



MONASH University

FIT3020
Information visualization

Unit guide

Semester 2, 2008

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FIT3020 Information visualization - Semester 2 , 2008

Unit leader :

Grace Rumantir

Lecturer(s) :

Berwick

- Grace Rumantir

Tutors(s) :

Berwick

- Grace Rumantir

Introduction

Welcome to FIT3020 Information Visualization for Semester 2, 2008. This 6 point unit is elective to the the Bachelor of Information Technology and System (Multimedia Applications Major) degree program in the Faculty of IT. The unit has been designed to provide you with an understanding of how and what information can be extracted from large amount of data when the right method and tool are employed. It gives special emphasis on the visualization of geospatial data.

Unit synopsis

With the increasing amount of data available, it is important to be able to represent large collections from a wide range of domains in forms that more readily convey embedded information. The human sense of vision is a powerful tool for pattern recognition - this sense can be harnessed via multimedia interactive presentations. This unit will examine the fundamental principles of information visualization and the range of tools and methods which are available to represent large data sets. These techniques can be applied across a wide range of fields including geographical, medical, statistical and scientific visualization. The unit will examine in detail the visualization of geospatial data in GIS (Geographic Information Systems).

Learning outcomes

Knowledge and Understanding

At the completion of this unit students will have a theoretical and conceptual understanding of:

- the basic concepts of human visual perception and its impact on cognition;
- the functions of visualization with respect to amplifying cognition;
- the properties of data and the rules for mapping data to images;
- the role of factors such as pattern, space, color, interactivity and animation in visualization;
- the range of applications to which visualization approaches can be applied, particularly with respect to geospatial data.

Attitudes, Values and Beliefs

At the completion of this unit students will have developed attitudes that enable them to:

- critically select from the range of available visualization techniques and apply the one that is best for the domain at hand.

Practical Skills

At the completion of this unit students will have the skills to:

- evaluate a given data set and infer valid conclusions based on a supplied visualization;
- design and construct an appropriate type of visualization for a given data set;
- manipulate visual variables such as color and size to optimise a visualization;
- identify the principle components of a map and describe map projections commonly used;
- import, display and manipulate data within a Geographic Information System (GIS).

Relationships, Communication and TeamWork

At the completion of this unit students will have further developed the teamwork skills needed to:

- work as a member of a project team.

Workload

Unit relationships

Prerequisites

Before attempting this unit you must have satisfactorily completed 12 points of second year FIT study or equivalent.

Relationships

FIT3020 is an elective unit in the Multimedia Application major of the Bachelor of Information Technology and System degree.

Continuous improvement

Monash is committed to 'Excellence in education' and strives for the highest possible quality in teaching and learning. To monitor how successful we are in providing quality teaching and learning Monash regularly seeks feedback from students, employers and staff. Two of the formal ways that you are invited to provide feedback are through Unit Evaluations and through Monquest Teaching Evaluations.

One of the key formal ways students have to provide feedback is through Unit Evaluation Surveys. It is Monash policy for every unit offered to be evaluated each year. Students are strongly encouraged to complete the surveys as they are an important avenue for students to "have their say". The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

Student Evaluations

The Faculty of IT administers the Unit Evaluation surveys online through the my.monash portal, although for some smaller classes there may be alternative evaluations conducted in class.

If you wish to view how previous students rated this unit, please go to <http://www.monash.edu.au/unit-evaluation-reports/>

Over the past few years the Faculty of Information Technology has made a number of improvements to its courses as a result of unit evaluation feedback. Some of these include systematic analysis and planning of unit improvements, and consistent assignment return guidelines.

Monquest Teaching Evaluation surveys may be used by some of your academic staff this semester. They are administered by the Centre for Higher Education Quality (CHEQ) and may be completed in class with a facilitator or on-line through the my.monash portal. The data provided to lecturers is completely anonymous. Monquest surveys provide academic staff with evidence of the effectiveness of their teaching and identify areas for improvement. Individual Monquest reports are confidential, however, you can see the summary results of Monquest evaluations for 2006 at <http://www.adm.monash.edu.au/cheq/evaluations/monquest/profiles/index.html>

Unit staff - contact details

Unit leader

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Contact hours : tba

Tutor(s) :

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Additional communication information

Grace Rumantir's consultations: tba

Teaching and learning method

Communication, participation and feedback

Monash aims to provide a learning environment in which students receive a range of ongoing feedback throughout their studies. You will receive feedback on your work and progress in this unit. This may take the form of group feedback, individual feedback, peer feedback, self-comparison, verbal and written feedback, discussions (on line and in class) as well as more formal feedback related to assignment marks and grades. You are encouraged to draw on a variety of feedback to enhance your learning.

