

Contextualised Information Retrieval and Delivery

The Right Information, to the Right People
at the Right Time in the Right Form

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Sydney, Australia

- What problem are we addressing?
- Our approach
- How we help both users and business?
- Applying our ideas
- Partnership opportunities

User Perspective:

- Time-poor and overloaded with information
- Can't easily find the information needed in the form needed to complete tasks

Business Perspective:

- People have different needs
- It would take too long and cost too much to write what is appropriate to address all these needs

- Information seeking is almost always part of a larger task or process
- Knowledge without **context** is meaningless
 - What's relevant in one situation for one person may be irrelevant for a different person in a different situation
- The way information is delivered matters!
 - Often need to do much more than provide a list of search results to give people the information they need in a suitable form

Example: Searching for information about Health-related research in CSIRO

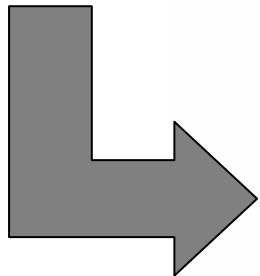
www.csiro.au

health research Go

Search all CSIRO

Search this site

Current Highlights



http://www.csiro.au/csiro/search/CSIROau.html?query=health+research&Go=Go&area=all

and L... Press It - Thoughtlets del.icio.us/atlamp post to del.icio.us popup post to del.icio... bookmarks from others SciFly >> LinkedIn

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SEARCH
Home - Search

Search on keywords **"health research"** has produced **119306** results from all of CSIRO's websites.

Search results

- 1 e-Health Research Centre - Revolutionising the delivery of health services**
e-Health Research Centre homepage A leading national **research** facility in ICT for healthcare applications. The Centre aims to provide better access to **health** services information at the point of care to improve clinical and patient outcomes.
<http://e-hrc.net/> - 13k - Cached - 20 Dec 2005
- 2 e-Health Research Centre**
E-Health Research Centre
<http://ict.csiro.au/page.php?cid=12> - 7k - Cached - 4 Jul 2005
- 3 e-Health Research Centre**
E-Health Research Centre
<http://www.ict.csiro.au/page.php?cid=12> - 7k - Cached - 4 Jul 2005
- 4 Health Data Integration (HDI) Overview**
Health Data Integration (HDI) enables clinicians, researchers & policy analysts to access, link and analyse individual-level, population-based **health** data **Health** Data Integration (HDI) enables clinicians, researchers & policy analysts to access, link and analyse individual-level, population-based **health** data.
<http://e-hrc.net/hdi/> - 15k - Cached - 11 Jul 2005
- 5 Health & Wellbeing**

Find: Find Next Find Previous Highlight all Match case

Done Adblock

Example: So what's the problem?

People can't easily find the information they need

- Too much information and not all of it is relevant
- Must manually combine and aggregate information
- Must manually determine how information is related
- Must organise the data to suit the task

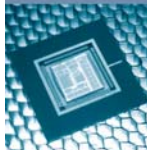
Contrast: A Possible Alternative

www.csiro.au



ICT Centre

Listening, creating, solving, delivering - Innovative ICT transforming Australian industries



ICT Centre

This flyer was produced for **Andrew Lampert** by SciFly, a customised flyer generation system from the Information Engineering Laboratory. SciFly is built using Myriad - CSIRO's generic platform for creating contextualised information retrieval and delivery systems.

www.csiro.au/scify

Introduction

The research projects you have selected belong to different domains. Before each project is presented, an introduction is provided to the relevant application domains.

Health and Medicine

Applying information and communication technologies to improve healthcare quality, delivery and outcomes.

Personal Monitoring

www.e-hrc.net/personal_monitoring

Background

Factors such as ageing population, rising health costs and the increasing incidence of long-term chronic diseases are creating a growing crisis in health care. These issues are driving a trend towards increasing levels of care in the home, with early discharge from hospitals, or "ageing in place" initiatives, in which the elderly are encouraged to maintain independent living for as long as possible.

Summary

Recent adoption of wireless technologies has led to the development of systems which can provide a truly continuous monitoring of patient vital signs and movement for extended periods, in almost any location.

Description

Advances in sensing, telecommunications and information technologies have led CSIRO and biomedical companies into the development of personal monitoring systems to improve the quality of care of the ageing population with chronic diseases.

