

How to Write a Quality Technical Paper and Where to Publish within IEEE – Part 1

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IEEE Client Services Manager
September 2015

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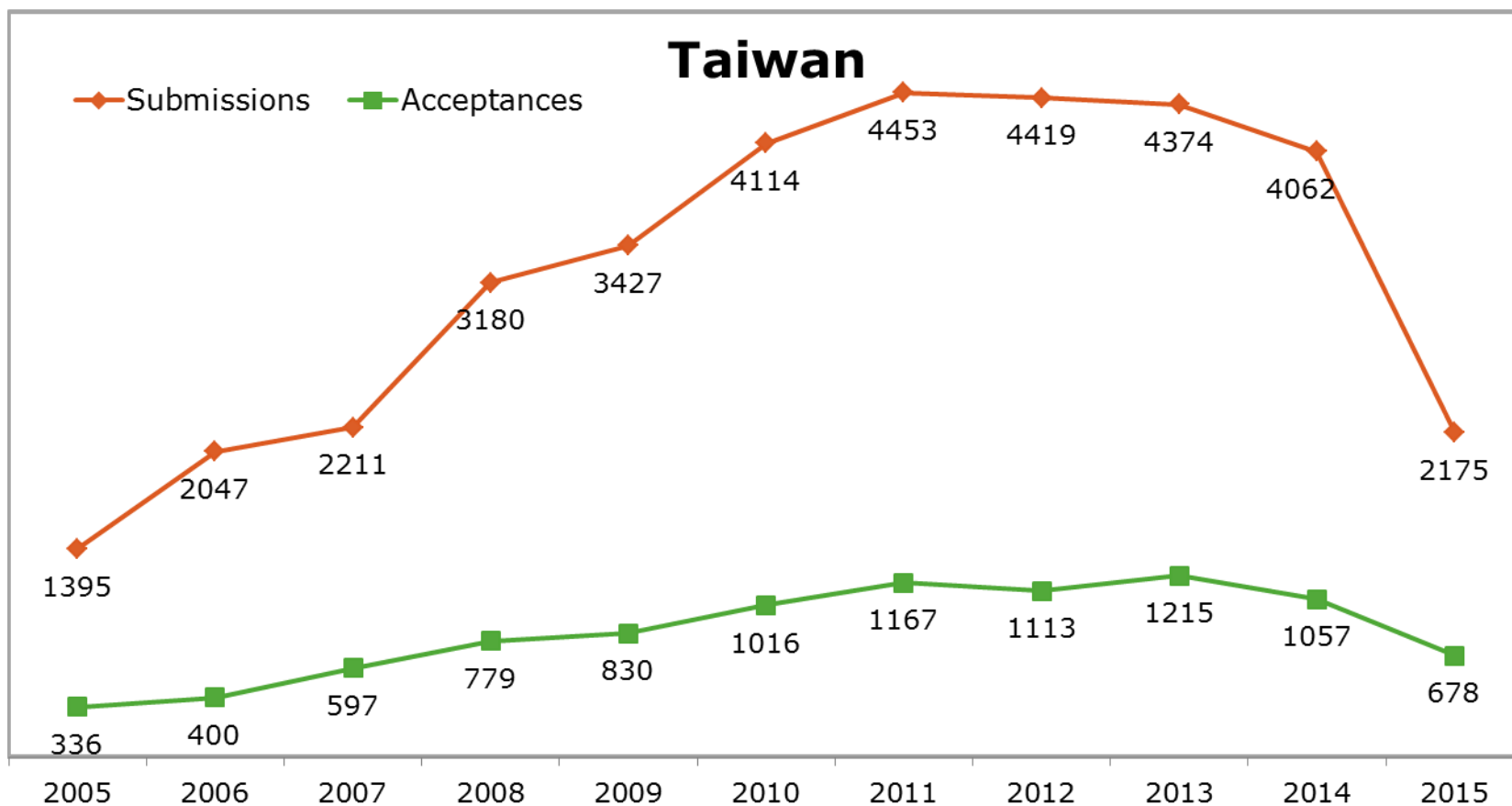
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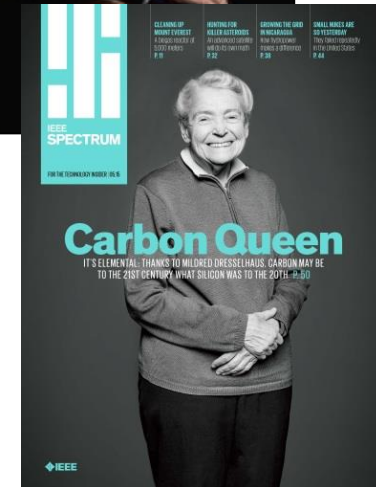
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- # 1 in Theory and Methods
- # 1 in Telecommunications
- # 2 in Aerospace Engineering
- # 2 in Robotics