It is essential that you take action immediately if you realise that you have a problem that is affecting your study. Semesters are short, so we can help you best if you let us know as soon as problems arise. Regardless of whether the problem is related directly to your progress in the unit, if it is likely to interfere with your progress you should discuss it with your lecturer or a Community Service counsellor as soon as possible.

Unit Schedule

Week	Topic	Key dates
1	Information Visualization: Displaying Quantitative Information	
2	Information Visualization Techniques	
3	Visualization for Analysis	
4	Research in Information Visualization: Social Visualization	
5	Introduction to Geographic Information System	
6	Representation of Maps in Geographic Information System	Assignment 1 due 24 August 2008
7	GIS data modeling and software	
8	GIS data collection and geographic databases	
9	Cartography and GeoVisualization	
10	Geographic query, measurement and spatial modeling	
11	Managing GIS	
Mid semester break		
12	Exam preparation and Revision	Assignment 2 due 12 October 2008
13	No lecture	

Unit Resources

Prescribed text(s) and readings

- **Kennedy, M. (2006). *Introducing geographic information systems with ArcGIS*. New Jersey: John Wiley & Sons** Text books are available from the [Monash University Book Shops](#). Availability from other suppliers cannot be assured. The Bookshop orders texts in specifically for this unit. You are advised to purchase your text book early.

Recommended text(s) and readings

- Chang, K.-t. (2008). *Introduction to geographic information systems* (4 ed.). New York: McGraw-Hill.
- Chen, C. (1999). *Information visualization and virtual environments*. London: Springer-Verlag.
- Chen, C. (2004). *Information visualization: Beyond the horizon* (2 ed.). London: Springer-Verlag.
- Heywood, I., Cornelius, S., Carver, S. (2006). *An introduction to geographical information systems* (3 ed.). London: Pearson Education Ltd.
- Tufte, E. R. (2001). *The visual display of quantitative information* (2 ed.). Cheshire, Connecticut: Graphics Press.
- Kraak, M.J. and Ormeling, F.J. *Cartography : visualization of geospatial data*, Prentice Hall, 2003
- Ware, C. (2004). *Information visualization: Perception for design* (2 ed.). San Francisco: Morgan Kaufmann - Elsevier.

Required software and/or hardware

You will need access to: ArcView 9.1 or ArcView 9.2

- As part of the site license agreement with ESRI, students enrolled in FIT3020 will get a DVD containing ArcView 9.1 for use for 1 year free of charge.
- Each student will need to fill in the sublicense agreement form available for FIT3020 Muso site before using the software

and Google Earth and SketchUp

- These two softwares can respectively be downloaded free from <http://earth.google.com> and <http://sketchup.google.com/>

Equipment and consumables required or provided

Students studying off-campus are required to have the minimum system configuration specified by the Faculty as a condition of accepting admission, and regular Internet access. On-campus students, and those studying at supported study locations may use the facilities available in the computing labs. Information about computer use for students is available from the ITS Student Resource Guide in the Monash University Handbook. You will need to allocate up to **n** hours per week for use of a computer, including time for newsgroups/discussion groups.

Study resources

Study resources we will provide for your study are:

- Weekly detailed lecture notes outlining the learning objectives, discussion of the content, required readings and exercises;
- Weekly laboratory tasks and exercises with sample solutions provided one to two weeks later;

- Assignment specifications and sample solutions;
- A sample examination and suggested solution
- Discussion groups;
- This Unit Guide outlining the administrative information for the unit;
- The unit web site on MUSO, where resources outlined above will be made available.

