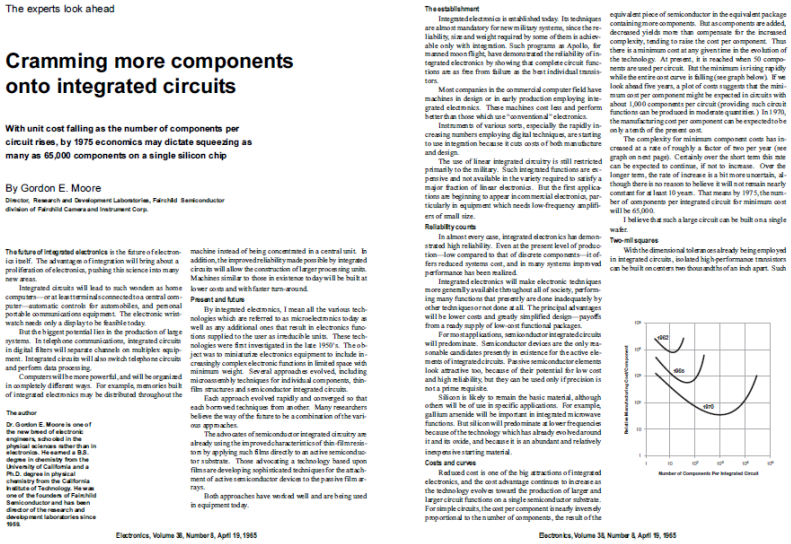
X10

Finding and Citing Relevant Literature

In this lab, you will learn how to search for relevant literature on a subject by constructing effective search terms. You will use search engines and databases such as Google Scholar (http://scholar.google.com) and IEEEXplore (http://ieeexplore.ieee.org). You will have the opportunity to apply these techniques to find material which will help you with your assignments, and create and format a technical document adhering to formatting guidelines.



The experts look ahead

Cramming more components onto integrated circuits

With unit cost falling as the number of components per circuit rises, by 1975 economics may dictate squeezing as many as 65,000 components on a single silicon chip

By Gordon E. Moore

Director, Research and Development Laboratories, Fairchild Semiconductor division of Fairchild Camera and Instrument Corp.

The future of integrated electronics is the future of electronics itself. The advantages of integration will bring about a proliferation of electronics, pushing this science into many new areas.

Integrated circuits will lead to such wonders as home computers—or at least terminals connected to a central computer—automatic controls for automobiles, and personal portable communications equipment. The electronic wristwatch needs only a display to be feasible today.

But the biggest potential lies in the production of large systems. In telephone communications, integrated circuits in digital filters will separate channels on multiplex equipment. Integrated circuits will also switch telephone circuits and perform data processing.

Computers will be more powerful, and will be organized in completely different ways. For example, memories built of integrated electronics may be distributed throughout the machine instead of being concentrated in a central unit. In addition, the improved reliability made possible by integrated circuits will allow the construction of larger processing units. Machines similar to those in existence today will be built at lower costs and with faster turn-around.

Present and future

By integrated electronics, I mean all the various technologies which are referred to as microelectronics today as well as any additional ones that result in electronics functions supplied to the user as irreducible units. These technologies were first investigated in the late 1950's. The object was to miniaturize electronics equipment to include increasingly complex electronic functions in limited space with minimum weight. Several approaches evolved, including microassembly techniques for individual components, thin-film structures and semiconductor integrated circuits.

Each approach evolved rapidly and converged so that each borrowed techniques from another. Many researchers believe the way of the future to be a combination of the various approaches.

The advocates of semiconductor integrated circuitry are already using the improved characteristics of thin-film resistors by applying such films directly to an active semiconductor substrate. Those advocating a technology based upon films are developing sophisticated techniques for the attachment of active semiconductor devices to the passive film arrays.

Both approaches have worked well and are being used in equipment today.

The author

Dr. Gordon E. Moore is one of the new breed of electronic engineers, schooled in the physical sciences rather than in electronics. He earned a B.S. degree in chemistry from the University of California and a Ph.D. degree in physical chemistry from the California Institute of Technology. He was one of the founders of Fairchild Semiconductor and has been director of the research and development laboratories since 1959.

Electronics, Volume 38, Number 8, April 19, 1965

The establishment

Integrated electronics is established today. Its techniques are almost mandatory for new military systems, since the reliability, size and weight required by some of them is achievable only with integration. Such programs as Apollo, for manned moon flight, have demonstrated the reliability of integrated electronics by showing that complete circuit functions are as free from failure as the best individual transistors.

Most companies in the commercial computer field have machines in design or in early production employing integrated electronics. These machines cost less and perform better than those which use "conventional" electronics.

Instruments of various sorts, especially the rapidly increasing numbers employing digital techniques, are starting to use integration because it cuts costs of both manufacture and design.

The use of linear integrated circuitry is still restricted primarily to the military. Such integrated functions are expensive and not available in the variety required to satisfy a major fraction of linear electronics. But the first applications are beginning to appear in commercial electronics, particularly in equipment which needs low-frequency amplifiers of small size.

Reliability counts

In almost every case, integrated electronics has demonstrated high reliability. Even at the present level of production—low compared to that of discrete components—it offers reduced systems cost, and in many systems improved performance has been realized.

Integrated electronics will make electronic techniques more generally available throughout all of society, performing many functions that presently are done inadequately by other techniques or not done at all. The principal advantages will be lower costs and greatly simplified design—payoffs from a ready supply of low-cost functional packages.

For most applications, semiconductor integrated circuits will predominate. Semiconductor devices are the only reasonable candidates presently in existence for the active elements of integrated circuits. Passive semiconductor elements look attractive too, because of their potential for low cost and high reliability, but they can be used only if precision is not a prime requisite.

Silicon is likely to remain the basic material, although others will be of use in specific applications. For example, gallium arsenide will be important in integrated microwave functions. But silicon will predominate at lower frequencies because of the technology which has already evolved around it and its oxide, and because it is an abundant and relatively inexpensive starting material.

Costs and curves

Reduced cost is one of the big attractions of integrated electronics, and the cost advantage continues to increase as the technology evolves toward the production of larger and larger circuit functions on a single semiconductor substrate. For simple circuits, the cost per component is nearly inversely proportional to the number of components, the result of the equivalent piece of semiconductor in the equivalent package containing more components. But as components are added, decreased yields more than compensate for the increased complexity, tending to raise the cost per component. Thus there is a minimum cost at any given time in the evolution of the technology. At present, it is reached when 50 components are used per circuit. But the minimum is rising rapidly while the entire cost curve is falling (see graph below). If we look ahead five years, a plot of costs suggests that the minimum cost per component might be expected in circuits with about 1,000 components per circuit (providing such circuit functions can be produced in moderate quantities.) In 1970, the manufacturing cost per component can be expected to be only a tenth of the present cost.

The complexity for minimum component costs has increased at a rate of roughly a factor of two per year (see graph on next page). Certainly over the short term this rate can be expected to continue, if not to increase. Over the longer term, the rate of increase is a bit more uncertain, although there is no reason to believe it will not remain nearly constant for at least 10 years. That means by 1975, the number of components per integrated circuit for minimum cost will be 65,000.

I believe that such a large circuit can be built on a single wafer.

Two-mil squares

With the dimensional tolerances already being employed in integrated circuits, isolated high-performance transistors can be built on centers two thousandths of an inch apart. Such

Electronics, Volume 38, Number 8, April 19, 1965

The first two pages of Intel co-founder Gordon Moore's seminal paper, which gave rise to *Moore's Law* (reprinted from [1])

[1] G. E. Moore, "Cramming More Components onto Integrated Circuits," *Electronics*, vol. 38, no. 8, pp. 114-117, Apr 19, 1965

Schedule

Preparation time	:	3 hours
Lab time	:	3 hours

Items provided

Tools	:	n/a
Components	:	n/a
Equipment	:	Desktop Computer
Software	:	Microsoft Word, LaTeX

Items to bring

Essentials. A full list is available on the Laboratory website at https://secure.ecs.soton.ac.uk/notes/ellabs/databook/essentials/

Before you come to the lab, it is essential that you read through this document and complete ***all*** of the preparation work in section 2. If possible, prepare for the lab with your usual lab partner. Only preparation which is recorded in your laboratory logbook will contribute towards your mark for this exercise. There is no objection to several students working together on preparation, as long as all understand the results of that work. Before starting your preparation, read through all sections of these notes so that you are fully aware of what you will have to do in the lab.