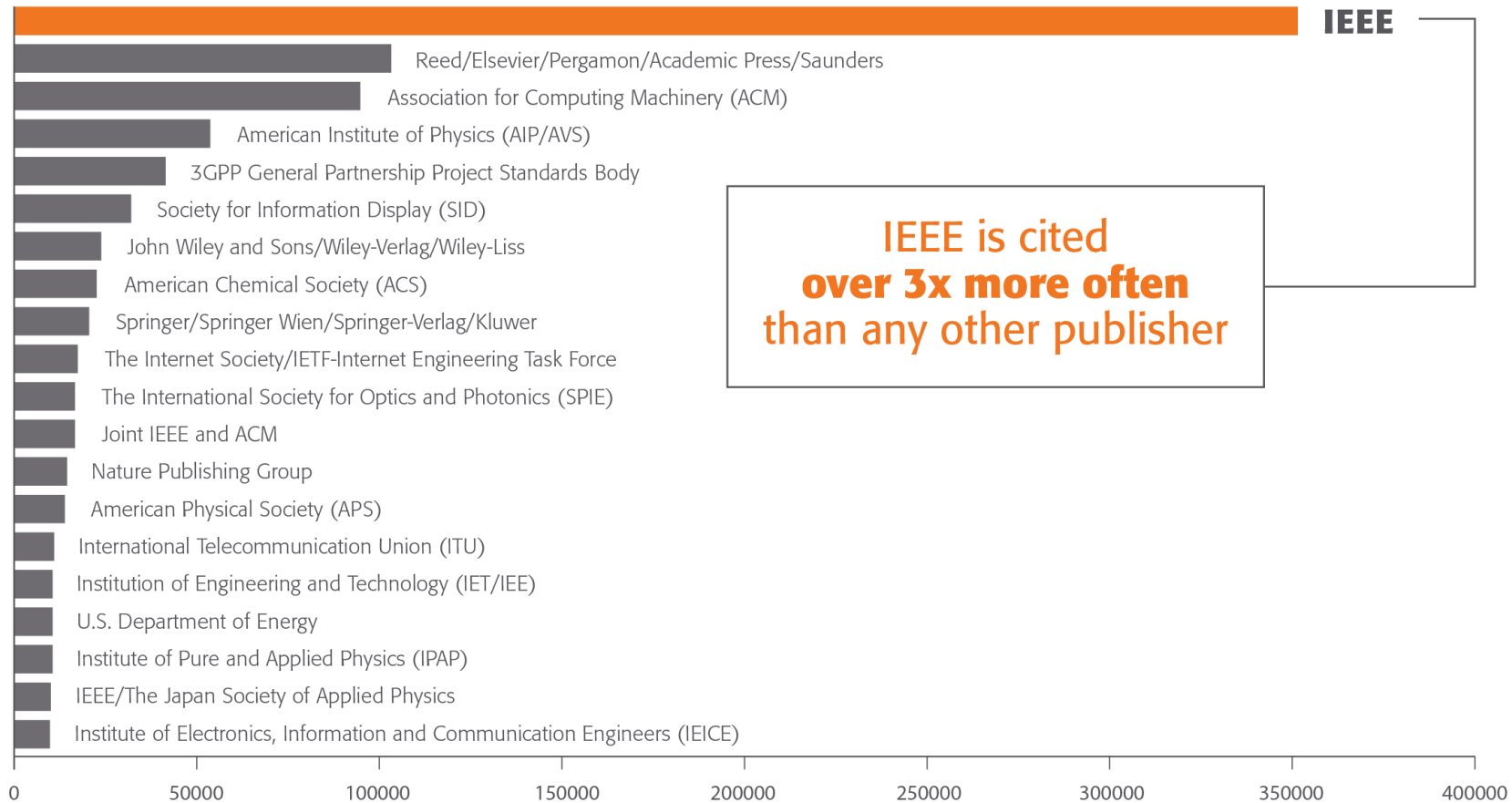


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