Library access

The Monash University Library site contains details about borrowing rights and catalogue searching. To learn more about the library and the various resources available, please go to <http://www.lib.monash.edu.au>. Be sure to obtain a copy of the Library Guide, and if necessary, the instructions for remote access from the library website.

Monash University Studies Online (MUSO)

All unit and lecture materials are available through MUSO (Monash University Studies Online). Blackboard is the primary application used to deliver your unit resources. Some units will be piloted in Moodle. If your unit is piloted in Moodle, you will see a link from your Blackboard unit to Moodle (<http://moodle.monash.edu.au>) and can bookmark this link to access directly. In Moodle, from the Faculty of Information Technology category, click on the link for your unit.

You can access MUSO and Blackboard via the portal: <http://my.monash.edu.au>

Click on the Study and enrolment tab, then Blackboard under the MUSO learning systems.

In order for your Blackboard unit(s) to function correctly, your computer needs to be correctly configured.

For example:

- Blackboard supported browser
- Supported Java runtime environment

For more information, please visit: <http://www.monash.edu.au/muso/support/students/downloadables-student.html>

You can contact the MUSO Support by: Phone: (+61 3) 9903 1268

For further contact information including operational hours, please visit:
<http://www.monash.edu.au/muso/support/students/contact.html>

Further information can be obtained from the MUSO support site:
<http://www.monash.edu.au/muso/support/index.html>

Assessment

Unit assessment policy

The unit is assessed with two assignments and a three hour closed book examination. To pass this unit, a student must :

- attempt both assignments and the examination
- obtain 40% or more in the unit's examination and
- obtain 40% or more in the unit's non-examination assessment and
- obtain an overall unit mark of 50% or more

If a student does not achieve 40% or more in the unit examination or the unit non-examination assessment then a mark of no greater than 44-N will be recorded for the unit.

Assignment tasks

• Assignment Task

Title : Assignment 1 - Information Visualization Applications

Description :

In this assignment you are to write a research report on information visualization applications in a domain area of your choice, e.g. Archaeology, Arts, medicine, business, agriculture, environmental management, state and local government, defense and intelligence, transportation, telecommunication, etc.

Weighting : 20%

Criteria for assessment :

- ◆ Quality of research
- ◆ Analysis and synthesis of material
- ◆ Consistency in format and presentation
- ◆ Writing style
- ◆ Bibliography and referencing

Further detail on the assessment criteria is available on the assignment specification.

Due date : 24 August 2008

• Assignment Task

Title : Assignment 2 - Geographic Information System Implementations

Description :

In this assignment, you are to build GIS related animations using the knowledge you have gained on Google Earth, SketchUp and KML as well as ArcGIS.

Weighting : 40%

Criteria for assessment :

- ◆ Understanding of animation concepts using the application of choice
- ◆ Efficiency of approach
- ◆ General application stability
- ◆ Completion of all requirements of brief
- ◆ Thought given to interactive affordance
- ◆ Value-added functionality

Due date : 12 October 2008

Examinations

- **Examination**

Weighting : 40%

Length : 2 hours

Type (open/closed book) : Closed book

Assignment submission

Assignments will be submitted by electronic submission to Muso. Each student will be required to submit the online Plagiarism Declaration available on Muso before being able to submit each assignment. Do not email submissions. The due date is the date by which the the submission is to be posted.

Assignment coversheets

The online Plagiarism Declaration replaces the official signed assignment coversheets used for paper-based submission.

University and Faculty policy on assessment

Due dates and extensions

The due dates for the submission of assignments are given in the previous section. Please make every effort to submit work by the due dates. It is your responsibility to structure your study program around assignment deadlines, family, work and other commitments. Factors such as normal work pressures, vacations, etc. are seldom regarded as appropriate reasons for granting extensions. Students are advised to NOT assume that granting of an extension is a matter of course.

Requests for extensions must be made to the unit lecturer at your campus at least two days before the due date. You will be asked to forward original medical certificates in cases of illness, and may be asked to provide other forms of documentation where necessary. A copy of the email or other written communication of an extension must be attached to the assignment submission.

Late assignment

Assignments received after the due date will be subject to a penalty of 5% per day, including weekends. Assignments received later than one week (seven days) after the due date will not normally be accepted. In some cases, this period may be shorter if there is a need to release sample solutions.