> **Academic Integrity** – *If you undertake the preparation jointly with other students, it is important that you acknowledge this fact in your logbook. Similarly, you may want to use sources from the internet or books to help answer some of the questions. Again, record any sources in your logbook.*

Revision History

January 30, 2014	Geoff Merrett (gvm)	Minor chanes
July 24, 2013	Geoff Merrett (gvm)	Minor changes, and new formatting spec
January 23, 2013	Geoff Merrett (gvm) Fiona Nichols	New lab for 2012/13

1 Aims, Learning Outcomes and Outline

This laboratory exercise aims to:

- Give you the skills to effectively search for relevant scientific literature
- Ensure that you are able to format a technical document following formatting guidelines

Having successfully completed the lab, you will be able to:

- Construct effective search queries
- Find relevant literature using databases including Google Scholar and IEEEXplore
- Format a technical document according to a specification
- Cite your sources of information

In this lab, you will learn how to search for relevant literature on a subject by constructing effective search terms. You will use search engines and databases such as Google Scholar (http://scholar.google.com) and IEEEXplore (http://ieeexplore.ieee.org). You will have the opportunity to apply these techniques to find material which will help you with your assignments, and create and format a technical document adhering to formatting guidelines.

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2 Preparation

Read through the course handbook statement on safety and safe working practices, and your copy of the standard operating procedure. Make sure that you understand how to work safely.

Do NOT read through the notes until you have completed section 2.1 of the preparation.

The mark you receive for your preparation will not be affected by how you answer the questions in section 2.1 – we want you to be honest so that you can reflect on your current practice.

2.1 Your Current Approach to Finding Information

Imagine that you had been set an assignment which required you to write a report on the use of sensor networks in farming (note: don't worry, you are not actually being asked to write this report!). A (very) brief overview of wireless sensor networks is given on the next page.

Clearly, if you were to undertake this assignment, you would need to research the topic in more depth, and find relevant literature on the subject.

If you had been set this assignment today, how would you go about searching for information?

Note: be completely honest with yourself – you will not be marked on how you answer this (though you must answer it!), but we want you to be able to reflect on your current practice.

Information: A wireless sensor network is a collection of locally-powered electronic devices which are capable of sensing parameters in their environment (for example temperature, acceleration or physiological parameters). Two or more of these devices form a wireless network, to communicate information through the network to a central point or 'gateway'.

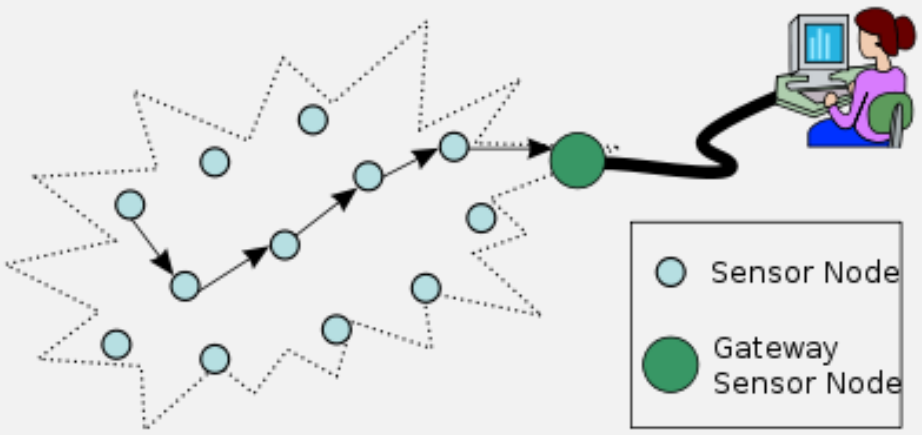

FIGURE 1: Architecture of a Sensor Network (reproduced from [2]).

Wireless sensor networks are beginning to find application in farming where they can be used to monitor livestock (for example where a farmer's cows are in the field) or crops (for example soil moisture to control irrigation).

2.2 Finding Relevant Literature

When you attempt to research an area, such as the one in the previous section, you have a task to find relevant sources of information. The internet has allowed a virtually unlimited amount of information to be at your fingertips, but you need to be able to judge a source's credibility, and hence whether or not you can trust it. Wikipedia is a source often cited by undergraduates, but can you trust it? Watch the video at http://www.collegehumor.com/video/3581424/professor-wikipedia, which shows some limitations.

The internet is a great resource for finding information, but care must be taken. Always look for some form of quality assurance – who published it and when was it published?

> ⍰ *Give three examples of sources that may not be credible (explaining why), and three examples of sources that should be credible (explaining why).*

When evaluating a source, you should consider factors such as its authority, objectivity and purpose, accuracy, and relevance. You should examine the evidence available to you, ask questions of the resource, and consider the motives of the people that are providing the information. Trust nothing until you have good reason to do so! Consider who has written and published the information; do you consider them to be a trustworthy source of information? Are they also trying to persuade you, sell you something, or misinform you? Which country does the information come from, and where is it held? Does its origin affect the slant of the information?

Watch the presentation on this topic created by the University of Southampton library which is available at http://www.soton.ac.uk/library/infoskills/evaluatingwebresources/index.htm (for other tutorials see http://www.southampton.ac.uk/library/infoskills/tutorials.html).

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[2] http://upload.wikimedia.org/wikipedia/commons/2/21/WSN.svg

What are conference and journal articles?

Hint: watch http://www.youtube.com/watch?v=o63WOuipAd4 for further information

How does material get published in conference and journal articles? Are they credible? What is meant by the term 'peer review', in the context of scientific literature?

Are some conferences/journals better than others (for example those sponsored/published by a professional body, e.g. IEEE or ACM)?

Books can take many years to get published. Conference proceedings, journals and periodicals are 'scientific publications', which are usually more targeted and contain up-to-date technical literature. These papers/articles tell us about state-of-the-art research. Some papers do however provide reviews of other existing literature though, and these are usually referred to as 'review' or 'survey' papers (and this word often appears in their title).

The library website contains a wealth of information and resources, including an area dedicated to subject-specific information for ECS students (see Figure 1). There is information including catalogues for finding resources, support, and tutorials on how to use the resources. Take a look at www.southampton.ac.uk/library, and find the ECS subject-specific area (Figure 2).

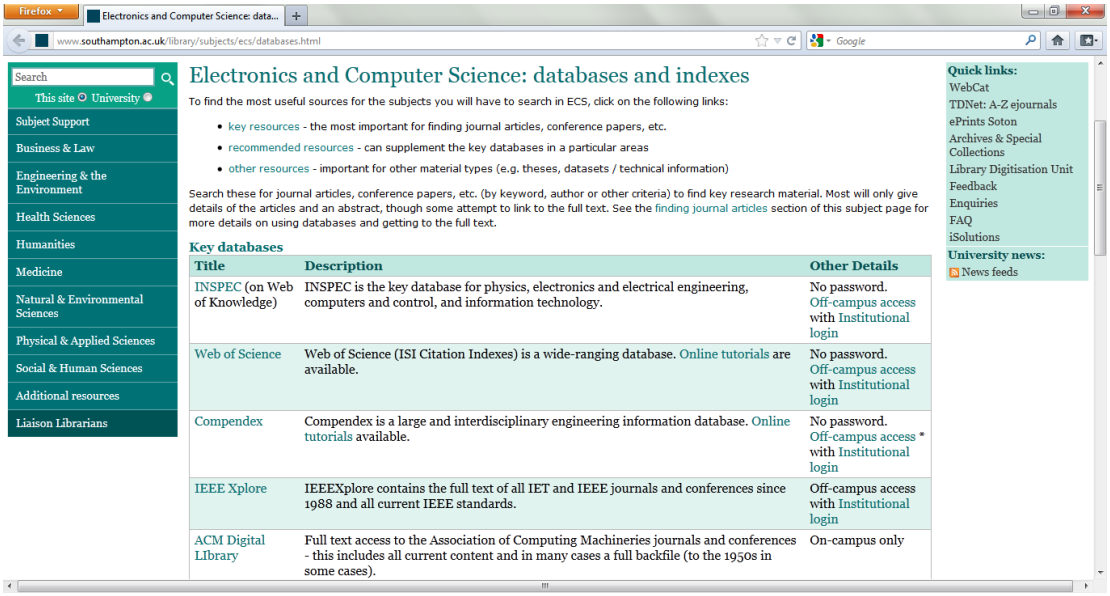

FIGURE 2: The library website contains a wealth of information specifically targeted at ECS students.

