

Tips For Writing Your ELEC 222/273 Y2 Group Project Report

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(with many thanks to Dr M Lopez-Benitez and Dr V Selis)



Expectations

- Good report is reader centric:
 - Informative (what, why, how, who, when, where).
 - Organized for the convenience of the reader.
 - Concise, clear.
 - TyPe-O Frii.
 - Scholarly writing practices:
 - Evidencing your work.
 - Accurate referencing of sources.



TEMPLATE

Template: Where?

- MS Word/LaTeX template on CANVAS.

Tip 1: Use the provided template. Don't modify it.

Tip 2: Read the guidelines on the template.

Tip 3: Submit .pdf (with fonts embedded).

Rule 1: Submission files should be MS Word or PDF.

Rule 2: Submission is online via CANVAS.

Template: Fonts, etc.

- **Style Guidelines:**

- Fonts: Report title font size is 18pt, abstract heading font size is 16pt, and abstract text size is 12pt. For the section titles, level 1, 2 and 3 heading font sizes are 16pt, 13pt and 12pt, respectively. For the body text, the text font size is 12 pt.
- Line spacing: 1.5 line spacing.

Rule 3: All text should use black font colour. Avoid using different colours, WordArt, fancy headers or footers, etc.

Rule 4: Avoid underlining.

- In order to place emphasis on certain words, the use italic or bold fonts is optional.

Rule 5: Figures and tables should be captioned, centred and referred in the text.

- Place figure captions under the figures, but table captions over the tables.



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Template: Contents (3)

Title page

Rule 5: Title page contains the title, names of the team members and the supervisor.

Plagiarism declaration

Rule 6: Plagiarism declaration is a formal declaration!

Abstract / Synopsis

Table of Contents [List of Figures/Tables]

Introduction

Materials and Methods/Procedure

Results and Analysis

Discussion and Conclusions

References

Appendices



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WRITING

Brevity is the soul of wit.
William Shakespeare



Source: The Chandos portrait (held by the National Portrait Gallery, London) via Wikipedia.

Title

- First impressions are important: Useful or not?
- Good titles attract readers from the intended audience.



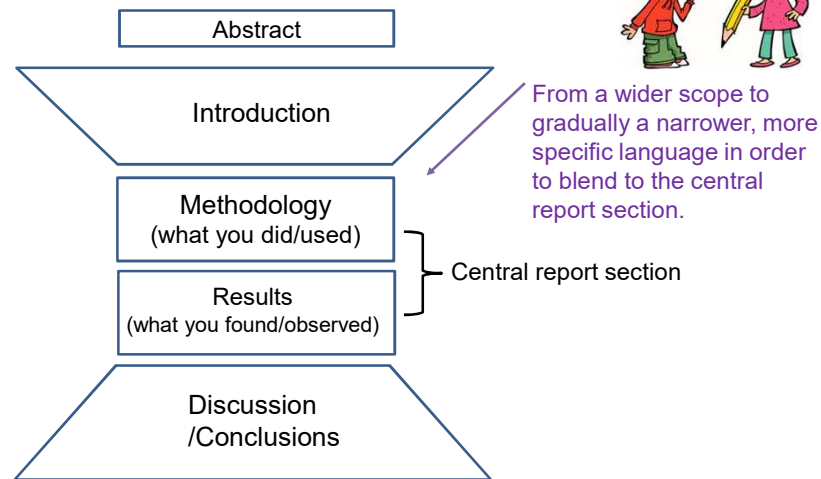
Tip 4: Choose a precise, descriptive title that is NOT wordy!

- Fact: Shorter titled papers attract more citations*.
- Central question into a title: "How does multipath affect time-of-arrival estimation?" → "The impact of multipath information on time-of-arrival estimation."
- Use "Buzzwords" if applicable.



* A Letchford, H S Moat and T Preis, "The advantage of short paper titles," Royal Society Open Science, Vol.2, Issue 8, August 2015.