This policy is strict because comments or guidance will be given on assignments as they are returned, and sample solutions may also be published and distributed, after assignment marking or with the returned assignment.

Return dates

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assessment for the unit as a whole is in accordance with the provisions of the Monash University Education Policy at <http://www.policy.monash.edu/policy-bank/academic/education/assessment/>

We will aim to have assignment results made available to you within three weeks after assignment receipt.

Plagiarism, cheating and collusion

Plagiarism and cheating are regarded as very serious offences. In cases where cheating has been confirmed, students have been severely penalised, from losing all marks for an assignment, to facing disciplinary action at the Faculty level. While we would wish that all our students adhere to sound ethical conduct and honesty, I will ask you to acquaint yourself with Student Rights and Responsibilities (<http://www.infotech.monash.edu.au/about/committees-groups/facboard/policies/studrights.html>) and the Faculty regulations that apply to students detected cheating as these will be applied in all detected cases.

In this University, cheating means seeking to obtain an unfair advantage in any examination or any other written or practical work to be submitted or completed by a student for assessment. It includes the use, or attempted use, of any means to gain an unfair advantage for any assessable work in the unit, where the means is contrary to the instructions for such work.

When you submit an individual assessment item, such as a program, a report, an essay, assignment or other piece of work, under your name you are understood to be stating that this is your own work. If a submission is identical with, or similar to, someone else's work, an assumption of cheating may arise. If you are planning on working with another student, it is acceptable to undertake research together, and discuss problems, but it is not acceptable to

jointly develop or share solutions unless this is specified by your lecturer.

Intentionally providing students with your solutions to assignments is classified as "assisting to cheat" and students who do this may be subject to disciplinary action. You should take reasonable care that your solution is not accidentally or deliberately obtained by other students. For example, do not leave copies of your work in progress on the hard drives of shared computers, and do not show your work to other students. If you believe this may have happened, please be sure to contact your lecturer as soon as possible.

Cheating also includes taking into an examination any material contrary to the regulations, including any bilingual dictionary, whether or not with the intention of using it to obtain an advantage.

Plagiarism involves the false representation of another person's ideas, or findings, as your own by either copying material or paraphrasing without citing sources. It is both professional and ethical to reference clearly the ideas and information that you have used from another writer. If the source is not identified, then you have plagiarised work of the other author. Plagiarism is a form of dishonesty that is insulting to the reader and grossly unfair to your student colleagues.

Register of counselling about plagiarism

The university requires faculties to keep a simple and confidential register to record counselling to students about plagiarism (e.g. warnings). The register is accessible to Associate Deans Teaching (or nominees) and, where requested, students concerned have access to their own details in the register. The register is to serve as a record of counselling about the nature of plagiarism, not as a record of allegations; and no provision of appeals in relation to the register is necessary or applicable.

Non-discriminatory language

The Faculty of Information Technology is committed to the use of non-discriminatory language in all forms of communication. Discriminatory language is that which refers in abusive terms to gender, race, age, sexual orientation, citizenship or nationality, ethnic or language background, physical or mental ability, or political or religious views, or which stereotypes groups in an adverse manner. This is not meant to preclude or inhibit legitimate academic debate on any issue; however, the language used in such debate should be non-discriminatory and sensitive to these matters. It is important to avoid the use of discriminatory language in your communications and written work. The most common form of discriminatory language in academic work tends to be in the area of gender inclusiveness. You are, therefore, requested to check for this and to ensure your work and communications are non-discriminatory in all respects.

Students with disabilities

Students with disabilities that may disadvantage them in assessment should seek advice from one of the following before completing assessment tasks and examinations:

- Faculty of Information Technology Student Service staff, and / or
- your Unit Coordinator, or
- [Disabilities Liaison Unit](#)

Deferred assessment and special consideration

Deferred assessment (not to be confused with an extension for submission of an assignment) may be granted in cases of extenuating personal circumstances such as serious personal illness or bereavement. Information and forms for Special Consideration and deferred assessment applications are available at <http://www.monash.edu.au/exams/special-consideration.html>. Contact the Faculty's Student Services staff at your

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campus for further information and advice.