Manager’s Message

Welcome to SPAN’s June newsletter. As always, SPAN is having a very busy year working with researchers on their projects. These projects are many and varied, ranging from modelling wireless LAN coverage areas and light pollution zones to travel routes taken by insect predators of crops. Brief descriptions of some of these projects and the work that SPAN is doing to assist are included in the following pages.

Also in this issue are updates on some of the data and equipment SPAN has available for research use. Note that there is usually no charge for researchers to utilise these resources or to obtain SPAN’s assistance.

Recent enquiries have indicated that there are some new staff members and postgraduate students who are unaware of the services, resources and facilities SPAN offers. I would be delighted to come along to school, faculty or research group meetings to give a presentation highlighting what is available and to speak with researchers about their projects and how SPAN may be able to help. Simply call or email me (contact details are listed on the right of this page) to arrange a suitable time.

Gail Fuller

Can SPAN help you?

SPAN might be able to assist your research in ways you do not anticipate. From simple data retrieval and map making to complex spatial and statistical data analysis, SPAN is available to enhance the quality of your research. If you are a researcher, academic or postgraduate student at Charles Sturt University and believe that some aspect of your research might be assisted by using our skills, do not hesitate to contact the Manager, Gail Fuller, on 32004 or gfuller@csu.edu.au to discuss your project requirements.

Want to know more? Visit www.csu.edu.au/research/span/
Projects

SPAN has been assisting David Perovic’s PhD research by investigating how well cost-distance measures fit his arthropod collection data and also with modelling landscape connectivity or fragmentation in Australian cotton landscapes. Analysis so far has included thousands of calculations of the best ‘route’ given various maps of ‘cost’. Results of this analysis suggest that the landscape structure for a distance of up to 3 km from the crop strongly affects both pests and beneficial insects in cotton. The presence of native vegetation is also very important in supporting beneficial insects.

![Cotton crops can be affected by pests](image1)

![Example of cost surface model showing least cost route](image2)

Wireless Local Area Networks (WLANs) are becoming increasingly popular for personal and business use. Despite the benefits that WLANs offer in shared environments, there is an increase in security risks if a WLAN is implemented as part of a network infrastructure. This increased risk is caused by the broadcast nature and easy accessibility of the WLAN, with users able to access the WLAN from anywhere in the coverage area. This opens up the way for hackers to compromise network integrity while being located safely outside the organisation’s perimeters.

To better protect valuable resources on a network, this project investigates location based resource access control in addition to the encryption and authentication mechanisms commonly used in WLANs. Such a system may provide a simple yet powerful means of geographical access control, by authorising users based on their physical location.

SPAN is assisting A/Prof John Louis and Tanja Lang’s project by developing a 3D model of the sample building, Access Point (AP) and Personal Digital Assistant (PDA) locations, AP-PDA networks, and statistical analysis.

Equipment

SPAN’s UNIX computer, ‘Newton’, which has served faithfully for the last five years is soon to be replaced with a new machine. This machine, to be known as ‘Tesla’, will be running a Red Hat Linux operating system. Specifications for this machine include two quad core 3GHz processors, 32Gb RAM and 8 x 1Tb hard disc drives. Upgrades to the RAID storage array will increase its capacity to approximately 16Tb.

Remember that SPAN has technical equipment available for researchers to borrow, such as:
- GPS units;
- Nomad rugged PDAs with inbuilt GPS;
- Ricoh 8Mp digital cameras with inbuilt GPS;
- Toughbook field portable laptop;
- Spectroradiometers – 400-1100Nm and 300-2500Nm units;
- MADIS multispectral airborne digital imaging system;

Printing:

SPAN also prints photo quality conference posters up to 1m wide and many metres long. High quality full colour A4 printing is also available, suitable for thesis printing. All SPAN’s printing is done at very reasonable rates for CSU staff and students and can be charged by internal funds transfer.
Another interesting project brought to SPAN by Professor Dirk Spennemann and Dr Rosemary Black involves light pollution. Artificial skyglow is growing more intense and reaching out further into the countryside due to the overuse of lighting and non efficient lighting designs, particularly outdoor uplift lights. Only a small percentage of stars are now visible in the more populated areas of Australia, with astronomers as far away as Coonabarabran, NSW, affected by Sydney’s skyglow.

Dirk and Rosemary’s project aims to assess light pollution in national parks along the eastern seaboard of Australia and to eventually have those with the least light pollution designated as the best stargazing sites. In addition, the intention is to calculate travel times to reach these dark sky sites from urban areas.

To accomplish this, SPAN acquired the highest resolution image of NASA’s Earth’s City Lights:

This image was combined with the most recent national parks location data. A population density dataset was then created using Census 2006 data, since lights alone do not equate to population levels. This image was then reclassified using ArcGIS’s Spatial Analyst to create a map of light polluted areas.

The next step will be to find out how large the buffer around the bright areas should be. To each grid cell we will apply Walkers Law, a formula for estimating skyglow levels. The final task will be to determine driving times to the best sites.
Projects

SPAN has been assisting Janine Friedrich, a master’s student at Orange, with her cultural research project. Janine is applying the concepts of social catchments for community participation in natural resource management (NRM) to identify communities in rural areas.

Janine gathered data from participants attending a series of forums aimed at engaging local communities in NRM. After considering a number of options it was decided that spider diagrams would be the best method to visualize the survey data, displaying both the origins and destinations for social and commercial activities, as well as the location of NRM meetings. After many trials and tribulations using ArcGIS tools and ArcScripts to locate the correct tool, Hawth’s Analysis Tools for ArcGIS were selected. Spider diagrams were created for each forum location, employing the Animal Movements “Convert Locations to Paths (points to lines)” tool.

Comparisons were then made of Janine’s findings against social catchment areas previously formulated by Peter Smiales. The spider diagrams were also overlayed with Landcare, Eco-civic regions and catchment management area shapefiles. This helped to locate overlaps and discrepancies in social catchment areas of where participants attended meetings and where they would be prepared to travel to for a similar meeting.

Example of one of Janine’s social catchment maps showing travel destinations for social and commercial activities and NRM meetings.

Data

WEATHER DATA
SPAN has just received updates to the Bureau of Meteorology weather data sets to June 2008. These datasets incorporate data from all BoM weather stations across all of Australia from the date of first recordings. Included in these datasets are records for:

- Daily minimum and maximum temperatures;
- Daily rainfall;
- Daily evaporation;
- Hourly temperature, pressure and humidity;
- Daily and hourly wind.

CENSUS DATA
Although much of the Australian Bureau of Statistics’ data is now freely available online, it can be quite tedious and time consuming to download large volumes or data for multiple sites. To assist, SPAN has purchased the 2006 datapacks and will also subscribe to Table Builder when this becomes available. Current datapacks include:

- Basic community profile;
- Indigenous profile;
- Time series profile;
- Place of enumeration profile;
- Expanded community profile;
- Working population profile;
- Estimated resident population profile.

Please contact SPAN for all your data requirements.