Structure



Abstract



- Still, useful or not?
- Factoid: #Title reads >> #Abstract reads >> #Body text reads.
- The abstract should articulate the key messages of the article as an independent piece of writing.

Tip 5: Work on perfecting the abstract after the report is mostly/completely finished!

Tip 6: Do not verbatim copy sentences from your report into your abstract! Always rephrase!

Abstract

(1)	Background Aim Problem What this work does
(2)	Methodology Materials
(3)	Results Achievement/Contribution Implications
(4)	Applications
(5)	Limitations, Future work

* Hilary Glasman-Deal, Science Research Writing, Imperial College Press, 2015.



(1) In this work, we consider joint micro-Doppler signature estimation and track-before-detect for detecting and classifying manoeuvring and small rotary-wing aircraft with a phased array radar receiver. (2) Such aircraft induce low signal to noise ratio (SNR) reflections which complicates their detection. These difficulties are exacerbated by the high manoeuvrability of such aircraft which results with resolution cell migrations in conventional detectors. (3) We propose a novel track-before-detect algorithm which jointly estimates the micro-Doppler signature, dominant reflectivity and kinematic trajectory of an object before the decision on its existence is made. These quantities are used in a Neyman-Pearson test against a constant false alarm rate (CFAR) threshold which is equivalent to evaluating a coherent long time integration value. (4) We demonstrate the efficacy of our scheme in a real data experiment and compare it with conventional techniques.

*Kim, Uney, Mulgrew "Coherent track-before-detect with micro-Doppler signature estimation in array radars", IET RSN 2020.

Introduction

Introduction

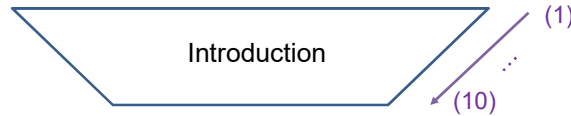
(1)	Present the problem area/research focus Provide background facts/information Define the terminology in the title/key words Establish the importance of your field
(2)	Previous and/or current research and contributions
(3)	Locate the gap in research Describe the problem you will address Present a prediction to be tested
(4)	Describe the present paper/report/document

Tip 7: Use signalling language to connect sentences and ideas. Don't leave any gaps.



* Hilary Glasman-Deal, Science Research Writing, Imperial College Press, 2015.

Introduction



Example: From general information to specifics in ten sentences. Signalling shown by different colours.

(1) **Reflections** from a **moving object**, when illuminated by consecutive radio-frequency (RF) waveforms, are characterised by the **object's reflectivity**, location and **velocity**. (2) In particular, the radial component of the **velocity** induce a frequency shift which is known as the **Doppler**. (3) The rotating and/or moving components of the object manifest themselves as additional frequency shifts centred at the **Doppler** frequency and constitute a **micro-Doppler** signature [1, Chp.1].

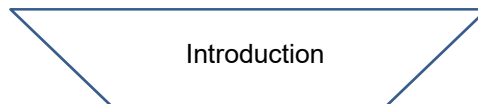
(4) **Micro-Doppler** signatures are important features for **classifying** and/or identifying **objects** in radar surveillance applications. (5) Different types of the propulsion systems have different **micro-Doppler** characteristics. (6) For example, rotary-wing aircraft induce a line spectra of **micro-Doppler shifts**. (7) **These shifts** are specified by the rotation frequencies, the number of rotating blades and the blade lengths [2]. (8) Jet aircraft engines, **on the other hand**, are characterised by sinusoidal deviations with a combination of fundamental frequencies [3].

(9) In this work, we consider joint estimation of the **micro-Doppler shift**, dominant reflection coefficients and the kinematic trajectory of aircraft for **detection** and **classification** of manoeuvring and small rotary-wing unmanned aerial vehicles (e.g., drones and UAVs). (10) In particular, we consider a pulsed radar with a uniform planar array (UPA) receiver and **detection** via coherent long time integration.



*Kim, Uney, Mulgrew "Coherent track-before-detect with micro-Doppler signature estimation in array radars", IET RSN 2020.