We can use databases to find technical articles, and the University has subscriptions to many.

Follow the 'databases' link on the ECS subject-specific section of the library website, and find out how to access 'IEEEXplore'.

To find the relevant technical articles, you need to search the databases.

What is a search term, and what are search queries?

Hint: Watch this video: http://www.youtube.com/watch?v=QlgWG10RMgg.

A wealth of other information is available via the library's website, in particular via the links below. You are encouraged to spend 5 or 10 minutes browsing the following links, so that you are aware of what material/resources/tutorials are available to you:

http://www.southampton.ac.uk/library/infoskills/

http://www.southampton.ac.uk/library/subjects/ecs/informationskills.html

In particular, there are some useful downloads on the right hand side of the second of these.

2.3 Citing and Referencing your Sources

In lecture L12 (Part 3), you learnt what is meant by academic integrity, plagiarism, referencing, citing and paraphrasing. If you are unsure of any of these terms, refer to L12 now.

If you wanted to copy 'word-for-word' the first sentence from the paragraph in the grey box below into your report, is this allowed, and how would you do this? Could you do this for the entire paragraph?

> "Aside from monitoring the environment, a remaining challenge is to control animals in the landscape—actuation. Actuation could take the form of automatically controlled gates, water troughs, and feeding stations. More interestingly, it could involve applying various stimuli to the animals to influence their motion. This work is in its early stages, but preliminary results are encouraging. (CSIRO adheres to the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes and operates in compliance with all relevant animal welfare legislation.) Unlike more conventional implementations of robotic multiagent systems, animal agents aren't perfectly controllable. Their full state—including both spatial position and mental state, such as stress, desire, hunger, or mood—is difficult to measure, and their behavior depends on factors such as age, season, temperature, and food availability."
>
> *Excerpt taken from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4160605*

What are meant by the terms 'paraphrasing' and 'citing'?

When should you include a word-for-word 'quote', and when should you paraphrase? Why?

Paraphrase the paragraph above (you should write it down in your logbook).

Many different referencing styles exist, the most common of which are probably Vancouver, Harvard and IEEE. The latter of these (IEEE) is commonly used in engineering, and is the style you are required to use for your A12 assignment. Refer to Appendix A for more information on the IEEE style, including the information that needs to be included for different categories of source (for example a book, website, or journal paper).

Add an appropriate citation and reference to the text that you paraphrased.

Note: You should use the IEEE referencing style (see Appendix A).

2.4 Formatting a Technical Document

Writing reports is both a necessity for your degree, and also a skill required of most engineers. Reports are one form of communication, and being able to communicate the work that you have done effectively is essential. You will often be required to follow templates and formatting guidelines when writing reports, whether these are for your project work at University, public-facing material for a company, or technical literature to be published in a conference or journal.

There are a wide variety of tools on the market for document preparation, ranging from familiar WYSIWYG (what-you-see-is-what-you-get) word processors to esoteric systems designed for publishing houses. Probably the two most commonly employed tools for document preparation are Microsoft Word (and its equivalents such as OpenOffice Writer) and LaTeX (free and available for virtually all computing platforms).

LaTeX is not a WYSIWYG system. You edit your document (with a .tex extension) in a text editor and run it through the LaTeX program to generate your final pdf document. There are now good Integrated Development Environments (IDE) which combine the editor and drive the compiler and viewers. A separate program called BiBTeX is used to automate referencing. Further information (including tutorials) on using LaTeX can be found by visiting http://users.ecs.soton.ac.uk/srg/softwaretools/document/.

We do not mandate which tool you should use, this decision is down to you. However, we do expect you to be able to effectively 'drive' your chosen tool. From experience, while the majority of students would be insulted if asked whether or not they could 'use' Microsoft Word, many cannot use more than its basic features. Before you come to the lab (i.e. as part of your preparation), you should ensure that you are familiar with Word's following features:

- Change font types, size, bold, italic
- Change line spacing, paragraph spacing, and text justification
- Use subscripts and superscripts
- Use tabs (including left, right, centre and decimal tabs)
- Set and change page margins
- Use columns and adjust column spacing
- Understand and use 'styles' (and define your own)
- Use automatic numbering
- Understand what 'pages' and 'sections' are, and be able to insert page and section breaks
- Add page numbers
- Add headers and footers to a page
- Insert figures (and make them wrap 'in-line with text' to stop them randomly moving about the page as you edit your document!)
- Insert tables
- Insert equations (using the 'Equation' feature in Microsoft Word .docx files)

If you are unfamiliar with any of these features, find out more about them – Google is a great resource for things like this!

We also encourage you to try out/use LaTeX. However, unfortunately we don't currently have a LaTeX template for the formatting requirements of this lab, so please use Microsoft Word for this lab.

2.5 Reflection

The aim of this preparation has been to teach you about different tools and techniques for finding information. In the lab, you will try out some of these techniques in practice and improve your technique. Look back at the answer that you gave at the start of the preparation in section 2.1.

> ? *Reflect on how you would now search for information on Wireless Sensor Networks used in Farming. Consider the answer that you gave in section 2.1.*

Now, read through the remainder of these lab notes so that you are aware of what you will be expected to do in the lab.

3 Laboratory Work

In this lab, you will learn how to search for relevant literature on a subject by constructing effective search terms, apply these techniques to find material which will help you with your assignment A12, and create and format a technical document adhering to formatting guidelines (the same guidelines that will be mandated by lab assignment A12).

3.1 Forming Effective Search Queries

The purpose of the first part of this lab is to show you the importance of constructing effective search queries. The purpose of searching for literature is trying to extract information from a huge database of documents (there are currently over 3.3 million documents on IEEEXplore). If your search is *in*effective, you may end up with an unmanageable number of results (how do you then pick the most important ones to read) or exclude the most important ones.

For the first part of this lab, your task is to find literature on the application of sensor networks in farming. In particular, we will consider two databases:

- **Google Scholar** (http://scholar.google.com): Google's own search engine for searching academic literature and patents. We would like to convince you to use the dedicated databases instead (such as IEEExplore below), but would prefer you to use this over a normal Google search (plus Google Scholar is continuing to improve)!
- **IEEEXplore** (http://ieeexplore.ieee.org): All papers published in IEEE/IET journals and conferences are indexed by IEEEXplore (currently over 3.3 million documents!). The University subscribes to this database, so you can download any of the papers for free from a computer on the University network. Important: you will need to be either on-campus or connected using the VPN (see https://secure.ecs.soton.ac.uk/kb/entry/22/ for more details) to access IEEEXplore.

The following subsections walk you through the process of constructing appropriate search terms to find the literature relevant to your search for Wireless Sensor Networks in Farming Applications using Google Scholar (section 3.1.1) and IEEEXplore (section 3.1.2). Think about what you are searching for at every stage, as you will only learn from this lab if you reflect on your practice.

This is not supposed to be a complete overview of how to create effective search terms, or necessarily a process that you should always follow. Instead, it is meant to make you think about what it is you are searching for, and how the search terms you choose effect your search results.

3.1.1 Google Scholar

Using Google Scholar, search for literature on '*the application of sensor networks in farming*'. Consider whether all 7 of these words are necessary; which ones are actually important in narrowing your search?

What search query did you use? How many results were returned?

Did you include words like *the*, *application*, *of* or *in*? Are these necessary, and will they have any effect on the search?

You will probably find that a query of *sensor networks farming* will have been suitable.

Think about how many results you obtained. Is this number useful? Could you write a report based on these results? What strategy would you adopt in order to decide which documents were worth reading? Would you just pick the first few and (incorrectly) assume that all of the remaining ones are not relevant?

When I search with the query *sensor networks farming*, I get ~17700 results (as of 22 January 2013 – this number will probably be bigger by the time you search!). Clearly, this is an unmanageable number of results, and we need to appropriately refine the search query.

Still using Google Scholar, try putting quotes (“) around the term sensor networks.

What search query did you use? How many results were returned? What have you done by adding the quotes?

You are now searching for documents that contain the phrase *sensor networks* rather than the individual words *sensor* and *networks*. When I search with the query *“sensor networks” farming*, I now get ~13000 results. This is still too many to be useful!

