel Wall of Shadow Creek Consulting

15:05	**"Computer Vision - Phone Localisation and Object Recognition"** **Professor Roberto Cipolla, Department of Engineering, Cambridge University** Computer vision is the science and technology of making machines that see. It is concerned with the theory, design and implementation of algorithms that can automatically process visual data to recognize objects, track and recover their shape and spatial layout. In this talk I will review the state-of-the art in both object and location recognition from images taken with a mobile phone camera.
15:25	**Q&A**
15:30	**"Location? Context? Activity!"** **Dr. Leo Poll, Philips Research** Sensors in intelligent systems are used largely to either extend human sensing abilities or to support the user interaction with devices by tailoring the user interface and/or filtering the sensor data to a certain context (context-awareness). In both cases the sensors mainly focus on detecting the world surrounding a user which only gives an indication of what kind of activity a user might be engaged in. During this presentation it will be argued that a truly adaptive user-centred approach should be primarily inward looking and focus on a user's activity rather than the user's location and context.
15:50	**Q&A**
15:55	**Panel Session, Chaired by David Bartlett of Omnisense**
16:15	**Closing Remarks.** **Complete Evaluation Forms**
16:20	**Event Closes**

With the permission of the speakers, presentations will be loaded to the Cambridge Wireless website on the day following the event

Profile of our Supporter

East of England Development Agency (EEDA)

EEDA has a clear mission - to improve the economy of the East of England. So whether it's helping businesses through the recession, supporting people to be the best they can or breathing new life into places, everything they do comes back to their mission statement. EEDA works across the six counties of Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk.

Key to their success is working with partners. EEDA is uniquely placed to lead partnerships and bring people and resources together on big projects which have a major impact. For more information please visit: www.eeda.org.uk

Discovering Start-Ups

Discovering Start-Ups is an exciting programme of activities to assist technology companies in the East of England. Cambridge Wireless is providing master classes, workshops and support from its industry leaders. At its heart is a competition with prizes for the best in five categories: Green radio, Hot applications and services, Wireless health and wellness, Technology design, and Emerging disruptive ideas. For further information please visit: www.cambridgewireless.co.uk/discoveringstartups

Profiles of our SIG Champions

David Bartlett, Omnisense

David Bartlett has specialist knowledge in the fields of location technology, wireless communications and digital imaging. Omnisense supplies real-time location and tracking systems (RTLS), technology and services based on its patented sparse-wideband (SWB) technology. The technology is extremely reliable and the entire system can be deployed without need for wired infrastructure (wireless). As such the system can be deployed rapidly and is fully transportable to different sites. www.omnisense.co.uk

Nigel Wall, Shadow Creek Consulting

Nigel Wall has been an independent consultant for 6 years (Shadow Creek Consulting), with a focus on Intelligent Transport Systems. Prior to this he held a number of key roles within BT, including leading mobile data research. He now works for a variety public and private sector clients, including acting as a Technology Translator for the Location & Timing Knowledge Transfer Network, and for innovITS. For further information please visit: www.shadow-creek.biz

Profiles of our Speakers

David Dungate, Tessella

Dave Dungate gained a PhD in Theoretical Physics and then worked for many years in the space and defence sectors, in particular in the design of spacecraft attitude control systems and radar tracking systems. He is now the Technical Manager of Tessella's algorithms and mathematical modelling group, which uses the group's expertise in estimation, control, statistics and signal processing to provide solutions in the space, defence, life sciences, consumer goods and energy sectors. The use of inertial sensors in tracking applications is a specific interest within the group and has been the subject of a number of projects as well as internal research initiatives. For further information please visit: http://www.tessella.com/

Charles Forsberg, Forsberg Services

Charles Forsberg has extensive knowledge of navigation and related industries. He was a navigator and surveyor in the Royal Navy from 1974 to 1984 and has worked in the commercial sector of the precise navigation industry since then. From 1984 to around 2000 his work was mainly as a navigation consultant to automotive, computer games, defence, motor sport and the oil industries. Since 2000 there has been significant commercial sales and manufacturing growth as opposed to consultancy. This is done through several companies that manufacture and sell navigation systems as well as managing related patents and inventions in navigation. They are all SMEs based in the U.K. and Germany. For further information please visit: http://www.forsbergservices.co.uk/

Professor Roberto Cipolla, Department of Engineering, Cambridge University

Roberto Cipolla obtained a B.A. (Engineering) from the University of Cambridge in 1984 and an M.S.E. (Electrical Engineering) from the University of Pennsylvania in 1985. From 1985 to 1988 he studied and worked in Japan at the Osaka University of Foreign Studies (Japanese Language) and Electrotechnical Laboratory.
In 1991 he was awarded a D.Phil. (Computer Vision) from the University of Oxford and from 1991-92 was a Toshiba Fellow and engineer at the Toshiba Corporation Research and Development Centre in Kawasaki, Japan. He joined the Department of Engineering, University of Cambridge in 1992 as a Lecturer and a Fellow of Jesus College. He became a Reader in Information Engineering in 1997 and a Professor in 2000.
His research interests are in computer vision and robotics and include the recovery of motion and 3D shape of visible surfaces from image sequences; object detection and recognition; novel man-machine interfaces using hand, face and body gestures; real-time visual tracking for localisation and robot guidance; applications of computer vision in mobile phones, visual inspection and image-retrieval and video search. He has authored 3 books, edited 8 volumes and co-authored more than 300 papers. For further information please visit: http://mi.eng.cam.ac.uk/milab.html

Dr. Leo Poll, Philips Research

Leo Poll has a keen interest in matching innovative technology to real world problems in a commercially sustainable way. In Philips, he pursues this in his role as business developer by identifying commercially promising research results and realising routes to market through venturing, partnering and licensing. Leo has more than 15 years of experience in customer-centred innovation and has managed venturing opportunities on topics such as 'near field communication', 'asset tracking', 'ultra low power radio transceivers' and 'innovative drug delivery systems'. For further information please visit: www.research.philips.com/