Introduction



Tip 8: At the end of the Introduction, give a bird's-eye-view of the document structure.

The outline of the document is as follows: In Section II, we discuss fusion rules that accommodate EMDs in the light of the associated variational problems and pointwise consistency of EMDs. We provide our results regarding the cardinality inconsistencies of finite set EMDs in Section III, together with examples. Then, we redefine the variational problem underpinning fusion and derive solutions for cardinality consistent fusion in Section IV. Conclusions and future directions are provided in Section V.



* Hilary Glasman-Deal, Science Research Writing, Imperial College Press, 2015.

Materials and Methods

or, Model, Experiments, Simulation, Procedures, Methodology...



- Sufficient information to replicate work.
 - All variables in an experimental design.
 - All components of a model.
 - All procedures, if production.
- Chronological order/steps followed.

Tip 9: Use past tense to report what you did!

Tip 10 : Let the reader know whys.

Tip 11: Use charts, diagrams, figures, tables,..., and refer them from the text!

Tip 7 applies!

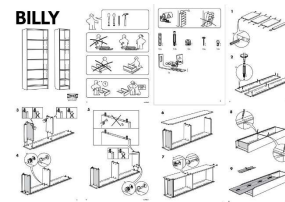


Figure. Instructions for the IKEA Billy bookcase.

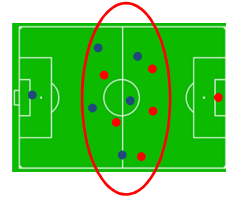
Materials and Methods

or, Model, Experiments, Simulation, Procedures, Methodology...



(1)	<p>Provide a general introduction and overview of the materials/methods</p> <p>Restate the purpose of the work</p> <p>Give the source of materials/equipment used</p> <p>Supply essential background information</p>
(2)	<p>Provide specific and precise details about materials and methods (i.e., quantities, temperatures, duration, sequence, conditions, locations, sizes)</p> <p>Justify choices made</p> <p>Indicate that appropriate care was taken</p>
(3)	Relate materials/methods to other studies
(4)	Indicate where problems occurred

Results/Data Analysis



Methodology
(what you did/used)

Results
(what you found/observed)

} Central report section

- Important/interesting results in relation to the goal of the work.
- What was expected, what did you achieve? Quantify!

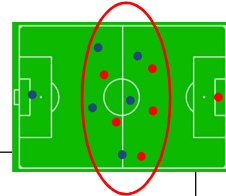
Tip 12: Guide the reader to interpret the results!

Tip 13: How do the results relate to the existing technology/performance?

Tip 11 applies!



Results/Data Analysis



(1)	Revisiting the research aim/existing research General overview of results Revisiting expanding methodology
(2)	Invitation to view the results Specific/key results in detail, with or without explanations Comparison with results in other research Comparison(s) with model predictions
(3)	Problems with results
(4)	Possible implications of results

Conclusions\Discussion



(1)	Revisiting Previous Sections Summarising/revisiting general or key results
(2)	Mapping (relationship to existing work)
(3)	Achievement/contribution Refining the implications
(4)	Limitations Current and future work Applications

Conclusions\Discussion



Tip 14: Reflect on your project:

- Setbacks (in planning, procurement, theoretical analysis, etc).
- What could have done differently?
- What do you plan to do in the future?
- Limitations of your work.
- Contextualise your work commercially, intellectually...

NEXT STEPS



To Do

- Each team will need to complete this task together and ONE project report should be submitted to Canvas by only ONE of the students in the team (Due: 18th March 2022).
- **More information on Canvas.**

Tip 15 : Write in iterations, write as a team, first draft one week before the deadline!