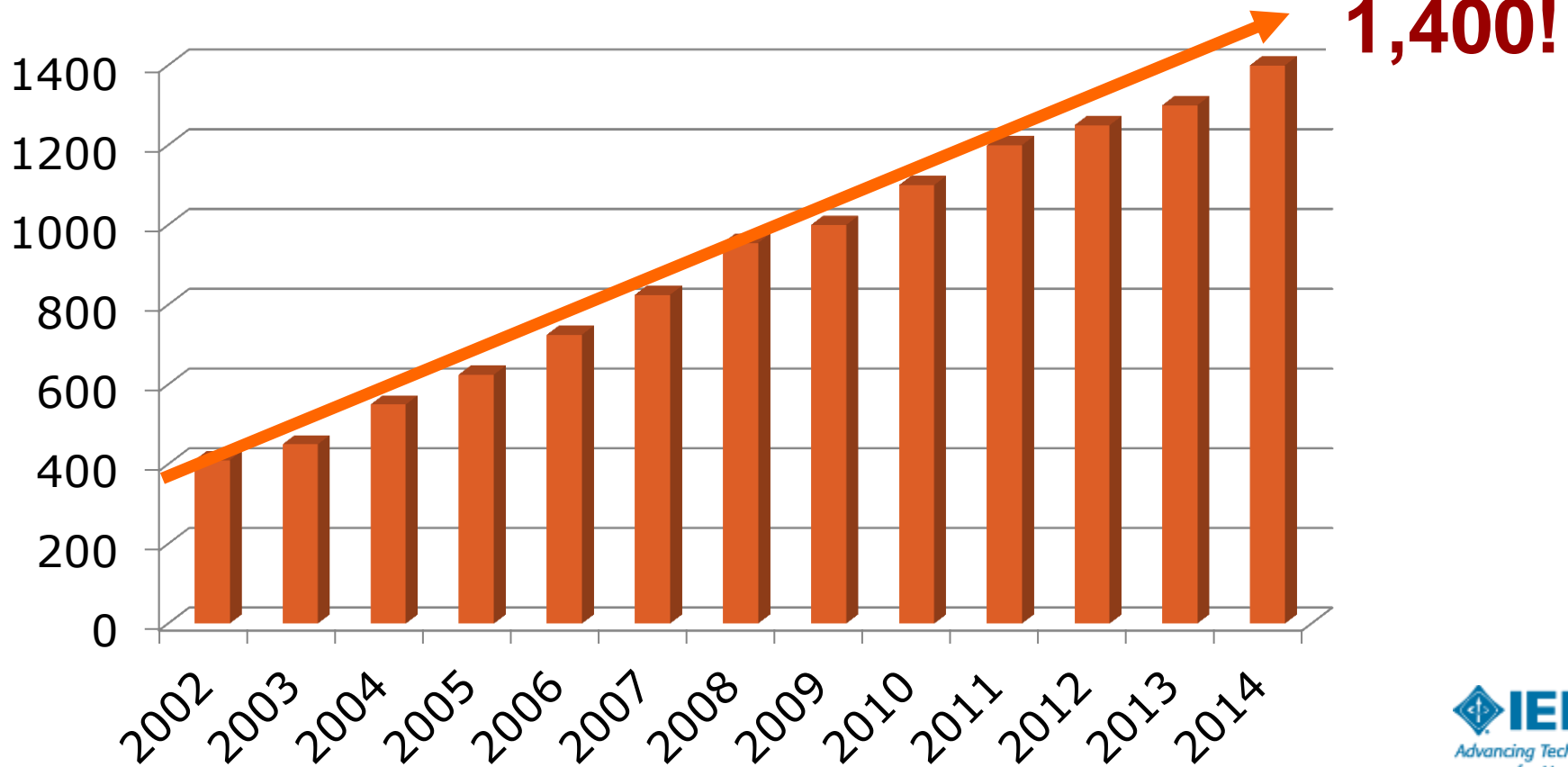