One way to restrict our search is to only look for terms in the title of the document (as opposed to those which might just mention *farming* and *sensor networks* somewhere in their content)…

Enter the ‘advanced search’ mode (this may be via an “Advanced Scholar Search” link, or by clicking on the drop-down arrow in the search box), and try searching only for terms “in the title”.

What search query did you use? How many results were returned? What do you think are the advantages and disadvantages of doing this?

By restricting your search to looking for the words *farming* and *sensor networks* in the title of the document, you have:

1. reduced the number of results you get to a more manageable number;
2. excluded documents that, while discuss farming and sensor networks, do not feature these terms in their title.

When I search with the query *allintitle: “sensor networks” farming*, I now get 11 results. This is much more manageable! But, is this actually giving me all of the relevant result? What about documents that refer to sensor networks in agriculture, for example? Repeat you search. replacing the word *farming* with *agriculture* instead.

What search query did you use? How many results were returned?

When I search with the query *allintitle: “sensor networks” agriculture*, I now get ~64 results. This shows how important it is to consider other words that might be used to describe the topics you are searching for.

Of course now, we have left out the documents with the word *farming* in the title… Search for documents that have *“sensor networks”* and (*farming* or *agriculture*) in the title.

What search query did you use? How many results were returned?

You can search for this using the ‘Advanced Scholar Search’ tool, or by entering the search query *allintitle: agriculture OR farming "sensor networks"*. When I run this query, I got ~73 results.

You now have a more manageable list of documents to work through.

Somewhere in your results list, you should find a document titled “*Investigation of wireless sensor networks for precision agriculture”*. You are interested in this research paper and want to find out more. See if you can find the full-text for it (for free) – can you?

You have probably found that you were unable to find the full-text (however, well done if you did!). You cannot find it because the University does not have a subscription to this journal. This can be a problem with Google Scholar – while it searches a massive database,

1. There is no guarantee that you will actually be able to find the full-text;
2. There is no guarantee that the documents you find are correct/reputable or of a good standard.

3.1.2 IEEEXplore

For the reasons shown at the end of the previous subsection, it can often be worth searching specific libraries of documents. One of these is IEEEXplore, the IEEE's online digital library of papers published in IEEE and IET journals and conferences. These all have full-text available (as the University pays for a subscription).

Using IEEEXplore, search for papers on *farming sensor networks*. What search query did you use? How many results were returned?

Have a look through your results. Are there results for papers that include the word *farms* and *network*? Are there results for papers without all three keywords in the title? Why do you think this is?

When I search with the query *farming sensor networks*, I get 214 results. These include results such as "*Adaptation of wireless sensor network for farming industries"*.

This result has the word *network* in (rather than *networks*) and also doesn't have the word *farming* in the title. This is because IEEEXplore is also looking for some variations of the words (e.g. removing the plural), and found the word *farming* in the abstract.

You'll notice that this behaviour is different to that of Google Scholar. There is no clear 'standard' for how different search engines and libraries work – in order to get useful results, it is important that you understand how each engine works. You can find out more information at:

http://ieeexplore.ieee.org/Xplorehelp/Help_Searching_IEEE_Xplore.html

http://scholar.google.co.uk/intl/en/scholar/help.html

Other databases and indexes you might wish to use are:

Web of Knowledge: http://wok.mimas.ac.uk/

ACM Digital Library: http://dl.acm.org/

Engineering Village: http://www.engineeringvillage.org

Still in IEEEXplore, click on "advanced search", and work out how to search for all papers with "*sensor networks*" and (*farming or agriculture*) in the title?

What search expression did you use (see top of the results). Consider how your results compare to those obtained with Google Scholar? Why are they different?

Your results will be different to those obtained from Google Scholar for many reasons, including

- Did you select to just search the titles?
- Did you search for "*sensor networks*" in quotes? If so, in IEEEXplore, putting something in quotes stops it for checking for variations, so it will not have also checked for "*sensor network*" automatically.
- They use different databases, so 'know about' different documents! Therefore, you'll get different results!
- Look at the search command that was run (this is written at the top of the search results, after where it says "You searched for:". Are the brackets in the correct places? Are you searching for what you wanted? If not, try "Advanced Search" -> "Command Search" to construct your own search commands (with brackets where you want them)!

I used the search command:

```
(("Document Title":"Sensor Networks") OR ("Document
Title":"Sensor Network")) AND (("Document Title":Farming) OR
("Document Title":Agriculture))
```

And received 31 results. Can you understand this query, and why I chose to write it in this way (it is probably not the only way possible!)

What is the most recent Journal paper in your list of results? (hint, using the control on the left hand side you can sort by date, and filter by 'content type').

What other 'filters' are available?

The most recent journal paper was (at the time of writing this lab!):

"Transforming Agriculture through Pervasive Wireless Sensor Networks"

Find and download the full-text for this paper. In this paper, the authors cite a publication by "V. Raghunathan et al." (reference '3'). Search for and download the full-text for this paper.

3.2 Adhering to Formatting Specifications

Writing reports is both a necessity for your degree, and also a skill required of most engineers. Reports are one form of communication, and being able to communicate the work that you have done effectively is essential. You will often be required to follow templates and formatting guidelines when writing reports, whether these are for your project work at University, public-facing material for a company, or technical literature to be published in a conference or journal. This part of the lab exercise gets you to format a document adhering to a formatting specification, and ensures that you know how to 'drive' Microsoft Word.

Refer to the formatting guidelines included in Appendix B (these are the same guidelines that you will be required to follow in assignment A12). Format the text, image, table and equation shown in Appendix C (the source for which is included on the labs webpage) according to these guidelines. When you have finished, print out your document, and have it checked by a demonstrator. Ask any questions as you go along!

As discussed in the preparation, we also encourage you to try out LaTeX and make an educated decision as to which one to use during your degree.

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4 Optional Additional Work

Marks will only be awarded for this section if you have already completed all of Section 3 to an excellent standard and with excellent understanding.

4.1 Further Searching

In the above examples, you searched for keywords in the titles of documents.

What problems are there in searching for keywords only in the titles? What other options do you have?

Look at the other databases available through the library website (for example Web of Knowledge/Web of Science), and explore how to create useful search queries in their engines.

How do they differ from the two databases that you explored in section 3?

4.2 Preparing for A12

For assignment A12 (technical report), you will need to research background literature to support the observations that you made in lab X3.

Using the skills you learnt at the start of this lab, search for five references that you think are the most relevant to your technical report, for example related to chaos, bifurcation etc.

Note: These should range from broad (and usually very important) ones which provide an overview of the area, to specific ones that have a narrow (but specifically relevant) focus.

NOTE: while you should perform this search today with your lab partner, the assignment is an individual assignment. We would expect to see more than 5 references in your submitted technical report, and you should search for the additional references independently.

Create a reference list for these 5 publications. You should format your reference list to adhere with the IEEE referencing style (further details can be found at http://www.ieee.org/documents/ieeecitationref.pdf).

5 Appendices

Appendix A: IEEE Citation Reference, *from http://www.ieee.org/documents/ieeecitationref.pdf*

Appendix B: Formatting guidelines for EEE Laboratory Assignments

Appendix C: Text to format, *downloadable via http://www.ecs.soton.ac.uk/notes/ellabs/1/x10*

APPENDIX A

IEEE Citation Reference

IEEE Publications uses *Webster's College Dictionary*, 4th Edition. For guidance on grammar and usage not included in this manual, please consult *The Chicago Manual of Style*, published by the University of Chicago Press.

Citiation standards in this reference are provided for:

Books

Basic Format:

[1] J. K. Author, "Title of chapter in the book," in *Title of His Published Book, x*th ed. City of Publisher, Country if not USA: Abbrev. of Publisher, year, ch. *x*, sec. *x*, pp. *xxx–xxx.*

NOTE: Use *et al.* when three or more names are given.

Examples:

[1] B. Klaus and P. Horn, *Robot Vision.* Cambridge, MA: MIT Press, 1986.

[2] L. Stein, "Random patterns," in *Computers and You*, J. S. Brake, Ed. New York: Wiley, 1994, pp. 55-70.

[3] R. L. Myer, "Parametric oscillators and nonlinear materials," in *Nonlinear Optics*, vol. 4, P. G. Harper and B. S. Wherret, Eds. San Francisco, CA: Academic, 1977, pp. 47-160.