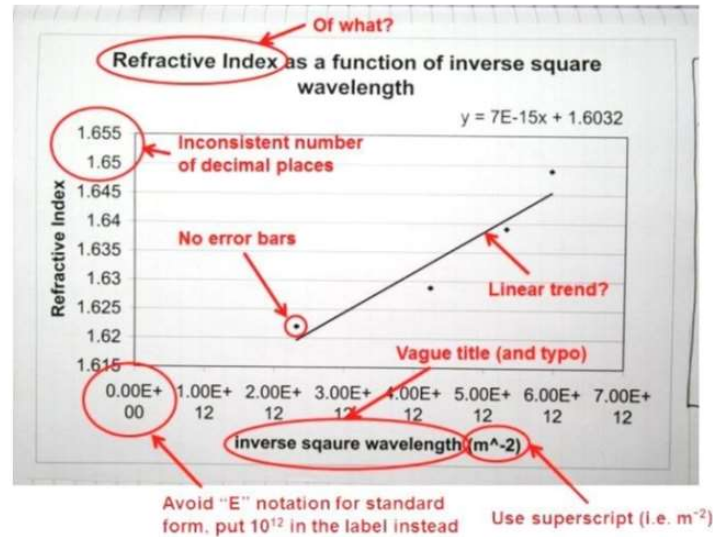
Tip 16 : Start putting together your charts, diagrams, figures, tables (evidence of your work and results)!

ADDITIONAL INFO

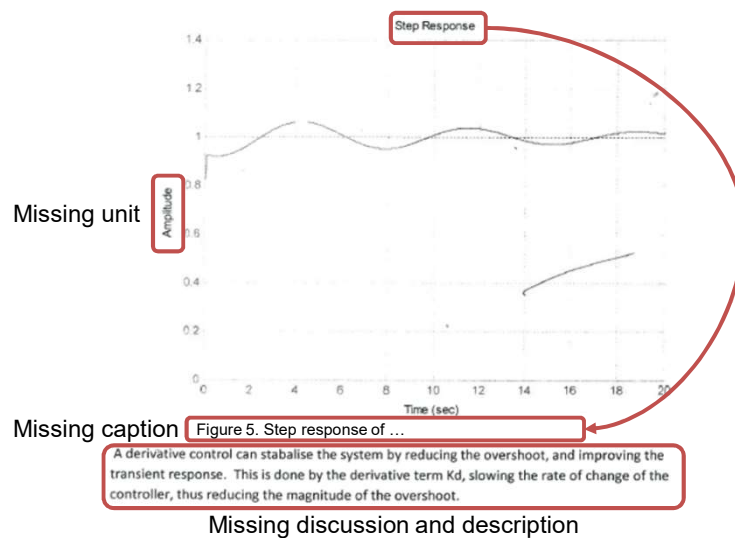
Figures and tables

- Must have numbered captions
 - Below Figures
 - Above Tables
- If copied, state source in caption (and in Reference)
- Must cross-reference the figure/table in the body of the text (i.e. you must refer to it) and comment on it.

Figures and tables



Figures and tables



Abbreviations

First time use
should give
full name

air. The figures 2.3 & 2.4 below show the idealized diagram of steam and gas turbine of CHP systems respectively. CHP system is very beneficial as it reduce carbon emission, even sometimes zero carbon emissions, reduce energy costs and avoid fossil fuel depletion.

a significant reduction in carbon emission. The other form of energy source, which is very vital in the field of minimizing pollution, is known as photovoltaic system (solar PV system). It is a pure process of renewable energy where the power is generated by converting solar energy of the sun into direct current by implementing semiconductors on the solar cells system. In the comparison to the fossil fuels energy, renewable energy is must cleaner and environmentally friendly, in certain needs it can be designed and produced in the local area with the low budget.

The abbr. doesn't
match with full name

Example of reference and text formatting

gradually as it will be required for several years in the future and also in terms of lowering the level of pollution in the air from the industries and vehicles. It is better to operate the process of executing more renewable energy than the stored solar energy. Much more focus towards the development of renewable energy source should be performed and it all depends towards the enlightenment of the government and the public. [2]

Citation places before
the full stop.

a significant reduction in carbon emission. The other form of energy source, which is very vital in the field of minimizing pollution, is known as photovoltaic system (solar PV system). It is a pure process of renewable energy where the power is generated by converting solar energy of the sun into direct current by implementing semiconductors on the solar cells system. In the comparison to the fossil fuels energy, renewable energy is must cleaner and environmentally friendly, in certain needs it can be designed and produced in the local area with the low budget.