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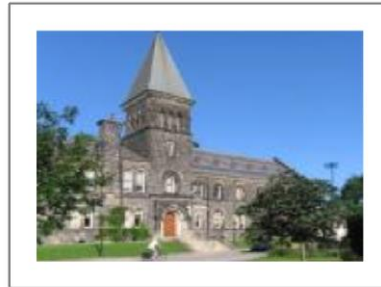
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- 24 out of top 25 Semiconductor companies
- Top 10 Aerospace companies
- 9 of top 10 Auto & Truck Manufacturers
- 9 of top 10 Communications Equipment companies
- 4 of top 5 Electronics companies
- 4 of top 5 Computer Hardware

14
(Forbes Global 2000 Rankings, June 2014)



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- All of the top 100 engineering schools in US
- 49 of the Top 50 Technical Universities Worldwide

(US News and World Report 2013,
(Study based on 2012) Times Higher
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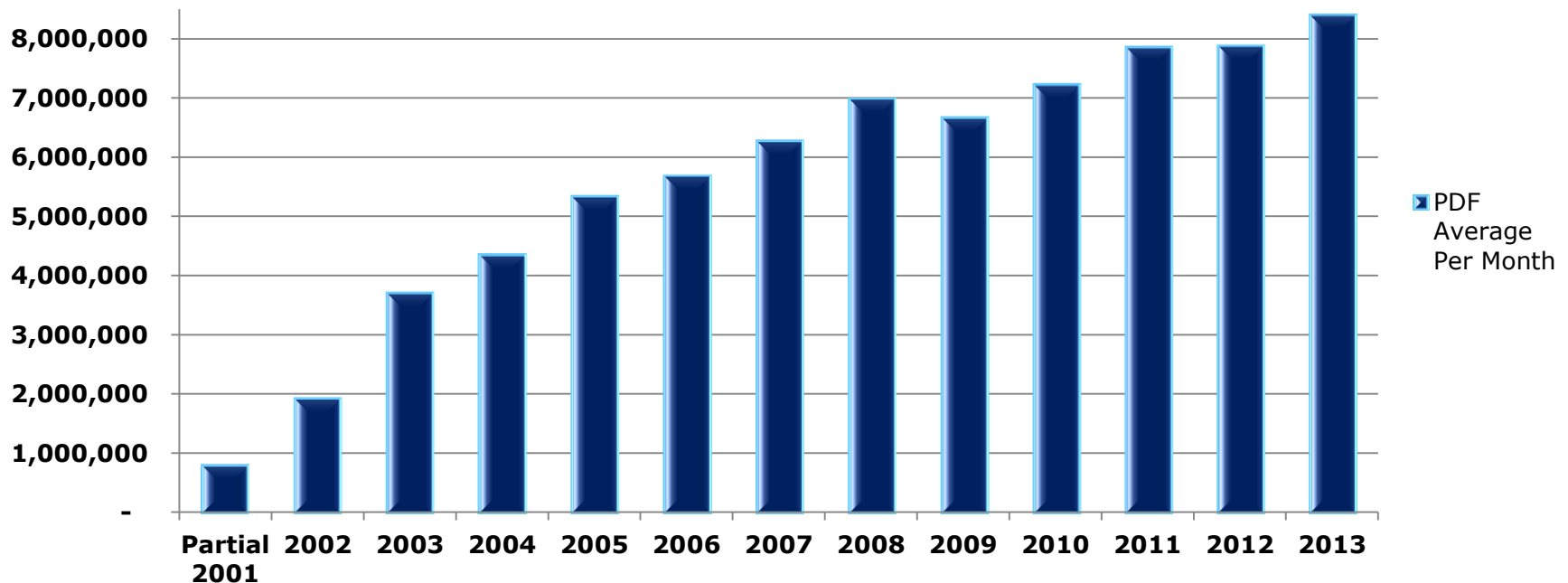
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Today's Author Workshop

Topics Covered

1. **Publishing choices**
2. **Choose an Audience**
3. **Paper Structure**
4. **Ethics**
5. **Where to Publish**
6. **Open Access**
7. **Impact Factor**
8. **Next Steps**



Choices

Publish

IEEE journal or IEEE conference?

- A **journal article** is a fully developed presentation of your work and its final findings
 - Original research results presented
 - Clear conclusions are made and supported by the data
- A **conference article** can be written while research is ongoing
 - Can present preliminary results or highlight recent work
 - Gain informal feedback to use in your research
- Conference articles are typically shorter than journal articles, with less detail and fewer references

Publish

IEEE journal or IEEE conference?