[4] M. Abramowitz and I. A. Stegun, Eds., *Handbook of Mathematical Functions* (Applied Mathematics Series 55). Washington, DC: NBS, 1964, pp. 32-33.

[5] E. F. Moore, "Gedanken-experiments on sequential machines," in *Automata Studies* (Ann. of Mathematical Studies, no. 1), C. E. Shannon and J. McCarthy, Eds. Princeton, NJ: Princeton Univ. Press, 1965, pp. 129-153.

[6] Westinghouse Electric Corporation (Staff of Technology and Science, Aerospace Div.), *Integrated Electronic Systems*. Englewood Cliffs, NJ: Prentice-Hall, 1970.

[7] M. Gorkii, "Optimal design," *Dokl. Akad. Nauk SSSR*, vol. 12, pp. 111-122, 1961 (Transl.: in L. Pontryagin, Ed., *The Mathematical Theory of Optimal Processes.* New York: Interscience, 1962, ch. 2, sec. 3, pp. 127-135).

[8] G. O. Young, "Synthetic structure of industrial plastics," in *Plastics*, vol. 3, *Polymers of Hexadromicon*, J. Peters, Ed., 2nd ed. New York: McGraw-Hill, 1964, pp. 15-64.

Handbooks

Basic Format: [1] *Name of Manual/Handbook, x* ed., Abbrev. Name of Co., City of Co., Abbrev. State, year, pp. *xx-xx.*

Examples:

[1] *Transmission Systems for Communications*, 3rd ed., Western Electric Co., Winston-Salem, NC, 1985, pp. 44–60.

[2] *Motorola Semiconductor Data Manual*, Motorola Semiconductor Products Inc., Phoenix, AZ, 1989.

[3] *RCA Receiving Tube Manual*, Radio Corp. of America, Electronic Components and Devices, Harrison, NJ, Tech. Ser. RC-23, 1992.

TR-0200 (4230-46)-3, Nov. 1988.

Reports

The general form for citing technical reports is to place the name and location of the company or institution after the author and title and to give the report number and date at the end of the reference.

Basic Format:

[1] J. K. Author, "Title of report," Abbrev. Name of Co., City of Co., Abbrev. State, Rep. *xxx*, year.

Examples:

[1] E. E. Reber *et al*., "Oxygen absorption in the earth's atmosphere," Aerospace Corp., Los Angeles, CA, Tech. Rep. Angeles, CA, Tech. Rep. TR-0200 (4230-46)-3, Nov. 1988.
[2] J. H. Davis and J. R. Cogdell, "Calibration program for the 16-foot antenna," Elect. Eng. Res. Lab., Univ. Texas, Austin, Tech. Memo. NGL-006-69-3, Nov. 15, 1987.
[3] R. E. Haskell and C. T. Case, "Transient signal propagation in lossless isotropic plasmas," USAF Cambridge Res. Labs., Cambridge, MA, Rep. ARCRL-66-234 (II), 1994, vol. 2.
[4] M. A. Brusberg and E. N. Clark, "Installation, operation, and data evaluation of an oblique-incidence ionosphere sounder system," in "Radio Propagation Characteristics of the Washington-Honolulu Path," Stanford Res. Inst., Stanford, CA, Contract NOBSR-87615, Final Rep., Feb. 1995, vol. 1.
[5] P. Diament and W. L. Lupatkin, "V-line surface-wave radiation and scanning," Dept. Elect. Eng., Columbia Univ., New York, Sci. Rep. 85, Aug. 1991.

Conference Technical Articles

The general form for citing technical articles published in conference proceedings is to list the author/s and title of the paper, followed by the name (and location, if given) of the conference publication *in italics* using these standard abbreviations.

When the word below appears in the conference publication title,	*abbreviate to*
Annals	Ann.
Annual	Annu.
Colloquium	Colloq.
Conference	Conf.
Congress	Congr.
Convention	Conv.
Digest	Dig.
Exposition	Expo.
International	Int.
National	Nat.

When the word below appears in the conference publication title,	*abbreviate to*
Proceedings	Proc.
Record	Rec.
Symposium	Symp.
Technical Digest	Tech. Dig.
Technical Paper	Tech. Paper
First	1st
Second	2nd
Third	3rd
Fourth/*n*th ...	4th/*n*th...

Write out all the remaining words, but omit most articles and prepositions like "of the" and "on." That is, *Proceedings of the 1996 Robotics and Automation Conference* becomes *Proc. 1996 Robotics and Automation Conf.*

Basic Format:

[1] J. K. Author, "Title of paper," in *Unabbreviated Name of Conf.*, City of Conf., Abbrev. State (if given), year, pp. *xxx-xxx.*

For an electronic conference article when there are no page numbers:

[1] J. K. Author [two authors: J. K. Author and A. N. Writer] [three or more authors: J. K. Author et al.], "Title of Article," in [Title of Conf. Record as it appears on the copyright page], [copyright year] © [IEEE or applicable copyright holder of the Conference Record]. doi: [DOI number]

For an unpublished papr presented at a conference:

[1] J. K. Author, "Title of paper," presented at the Unabbrev. Name of Conf., City of Conf., Abbrev. State, year.

Online Sources

The basic guideline for citing online sources is to follow the standard citation for the source given previously and add the Digital Object Identifier (DOI) at the end of the citation, or add the DOI in place of page numbers if the source is not paginated. The DOI for each IEEE conference article is assigned when the article is processed for inclusion in the IEEE Xplore digital library and is included with the reference data of the article in Xplore. See The DOI System for more information about the benefits of DOI referencing.

The following sources are unique in that they are electronic only sources.

FTP

Basic Format:

[1] J. K. Author. (year). *Title* (edition) [Type of medium]. Available FTP: Directory: File:

Example:

[1] R. J. Vidmar. (1994). *On the use of atmospheric plasmas as electromagnetic reflectors* [Online]. Available FTP: atmnext.usc.edu Directory: pub/etext/1994 File: atmosplasma.txt

WWW

Basic Format:

[1] J. K. Author. (year, month day). *Title* (edition) [Type of medium]. Available: http://www.(URL)

Example:

[1] J. Jones. (1991, May 10). *Networks (2nd ed.)* [Online]. Available: http://www.atm.com

E-Mail

Basic Format:

[1] J. K. Author. (year, month day). *Title* (edition) [Type of medium]. Available e-mail: Message:

Example:

[1] S. H. Gold. (1995, Oct. 10). *Inter-Network Talk* [Online]. Available e-mail: COMSERVE@RPIECS Message: Get NETWORK TALK

Telnet

Basic Format:

[1] J. K. Author. (year, month day). *Title* (edition) [Type of medium]. Available Telnet: Directory: File:

Example:

[1] V. Meligna. (1993, June 11). *Periodic table of elements* [Online]. Available Telnet: Library.CMU.edu Directory: Libraries/Reference Works File: Periodic Table of Elements

Patents, Standards, Theses, Unpublished

Patents

Basic Format:

[1] J. K. Author, "Title of patent," U.S. Patent *x xxx xxx*, Abbrev. Month, day, year.

Example:

[1] J. P. Wilkinson, "Nonlinear resonant circuit devices," U.S. Patent 3 624 125, July 16, 1990.

NOTE: Use "issued date" if several dates are given.

Standards

Basic Format:

[1] *Title of Standard*, Standard number, date.

Examples:

[1] *IEEE Criteria for Class IE Electric Systems*, IEEE Standard 308, 1969.
[2] *Letter Symbols for Quantities*, ANSI Standard Y10.5-1968.

Theses (M.S.) and Dissertations (Ph.D.)

Basic Format:

[1] J. K. Author, "Title of thesis," M.S. thesis, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.
[2] J. K. Author, "Title of dissertation," Ph.D. dissertation, Abbrev. Dept., Abbrev. Univ., City of Univ., Abbrev. State, year.

Examples:

[1] J. O. Williams, "Narrow-band analyzer," Ph.D. dissertation, Dept. Elect. Eng., Harvard Univ., Cambridge, MA, 1993.
[2] N. Kawasaki, "Parametric study of thermal and chemical nonequilibrium nozzle flow," M.S. thesis, Dept. Electron. Eng., Osaka Univ., Osaka, Japan, 1993.
[3] N. M. Amer, "The effects of homogeneous magnetic fields on developments of tribolium confusum," Ph.D. dissertation, Radiation Lab., Univ. California, Berkeley, Tech. Rep. 16854, 1995. *** *The state abbreviation is omitted if the name of the university includes the state name, i.e., "Univ. California, Berkeley."****
[4] C. Becle, These de doctoral d'etat, Univ. Grenoble, Grenoble, France, 1968.