One of the focuses of the e-Health Research Centre is directed towards rapid testing and implementation of these personal monitoring technologies. As part of the program of ambulatory monitoring of stroke and elderly patients, the e-Health Research Centre will apply this technology with the aim to detect pre-cursors and prevent falls

in the ageing population.



Health and Medicine

Applying information and communication technologies to improve healthcare quality, delivery and outcomes.

Virtual Critical Care Unit

<http://www.ict.csiro.au/VICCU>

Background

Rural and regional hospitals are unable to provide the levels of round-the-clock specialist expertise available in major tertiary referral centres. The solution is usually a sometimes unnecessary ambulance transfer to a major centre, resulting in delays in appropriate treatment. These issues are exemplified in the Blue Mountains District Anzac Memorial Hospital (BMDH) in Katoomba, west of Sydney - an 80-bed hospital for which the nearest tertiary referral hospital is Nepean Hospital, 80km distant.

Summary

VICCU provides an always-on telepresence link to enable specialists to confidentially treat patients in critical situations at a remote location.

Description

VICCU is designed so that all information required by the specialist to make judgments on patient treatment is available in real time, as if he or she were present at the remote hospital. The communications - based on technology developed by the Centre for Networking Technologies for the Information Economy (CeNTIE) - transmit multiple high quality digital video channels, high quality audio, vital signs data, written notes and medical images. Two-way high bandwidth video permits natural, low-latency, telepresence interaction with the specialist.

Highlight

By fusing existing technologies, the Virtual Critical Care Unit (VICCU) has become a tool of real clinical use which solves the problem of how to get specialist critical care into smaller, regional hospitals.



Working with us

CSIRO offers flexibility in structuring partnerships, addressing issues of confidentiality and IP ownership under negotiated agreements with our customers. CSIRO welcomes enquiries relating to acquiring or licensing our intellectual property. Visit our website or contact us for more information.

<http://www.ict.csiro.au>

Contact CSIRO

Phone 1300 363 400
Email enquiries@csiro.au
Web www.csiro.au

For further information about the CSIRO ICT Centre, contact:

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CSIRO ICT Centre

www.ict.csiro.au

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- Can manually author some documents for specific information needs (e.g., flyers for individual projects)
- **BUT** infeasible to author flyers for all the combinations of projects people might want!
 - Would take too long
 - Would cost too much

- Exploit user context to:
 - Guide search
 - Reason about appropriate delivery
- Access and integrate data from multiple sources
- Construct virtual documents to ensure timeliness
- Ensure flexibility and portability across application domains

For **End Users**:

- **Tailored Information:** Providing only information that is relevant and appropriate to the user and their task
- **Better delivery of key messages:** Enabling high degree of action by recipient
- **Ease of comprehension:** Organising information to facilitate understanding

For **Business**:

- Automatically integrating the results of a number of queries across multiple data sources
 - Saves time and money in authoring
 - Enables high degree of tailoring to satisfy end-users

Automatic Integration of the relevant information

www.csiro.au



Biotechnology and Health Informatics at CSIRO

Statistical tools and software for biotechnology



CSIRO's diverse capabilities in biotechnology cover medical, agricultural, environmental and industrial applications, making CSIRO Australia's largest single provider of bioinformatics research.

CSIRO is Australia's national research agency. With over 6,500 employees and research collaboration involving some more than 70 countries, CSIRO is one of the world's largest and most diverse scientific research institutions.

CSIRO Mathematical and Information Sciences, one of CSIRO's 20 research divisions, uses advanced statistical data mining and machine learning techniques to solve important problems in biotechnology and health.

We provide essential consulting and specialised software development services to the global biotechnology industry.




Biotech Imaging

We develop world-leading image analysis algorithms that we use in a wide range of commercial applications, particularly drug discovery, genomics and proteomics. We operate an open-source software repository for identification, characterisation and analysis of highly complex images. Our software has already been licensed to biologists, plant breeders, and Bio Technologies for incorporation into a



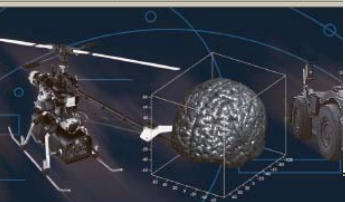
Biostatistics for Human Health

We have developed proprietary statistical techniques with applications in drug discovery, personalised medicine and development of simpler clinical diagnostic tests. We have particular expertise in the analysis of mass spectrometry, genomics data, where the number of variables is very greater than the number of observations (p).