IEEE Journals



- IEEE journals are cited 3 times more often in patent applications than other leading publisher's journals



- A high percentage of articles submitted to any professional publication are rejected

IEEE Conferences

- IEEE Conference proceedings are recognized worldwide as the most vital collection of consolidated published articles in EE, computer science, related fields
- Per IEEE Policy, if you do not present your article at a conference, it may be suppressed in IEEE *Xplore* and not indexed in other databases

Publish

Finding the right IEEE publication or IEEE conference

IEEE has **170 unique publications** covering a wide range of technical areas

- Review the journal listings
 - Who reads it
 - What they publish
 - What kinds of articles they want

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- Review the conference calendar
 - Find a good match for your research subject matter
 - Ensure you are available to present

Audience

Audience

Basic Questions

1. Are you writing this paper for the sake of writing a paper?
2. Or do you want to make a difference in your technical community?

Audience

Scientific research publishing

- Who writes scientific papers?
 - Whoever solves a new and important problem in their field
 - Engineers, scientists, educators and researchers from:
 - Corporations
 - Academia
 - Government
 - Students typically write and present conference papers before submitting journal articles



Audience

What IEEE editors and reviewers are looking for

- Content that is appropriate, in scope and level, for the journal
- Clearly written original material that addresses a new and important problem
- Valid methods and rationale
- Conclusions that make sense
- Illustrations, tables and graphs that support the text
- References that are current and relevant to the subject

Audience

Why IEEE editors and reviewers reject papers

- The content is not a good fit for the publication
- There are serious scientific flaws:
 - Inconclusive results or incorrect interpretation
 - Fraudulent research
- It is poorly written
- It does not address a big enough problem or advance the scientific field
- The work was previously published
- The quality is not good enough for the journal
- Reviewers have misunderstood the article

Structure

Paper Structure

Elements of a manuscript

Title

Abstract

Keywords

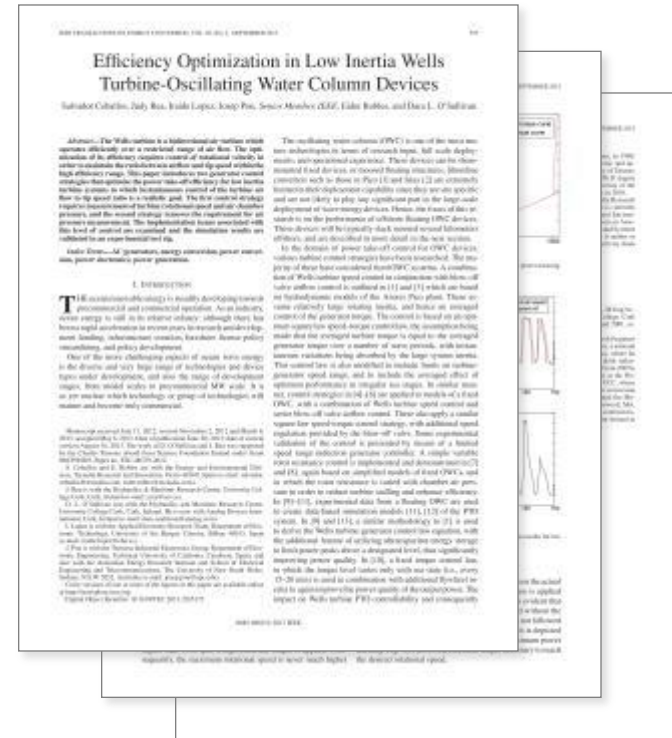
Introduction

Methodology

Results/Discussions/Findings

Conclusion

References



Paper Structure

Title

An effective title should...

- Answer the reader's question: *"Is this article relevant to me?"*
- Grab the reader's attention
- Describe the content of a paper using the fewest possible words
 - Is crisp, concise
 - Uses keywords
 - Avoids jargon

Good
Title

VS.