Unpublished

These are the two most common types of unpublished references.

Basic Format :

[1] J. K. Author, private communication, Abbrev. Month, year.
[2] J. K. Author, "Title of paper," unpublished.

Examples:

[1] A. Harrison, private communication, May 1995.
[2] B. Smith, "An approach to graphs of linear forms," unpublished.
[3] A. Brahms, "Representation error for real numbers in binary computer arithmetic," IEEE Computer Group Repository, Paper R-67-85.

Periodicals

NOTE: When referencing IEEE Transactions, the issue number should be deleted and month carried.

Basic Format:

[1] J. K. Author, "Name of paper," *Abbrev. Title of Periodical*, vol. *x*, no. *x*, pp. *xxx-xxx*, Abbrev. Month, year.

Examples:

[1] R. E. Kalman, "New results in linear filtering and prediction theory," *J. Basic Eng.*, ser. D, vol. 83, pp. 95-108, Mar. 1961.

[2] Ye. V. Lavrova, "Geographic distribution of ionospheric disturbances in the F2 layer," *Tr. IZMIRAN*, vol. 19, no. 29, pp. 31–43, 1961 (Transl.: E. R. Hope, Directorate of Scientific Information Services, Defence Research Board of Canada, Rep. T384R, Apr. 1963).

[3] E. P. Wigner, "On a modification of the Rayleigh–Schrodinger perturbation theory," (in German), *Math. Naturwiss. Anz. Ungar. Akad. Wiss.*, vol. 53, p. 475, 1935.

[4] E. H. Miller, "A note on reflector arrays," *IEEE Trans. Antennas Propag...*, to be published.**

[5] C. K. Kim, "Effect of gamma rays on plasma," submitted for publication. **

[6] W. Rafferty, "Ground antennas in NASA's deep space telecommunications," *Proc. IEEE* vol. 82, pp. 636-640, May 1994.

** *Always use this style when the paper has not yet been accepted or scheduled for publication. Do not use "to appear in."*

Abbreviations for IEEE Periodicals

Proceedings of the IEEE abbreviates to: Proc. IEEE
Proceedings of the IRE abbreviates to: Proc. IRE *(until 1962)*

IEEE Journals	IEEE J. Comput. Aid. Des.	IEEE J. Solid-State Circuits
	IEEE J. Ocean. Eng.	IEEE Sensors J.
	IEEE J. Quantum Electron.	IEEE Syst. J.
	IEEE J. Sel. Areas Commun.	IEEE Transl. J. Magn. Jpn.
	IEEE J. Sel. Topics Signal Process.	J. Lightw. Technol.
	IEEE J. Sel. Topics. Quantum Electron.	J. Microelectromech. Syst.
IEEE Letters	IEEE Antennas Wireless Propag. Lett.	IEEE Photonics Technol. Lett.
	IEEE Commun. Lett.	IEEE Power Electron. Lett. *(until 2005)*
	IEEE Electron Device Lett.	IEEE Signal Process. Lett.
IEEE Magazines	IEEE Aerosp. Electron. Syst. Mag.	IEEE Ind. Appl. Mag.
	IEEE Annals Hist. Comput.	IEEE Instrum. Meas. Mag.
	IEEE Antennas Propagat. Mag.	IEEE Intell. Syst.
	IEEE ASSP Mag. *(1984–1990)*	IEEE Internet Comput.
	IEEE Circuits Devices Mag. *(1985–present)*	IEEE IT Prof.
	IEEE Circuits Syst. Mag. *(1979–1984)*	IEEE Micro
	IEEE Commun. Mag. *(1979–present)*	IEEE Microwave
	IEEE Commun. Soc. Mag. *(until 1978)*	IEEE Multimedia
	IEEE Comput. Appl. Power	IEEE Nanotechnol. Mag.
	IEEE Comput. Graph. Appl.	IEEE Network
	IEEE Comput. Intell. Mag.	IEEE Pers. Commun.
	IEEE Comput. Sci. Eng. Mag.	IEEE Potentials
	IEEE Computer	IEEE Power Eng. Rev.
	IEEE Concurrency	IEEE Robot. Automat. Mag.
	IEEE Control. Syst. Mag.	IEEE Signal Processing Mag. *(1991–present)*
	IEEE Des. Test Comput.	IEEE Softw.
	IEEE Electr. Insul. Mag.	IEEE Spectr.
	IEEE Eng. Manag. Rev.	IEEE Technol. Soc. Mag.
	IEEE Eng. Med. Biol. Mag.	IEEE Veh. Technol. Mag.
	IEEE Expert *(until 1997)*	Today's Eng.

IEEE Transactions abbreviations

IEEE Adv. Packag.
IEEE/ACM Trans. Netw.
IEEE Human–Factors Electron. *(until 1968)*
IEEE Man–Mach. Syst. *(until 1970)*
IEEE Trans. Acoust., Speech, Signal Process. *(1975–1990)*
IEEE Trans. Aeronaut. Navig. Electron.
IEEE Trans. Aerosp.
IEEE Trans. Aerosp. Electron. Syst.
IEEE Trans. Aerosp. Navig. Electron.
IEEE Trans. Airbone Electron.
IEEE Trans. Antennas Propag.
IEEE Trans. Appl. Supercond.
IEEE Trans. Audio Electroacoust. *(until 1974)*
IEEE Trans. Autom. Control
IEEE Trans. Biomed. Circuits Syst.
IEEE Trans. Biomed. Eng.
IEEE Trans. Broadcast.
IEEE Trans. Broadcast. Technol.
IEEE Trans. Circuit Theory *(until 1973)*
IEEE Trans. Circuits Syst. *(1974–1992)*
IEEE Trans. Circuits Syst. I, Fundam. Theory Appl. *(until 2003)*
IEEE Trans. Circuits Syst. I, Reg. Papers
IEEE Trans. Circuits Syst. II, Analog Digit. Signal Process. *(until 2003)*
IEEE Trans. Circuits Syst. II, Exp. Briefs
IEEE Trans. Circuits Syst. Video Technol.
IEEE Trans. Commun.
IEEE Trans. Commun. Technol. *(until 1971)*
IEEE Trans. Compon. Hybrids, Manuf. Technol. *(1978—1993)*
IEEE Trans. Compon. Packag. Manuf. Technol. A *(1994–1998)*
IEEE Trans. Compon. Packag. Manuf. Technol. B *(1994–1998)*
IEEE Trans. Compon. Packag. Manuf. Technol. C *(1996–1998)*
IEEE Trans. Compon. Packag. Technol.
IEEE Trans. Comput.
IEEE Trans. Comput.-Aided Des. Integr. Circuits Syst.
IEEE Trans. Consum. Electron.
IEEE Trans. Control Syst. Technol.
IEEE Trans. Dev. Mat. Rel.
IEEE Trans. Dielectr. Electr. Insul.
IEEE Trans. Edu.
IEEE Trans. Electromagn. Compat.
IEEE Trans. Electron Devices
IEEE Trans. Electron. Packag. Manuf.
IEEE Trans. Energy Convers.
IEEE Trans. Eng. Manag.
IEEE Trans. Evol. Comput.
IEEE Trans. Fuzzy Syst.
IEEE Trans. Geosci. Electron. *(1962–1979)*
IEEE Trans. Geosci. Remote Sens.
IEEE Trans. Image Process.
IEEE Trans. Ind. Appl.
IEEE Trans. Ind. Electron.
IEEE Trans. Ind. Informat.
IEEE Trans. Inf. Forens. Security
IEEE Trans. Inf. Technol. Biomed.
IEEE Trans. Inf. Theory
IEEE Trans. Instrum.
IEEE Trans. Instrum. Meas.
IEEE Trans. Intell. Transp. Syst.
IEEE Trans. Knowl. Data Eng.
IEEE Trans. Magn.
IEEE Trans. Manuf. Technol. *(1972–1977)*
IEEE Trans. Mechatron.
IEEE Trans. Med. Imag.
IEEE Trans. Microw. Guid. Wave Lett. *(1987–1999)*
IEEE Trans. Microw. Theory Tech.
IEEE Trans. Microw. Wireless Compon. Lett. *(until 2004)*
IEEE Trans. Mil. Electron.
IEEE Trans. Multimedia
IEEE Trans. Nanotechnol.
IEEE Trans. Neural Netw.
IEEE Trans. Neural Syst. Rehabil. Eng.
IEEE Trans. Nucl. Sci.
IEEE Trans. Parallel Distrib. Syst.
IEEE Trans. Parts, Hybrids, Packag. Technol. *(June 1971–1977)*
IEEE Trans. Parts, Mater. Packag.
IEEE Trans. Pattern Anal. Mach. Intell.
IEEE Trans. Plasma Sci.
IEEE Trans. Power App. Syst. *(until 1985)*
IEEE Trans. Power Del.
IEEE Trans. Power Electron.
IEEE Trans. Power Syst.
IEEE Trans. Prof. Commun.
IEEE Trans. Rehabil. Eng. *(until 2000)*
IEEE Trans. Reliab.
IEEE Trans. Robot. Autom.
IEEE Trans. Semicond. Manuf.
IEEE Trans. Signal Process.
IEEE Trans. Softw. Eng.
IEEE Trans. Sonics Ultrason. *(until 1985)*
IEEE Trans. Speech Audio Process.
IEEE Trans. Syst. Man Cybern. *(1971–1995)*
IEEE Trans. Syst. Man Cybern. A., Syst. Humans
IEEE Trans. Syst. Man Cybern. B, Cybern.
IEEE Trans. Syst. Man Cybern. C, Appl. Rev.
IEEE Trans. Ultrason. Eng.
IEEE Trans. Ultrason. Ferroelectr. Freq. Control
IEEE Trans. Veh. Technol.
IEEE Trans. Very Large Scale Integr. (VLSI) Syst.
IEEE Trans. Vis. Comput. Graphics
IEEE Trans. Wireless Commun.