Advanced models for the automated extraction of genomic information from complex images

CSIRO Mathematical and Information Sciences www.cmis1.csiro.au



Autonomous Systems Laboratory

The CSIRO ICT Centre's Autonomous Systems Laboratory develops technologies which, without human intervention, generate intelligent, goal-directed behaviour by gathering information, then using that information to learn and adapt.

Our research is focused on:

- Outdoor Robotic Vehicles
- Mining Robotics
- Smart Agents for Energy Consumers
- Intelligent Networks
- Biomedical Imaging




Image Analysis for Biotechnology

Reliable information from image data

Extracting meaningful numerical information from image data requires expert skills in image analysis. At one of the leading image analysis specialists, we build our solutions using the very latest algorithms, long before they appear in commercial image analysis packages.

Our automated image analysis technology is based on advanced mathematical morphology with a core expertise in image segmentation suitable for the analysis of complex microstructures.

High Contrast Cellular Screening

CSIRO has undertaken advanced image analysis research and development for rapid screening of multi-channel fluorescence microscope images of cells. This is being applied in high content cellular screening as a critical tool used in drug discovery for target validation and compound screening.

High content screening provides measurements rich in biological, chemical and metabolic information about disease targets and drug candidates and helps pharmaceutical companies make more accurate choices about the most promising leads to move into clinical development.

To improve efficacy and quality assessment of drug candidates, cell-based fluorescence assays can probe a wide range of cellular functions, including:

- changes in morphology and the cytoskeleton
- cellular differentiation
- cell-cell interactions and adhesion
- apoptosis
- chemotaxis and motility
- spatial distribution changes such as receptor trafficking, translocation of signalling molecules and protein-protein interactions.

Applications include:

- cell counting
- cell nuclear detection and measurement
- cytoplasmic fluorescence measurements
- nucleus detection and measurement

Standard software only measures mean number & length. Our software (above) measures the morphological relevance complexity of neurite branching.

CSIRO Mathematical and Information Sciences www.cmis1.csiro.au

Commercial Partners

In collaboration with Amgen Instruments (now Molecular Devices), CSIRO has developed a suite of image analysis algorithms for the ImageXpress[®] cellular screening system.

Amgen Biotech (now ID Biotechnics) has licensed CSIRO's neurite analysis and detection software to the Amgen's software for its Pathway ICT cell screening system.

Genentech Technologies GmbH has licensed CSIRO's neurite analysis and detection software to the Amgen's software for its Open area high-throughput cell screening system.




Image Analysis at CSIRO

CSIRO has two divisions working in Image Analysis: CMIS (CSIRO Mathematical and Information Science) and the ICT Centre (Information and Communication Technology).




Image Analysis at CSIRO

CSIRO ICT Centre researchers are developing medical software tools to analyse images and extract valuable information for use in surgical planning and radiotherapy.

Biomedical Imaging at the ICT Centre

The efficacy of therapies such as surgery and radiotherapy can be greatly increased using information derived from imaging technologies. Advanced technologies such as Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) provide multiple images which need to be assembled and interpreted so that surgery and radiotherapy can be planned accurately.

Using computer models generated from images in real time, surgeons can plan and rehearse their procedures before seeing the patient, and refer to them during procedures such as radiotherapy and surgery to maximise safety and efficacy.

Our three ambitious goals are to:

- develop medical software using information derived from multidimensional images
- improve the efficacy of therapies such as surgery and radiotherapy
- improve the competitiveness of Australia in leading-edge ICT health technologies

This flyer was produced by SciFly, a customised flyer generation system from the Informatics Engineering Laboratory. SciFly is built using MyFly - CSIRO's generic platform for creating contextualised information content and delivery systems.

www.csiro.au/scifly

Additionally, MLX includes algorithms for the modelling of 3D images using:

- stereotactical methods
- segmentation and registration of 3D images
- a surgical simulation tool kit with haptic feedback.

Tangible outputs of the platform include:

- research papers
- documentation
- source code
- testing results

Software Engineering Strategy

Our software engineering strategy addresses the need to develop software that satisfies international quality regulations for use in a clinical setting. The software is based on Open Source libraries. Open Source allows CSIRO to capitalise on a wide community of testers and, at the same time, provide some research outcomes back to the community.