No underline.

Referencing style

IEEE Referencing Style

Article in Journal

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

e.g.: M. M. Chiampi and L. L. Zilberti, "Induction of electric field in human bodies moving near MRI: An efficient BEM computational procedure," *IEEE Trans. Biomed. Eng.*, vol. 58, Oct., pp. 2787–2793, 2011, doi: 10.1109/TBME.2011.2158315.

Paper Published in Conference Proceedings

J. K. Author, "Title of paper," in Abbreviated Name of Conf., (location of conference is optional), (Month and day(s) if provided) year, pp. xxx-xxx.

e.g.: A. Amador-Perez and R. A. Rodriguez-Solis, "Analysis of a CPW-fed annular slot ring antenna using DOE," in Proc. IEEE Antennas Propag. Soc. Int. Symp., Jul. 2006, pp. 4301–4304.



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Referencing style

IEEE Referencing Style

Books with single author:

J. K. Author, *Title of His Published Book*, City of Publisher, (only U.S. State), Country: Abbrev. of Publisher, year.

e.g.: B. Klaus and P. Horn, *Robot Vision*. Cambridge, MA, USA: MIT Press, 1986.

Software:

Publisher Name, *Title of Software*. (version or year). Accessed: Date (when applicable). [Type of Medium]. City of Publisher, (only U.S. State), Country: Abbrev. of Publisher, year.

e.g.: Thomson ISI, *Endnote 7*. [CD-ROM]. Berkeley, CA: ISI ResearchSoft, 2006.



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Referencing style

IEEE Referencing Style

General Internet Site:

First Name Initial(s) Last Name. "Page Title." *Website Title*, (Month and day(s) if provided) year. [Online]. Available: Web Address. [Accessed (retrieved Date Accessed)].

e.g.: J. Geraldts, "Sega Ends Production of Dreamcast," *vnunet.com*, para. 2, Jan. 31, 2007. [Online]. Available: <http://nli.vnunet.com/news/1116995>. [Accessed Sept. 12, 2007].

Full list at:

<https://libguides.liverpool.ac.uk/referencing/ieee>



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Referencing Manager

Software tool to:

- Manage the bibliographic details of references
- Archive and organize references
- Share references with other researchers
- Device-independent solution with cloud storage
- Adapt reference styles to meet journals' requirements

There are several reference managers available, some of these are:

- [Mendeley](#)
- [JabRef](#)
- [Zotero](#)
- [Citavi](#)
- [EndNote](#)



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Appendix

- Should contain any **extra material**, including:
 - Project management forms (Appendix A)
 - Breakdown of individual contributions to the project (Appendix B)
- Data sheets
- Additional photographs, diagrams
- Lookup tables
- Source code (yours or others)



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WARNING!

Plagiarism

Plagiarism occurs when a student misrepresents another person's work as his/her own. Examples include:

- The verbatim (word for word) copying of another's work without acknowledgment;
- The close paraphrasing of another's work by simply changing a few words or altering the order of presentation, without acknowledgment;
- Unacknowledged quotation of phrases from another's work;
- Deliberate and detailed presentation of another's concept as one's own.



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WARNING!

Avoid the Embarrassment

Originality GradeMark PostMark Sustainability turnitin 49% BOOKS OUT OF 100

Match Overview

Rank	Source	Percentage
1	www.nintendo.co.uk	16%
2	www.basementfreaks.co	6%
3	www.greenpeace.org	6%
4	www.nintendo.co.jp	3%
5	Submitted to Universit...	3%
6	Submitted to Glasgow	3%
7	www.europarl.europa.eu	2%

FAIL