References

NOTE: Use *et al.* when three or more names are given.

References in Text:

References need not be cited in the text. When they are, they appear on the line, in square brackets, *inside the punctuation.* Grammatically, they may be treated as if they were footnote numbers, e.g.,

as shown by Brown [4], [5]; as mentioned earlier [2], [4]–[7], [9]; Smith [4] and Brown and Jones [5]; Wood et al. [7]

or as nouns:

as demonstrated in [3]; according to [4] and [6]–[9].

References Within a Reference:

Check the reference list for *ibid.* or *op. cit.* These refer to a previous reference and should be eliminated from the reference section. In text, repeat the earlier reference number and renumber the reference section accordingly. If the *ibid.* gives a new page number, or other information, use the following forms:

[3, Th. 1]; [3, Lemma 2]; [3, pp. 5-10]; [3, eq. (2)]; [3, Fig. 1]; [3, Appendix I]; [3, Sec. 4.5]; [3, Ch. 2, pp. 5-10]; [3, Algorithm 5].

NOTE: Editing of references may entail careful renumbering of references, as well as the citations in text.

Style

Reference numbers are set flush left and form a column of their own, hanging out beyond the body of the reference. The reference numbers are on the line, enclosed in square brackets. In all references, the given name of the author or editor is abbreviated to the initial only and precedes the last name. Use commas around Jr., Sr., and III in names. If there are many names, use *et al.* Note that when citing IEEE Transactions, if the month is not available, the number may be kept, although it is normally deleted. Keep the day of the month when referencing a patent. References may not include all information; please obtain and include relevant information. Do not combine references. There must be only one reference with each number. If there is a URL included with the print reference, it can be included at the end of the reference.

When the word below appears in the reference, abbreviate to

Acoustics	Acoust.
Administration	Admin.
Administrative	Administ.
American	Amer.
Analysis	Anal.
Annals	Ann.
Annual	Annu.
Apparatus	App.
Applications	Applicat.
Applied	Appl.
Association	Assoc.
Automatic	Automat.
Broadcasting	Broadcast.
Business	Bus.
Communications	Commun.
Computer(s)	Comput.
Congress	Congr.
Convention	Conv.
Correspondence	Corresp.
Cybernetics	Cybern.
Department	Dept.
Development	Develop.
Digest	Dig.
Economic(s)	Econ.
Education	Educ.

Electrical	Elect.
Electronic	Electron.
Engineering	Eng.
Ergonomics	Ergonom.
Evolutionary	Evol.
Foundation	Found.
Geoscience	Geosci.
Graphics	Graph.
Industrial	Ind.
Industry	Ind.
Information	Inform.
Institute	Inst.
Intelligence	Intell.
International	Int.
Journal	J.
Letter(s)	Lett.
Machine	Mach.
Magazine	Mag.
Management	Manage.
Managing	Manag.
Mathematic(s)	Math.
Mathematical	Math.
Mechanical	Mech.
National	Nat.
Newsletter	Newslett.

Nuclear	Nucl.
Occupation	Occupat.
Philosophical	Philosph.
Proceedings	Proc.
Processing	Process.
Production	Prod.
Productivity	Productiv.
Quarterly	Quart.
Record	Rec.
Reliability	Rel.
Report	Rep.
Royal	Roy.
Science	Sci.
Selected	Select.
Society	Soc.
Sociological	Sociol.
Statistics	Stat.
Studies	Stud.
Supplement	Suppl.
Symposium	Symp.
Systems	Syst.
Technical	Tech.
Telecommunication	Telecommun.
Transactions	Trans.
Vehicular	Veh.
Working	Work.

APPENDIX B

Formatting Guidelines for EEE Laboratory Assignments (the report title, 28pt, Times, centred, 25pt line space after)

Joe Bloggs (your name, centred, Times, 11pt)
jb1v07@ecs.soton.ac.uk (your email, centred, italic, Times, 10pt)
Personal Tutor: Professor Bloggs (your tutor, centred, italic, Times, 10pt, 25pt line space after)

Abstract: This is the abstract text, and should be limited to under 150 words. It is important that your abstract makes sense on its own – hence it should not include any references or refer to tables or figures in the document. The text "Abstract:" should be included in the margin, while the abstract itself should be indented by 2cm. The abstract should be justified to both margins, in Times or Times New Roman, size 10pt, with 1.05x line spacing. A 25pt line space should be left between the abstract and the report body.

1. Introduction (12pt Times Bold)

Section headings should be in Times or Times New Roman, size 12pt, bold. The section number should be aligned with the left margin, and the section heading tabbed in 0.75 cm. A space of 10pt should be left before and after a section heading.

Subsection headings should be as section headings, except size 10pt, with a spacing of 6pts before and after.

Line spacing of 1.05x should be used throughout the document. The main body text should be size 10pt Times or Times New Roman, and be justified to both margins. A spacing of 6pt should be inserted between paragraphs.

2. Page Layout and Margins

A4 paper should be used and the margins should be set to 2 cm left and right, and 2.5 cm top and bottom. The body of the document should be split into two columns, with a 0.7 cm spacing between them. If a total word length is specified in the assignment, it should be adhered to (but excludes the title, author details, abstract and references).

Pages should be numbered sequentially in Times New Roman size 10, right-justified in the footer of each page (where the footer is 1.25cm from the edge of the page).

3. Figures, Tables and Equations

Figures (graphs, diagrams, photographs, etc.) should be computer generated or scanned in. They should be centred within the column (or span both columns), and a centred caption should appear below the figure in Times New Roman 9pt. The caption should begin with the word 'Figure' and be followed by the figure number. Figures should be numbered sequentially with Arabic numerals. The caption should give a general description of what the figure is (e.g. "The voltage across resistor 13 vs. time"), explain any symbols or line densities concisely (for example "the solid line represents the modelled relationship; triangles are observed data points"), and give other essential information pertaining to the figure. All figures should be referred to in the text, for example "the system architecture is shown in Figure 1".

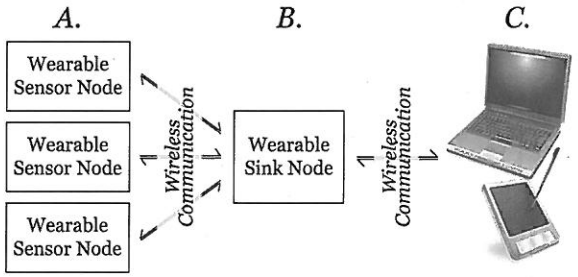


Figure 1: System architecture of the proposed BSN

A figure should have a 10pt line space before it, a 5pt line space between the bottom of the figure and its caption, and a 10pt line space underneath the caption.