Automated Testing

Automated testing will cover basic unit tests for modules, and integration and stress tests for applications. The testing harness provides memory leak detection and test coverage results across a variety of compilers and platforms. New code will not be merged into the release versions of MLX until it has been tested, however opening up the development branch to the community for the purposes of wider testing is a possibility.

Release Schedule

The MLX platform will be released as a working demonstrator CD. The release schedule will be based on a six monthly cycle, with the first release scheduled for June 2005. The final release will include binary demonstrators of ITK Board and the Medical Image Viewer. Future releases will include a Surgical Simulation prototype and new imaging algorithms and filters.

MLX Overview

The MLX platform provides tools and libraries for medical image analysis including:

- tools for rapid-prototyping of new algorithms through the ITK Board and the Medical Image Viewer, and
- libraries for registration, segmentation and digital signal processing.



CSIRO www.csiro.au

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Additionally, MILX includes algorithms for the modeling of 3D images using:

- tetrahedral meshes,
- segmentation and registration of 3D images,
- a surgical simulation tool kit with haptic feedback.

Tangible outputs of the platform include:

- research papers,
- documentation,
- source code, and
- testing results

Overview

Software Engineering Strategy

Our software engineering strategy addresses the

Main information



Why coherence matters

Disastrous fire last night.



President Alfonso
Kassali died age 67.

[<more>](#)

Disastrous fire last night.



Also in the news today:

President Alfonso Kassali
died age 67. [<more>](#)

Our approach has been used to develop software prototypes across a number different of domains

- Tailored Reporting Applications for customers including Boeing
- Tailored Travel and Traffic Information
- Task-sensitive Graphical User Interface for Boeing
- Task-sensitive instruction and feedback for surgical training within a Haptic Environment
- Tailored flyers

SciFly – Customised Flyers on Demand

www.csiro.au

- Delivers information about CSIRO's ICT research, tailored to user's interests, in the form of promotional flyers
- Delivery via paper flyer, web and email:
 - Presentation and content adapted to constraints of each medium as appropriate
- Even with content and presentation adaptation, content is kept coherent and consistent across output mediums
- Produces coherent brochures (akin to manually written brochures)

The screenshot displays the CSIRO ICT Centre website. At the top, the CSIRO logo and 'ICT Centre' are visible. Below this, the 'Information Engineering Laboratory - the right information for the right result' is highlighted. The page is divided into sections: 'Introduction', 'Information Engineering', and 'Information Retrieval'. Each section contains descriptive text and a 'Description' sub-section. The 'Information Engineering' section includes a list of research aims: 'Developing search technologies for business efficiency', 'Cutting through information overload to deliver actionable information', 'Improving business-making in complex, mission-critical environments', and 'Creating information environments that support collaborative, tacit, and knowledge'. The 'Information Retrieval' section mentions 'The Pacific team has an international reputation in information retrieval research including web search evaluation, text collection development, efficient and effective retrieval and distributed information retrieval mechanisms'. The website footer includes the URL 'www.csiro.au/ictfly'.

The screenshot shows a paper flyer for 'Information Security and Privacy'. The title is prominently displayed at the top. Below the title, there is a 'Description' section that discusses the importance of privacy in the Information Economy. A 'Background' section follows, explaining the research team's focus on addressing privacy issues. The flyer also includes a 'Description' section detailing the team's work on building tools for access control. The bottom of the flyer features the CSIRO logo and contact information for the Information Security and Privacy research team.

The screenshot shows the 'Contact CSIRO' page. It features a dark blue header with the CSIRO logo. Below the header, there is a 'Contact CSIRO' section with the following information: Phone: 1300 363 400, Email: enquiries@csiro.au, Web: www.csiro.au. To the right of this section is the CSIRO logo. Below the contact information, there is a section for 'For further information about the CSIRO ICT Centre, contact:' which lists three individuals: Ross Wilkinson (Research Laboratory Director), Tsz Hoang (Business Development Manager), and Tom McConnes (Communication Manager). Each individual's name, title, address, phone number, fax number, and email address are provided.

- SciFly Demo



- Additional evaluation
 - (we have already shown through experiments that our approach saves time)
- Additional summarisation techniques
- Build new applications in new domains.

Partners to:

- Provide industry problems and requirements
- Take the technology to market
- Provide useful content
- Undertake further case studies

Come see our demo of SciFly at the
CSIRO booth

THANK YOU