Tables should be self-contained, clearly labelled and accompanied by a sequentially numbered caption that appears above the table in Times New Roman 9pt. Table captions should appear above the table, with a 12pt line

space before it, a 6pt line space between the bottom of the caption and the figure, and a 12pt line space underneath the table. All tables should be referred to in the text, for example (Table I). Roman numerals should be used (Table I, Table II, etc.). Tables should be formatted using Table I as a template.

Table I: Example table.

Col 1	Col 2	Col 3	Col 4	Col 5
Row 1	a	b	c	d
Row 2	e	f	g	h
Row 3	i	j	k	l

Variables appearing in the text and in equations should be in italics. If an equation is complex, display it centred with 1 line of 6 pt spacing above and below it; displayed equations should be numbered sequentially in Times 10pt, with an Arabic numeral placed in brackets right-justified, as shown in (1).

$$(1 + x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots \qquad (1)$$

You should explain all parameters in the text.

4. Citing and Listing References

4.1 When and How to Cite (10pt bold)

Information that you obtained from other works needs to be identified within your paper, and full bibliographic data given for it. Within the text, use a brief way of citing the reference so that the reader can find the complete bibliographic details in the list of references at the end. There are several standard systems for citing references and for ordering the information in the list of references; the following specifies the system you should use either for your assignment.

When citing references within the text (or in a figure caption), number these sequentially using square brackets e.g. [9]. Then, list all cited references at the end of the report, under the heading References, again, in numerical order.

If a figure is copied from another source, state at the end of its caption, "(reprinted from [9])". If a figure from another source is used but you have substantially adapted it for your own purposes, state at the end of its caption, "(adapted from [9])"

If you paraphrase, i.e. restate in your own words some part of another work, do not use quote marks, but place the citation(s) at the end of the sentence(s). If you use an exact quote, enclose it in quotation marks, and place the citation either just before or just after the quotation. For example, Yang and Stone [6] state, "Ultrasound imaging has been used to assess ... tongue surface shapes." If you omit the citation, you are passing off their work as yours. If you cite them, but omit the quotation marks, you are giving them some credit, but representing their wording and flow of logic as your own. Both constitute a form of plagiarism; don't do it. Give other authors credit, and give credit properly.

If your original source was from the Web, include the URL in the reference, but search for as much other information as you can find on the web site; URL's can change rapidly. If what you read on the web site was a paper that is published elsewhere (for instance, in a journal that is both paper and on-line, or in conference proceedings), find out all of the information pertaining to the paper publication, and cite that. In other words, find out the authors' names, the title, the name of the conference, date it was held, the page numbers and any other numbers (volume, part) that apply. If the material seems to be only on the web site, list as much information as you can deduce. For instance, if you find course notes for a course at some distant university, search for the name of the person who wrote the notes, their department's name, the university name and location, etc.

Sometimes no individual is listed as author; it may be appropriate in such cases to list the institution, or the publisher, in place of the author above. This could be the case for an on-line encyclopaedia, the web site of a well-known museum, or an entity such as NASA. Adapt the format above if need be. Realize that you may have to hunt a bit: link to the homepage of the author, find out which country a university is in, and so on. But consider: if you can't find any or most of this information, should you be trusting that source?

4.2 Reference Formats

Format your references using the IEEE guidelines (a detailed description is available from http://www.ieee.org/documents/ieeecitationref.pdf.

References

References should be accompanied by a sequential number in square brackets flush with the left margin. The reference itself should be 0.7cm from the left margin, Times 9pt, and justified to both margins. There should be no line spacing in between references.

All references should appear in this 'References' section. Footnotes should not be used in the text to refer to sources.

[1] B. Klaus and P. Horn, Robot Vision. Cambridge, MA: MIT Press, 1986.

[2] L. Stein, "Random patterns," in Computers and You, J. S. Brake, Ed. New York: Wiley, 1994, pp. 55-70.

[3] R. L. Myer, "Parametric oscillators and nonlinear materials," in Nonlinear Optics, vol. 4, P. G. Harper and B. S. Wherret, Eds. San Francisco, CA: Academic, 1977, pp. 47-160.

APPENDIX C

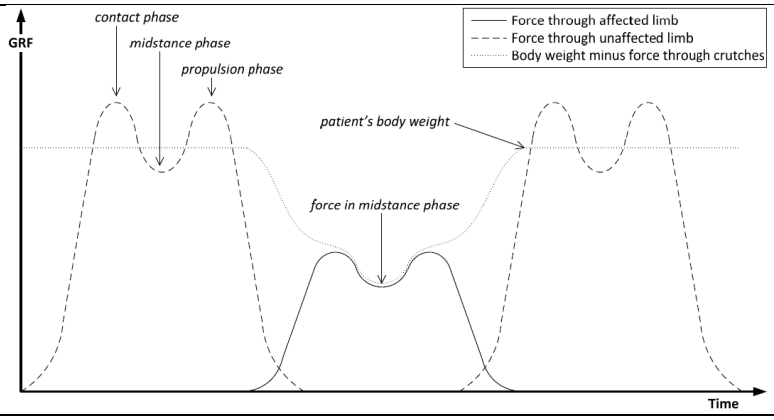
Text to format for X10 Laboratory

Title	Augmenting Crutches with Wireless Sensors for Lower Limb Rehabilitation
Abstract	Forearm crutches are frequently used in the rehabilitation of an injury to the lower limb. The recovery rate is improved if the patient correctly applies a fraction of their body weight through the axis of the crutch, referred to as partial weight bearing (PWB). Incorrect PWB has been shown to result in an extended recovery period or even cause further damage to the limb. This paper describes the research and development of an instrumented forearm crutch developed to wirelessly and autonomously monitor PWB over the full period of a patient's recovery. A pair of crutches are augmented with off-the-shelf wireless sensor nodes and electronic components to provide indicative measurements of applied weight, crutch tilt, and hand grip position. Biofeedback is provided when too much or little weight is put through the crutch. Initial results highlight the ability to support physiotherapists and patients in monitoring patient usage.
Section 1 Title	Introduction
Section 1 Text	Forearm crutches are used routinely following many operations to the lower limb in order to reduce weight-bearing through the affected limb and optimize the healing conditions for bone and soft tissues. Excessive loading of the lower limb following certain types of surgery can disrupt the operated tissues and put the healing bones at risk of mal-union, while mobilisation soon after surgery increases the bone turnover metabolism and stimulates bone growth. It has also been recognized that prolonged unloading of the articular cartilage causes the cartilage to become less stiff and less able to tolerate high loads. Therefore, a programme of partial weight bearing (PWB) usually begins immediately after certain types of surgery and continues until full weight bearing is achieved when there is sufficient healing in the limb.
Section 2 Title	Software Architecture
Section 2 Text	The software system consists of the embedded software on the master and slave crutches, the embedded software on the microcontroller, and the LABView graphical user interface.
Subsection 2.1 Title	Embedded Processing
Subsection 2.1 Text	Having sampled the data from its own sensors and received data from the slave crutch's sensors, the master crutch estimates the weight through the affected limb in order to provide biofeedback. To understand the reasoning behind this algorithm, consider a typical PWB gait cycle. Equation (1) is used to calculate the percentage of the patient's body weight that is translated through their limbs, where $\|F_{c1}[n]\|$ and $\|F_{c2}[n]\|$ are sets of the sampled magnitudes of the forces through the axes of crutches 1 and 2 during the period of one gait cycle, *M* is the mass of the patient (kg) and *g* is the acceleration due to gravity (ms^{-2}). The maximisation is performed over the sum of the forces with respect to *n*, a discrete time index.
Equation 1	$$W^{\%}_{\text{actual}} = 1 - \frac{\max(\|F_{c1}[n]\| + \|F_{c2}[n]\|)}{M \cdot g}$$

Text highlighted in yellow was paraphrased from the paper available at: http://www.ncbi.nlm.nih.gov/pubmed/16311201

Text highlighted in green was paraphrased from the paper available at: http://www.ncbi.nlm.nih.gov/pubmed/9785257

Text highlighted in blue is supported by a figure:

Figure	
Figure Caption	The theoretical forces through the affected limb, healthy limb, and crutches during PWB gait.