Bad
Title

Paper Structure

Good vs. Bad Title

A Human Expert-based Approach to Electrical Peak Demand Management

VS

A better approach of managing environmental and energy sustainability via a study of different methods of electric load forecasting

Paper Structure

Abstract

A “stand alone” condensed version of the article

- No more than 250 words; written in the past tense
- Uses keywords and index terms

Why they're useful & important & move the field forward

Why you did it

What you did

How the results were useful, important & move the field forward

Good vs. Bad Abstract

The objective of this paper was to propose a human expert-based approach to electrical peak demand management. The proposed approach helped to allocate demand curtailments (MW) among distribution substations (DS) or feeders in an electric utility service area based on requirements of the central load dispatch center. Demand curtailment allocation was quantified taking into account demand response (DR) potential and load curtailment priority of each DS, which can be determined using DS loading level, capacity of each DS, customer types (residential/commercial) and load categories (deployable, interruptible or critical). Analytic Hierarchy Process (AHP) was used to model a complex decision-making process according to both expert inputs and objective parameters. Simulation case studies were conducted to demonstrate how the proposed approach can be implemented to perform DR using real-world data from an electric utility. Simulation results demonstrated that the proposed approach is capable of achieving realistic demand curtailment allocations among different DSs to meet the peak load reduction requirements at the utility level.

Vs

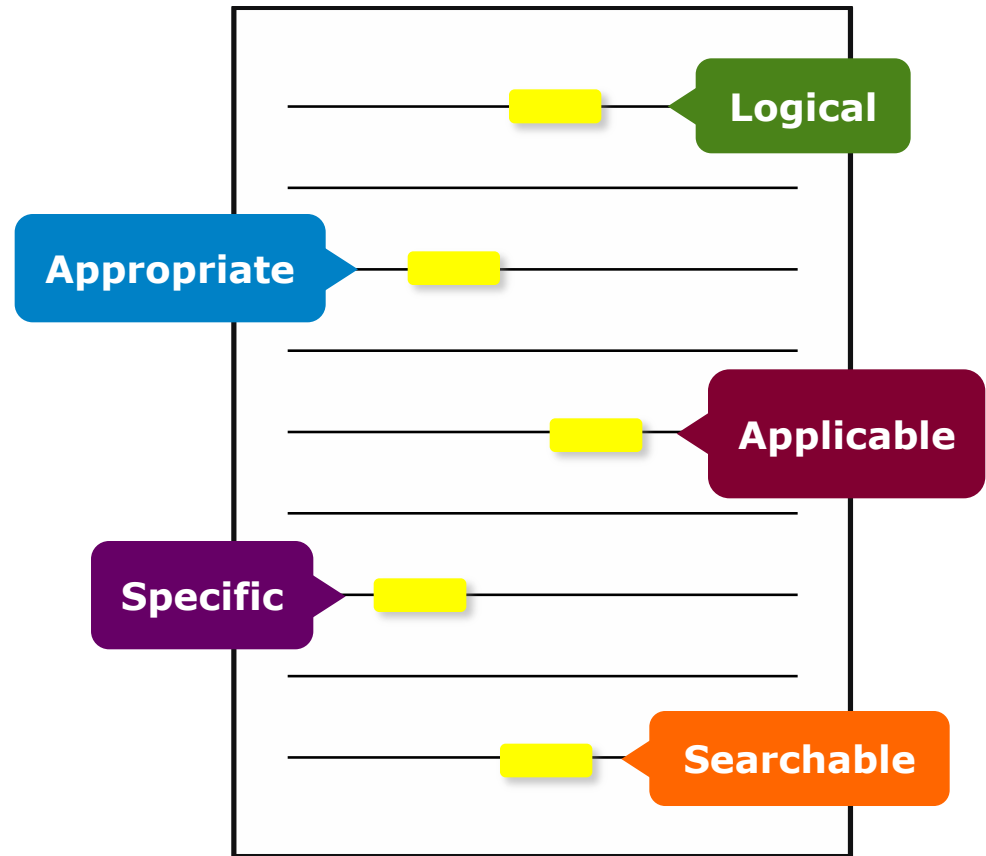
This paper presents and assesses a framework for an engineering capstone design program. **We explain** how student preparation, project selection, and instructor mentorship are the three key elements that must be addressed before the capstone experience is ready for the students. **Next, we describe** a way to administer and execute the capstone design experience including design workshops and lead engineers. **We describe the importance** in assessing the capstone design experience and report recent assessment results of our framework. **We comment** specifically on what students thought were the most important aspects of their experience in engineering capstone design and provide quantitative insight into what parts of the framework are most important.

First person, present tense

No actual results, only describes the organization of the paper

Paper Structure Keywords

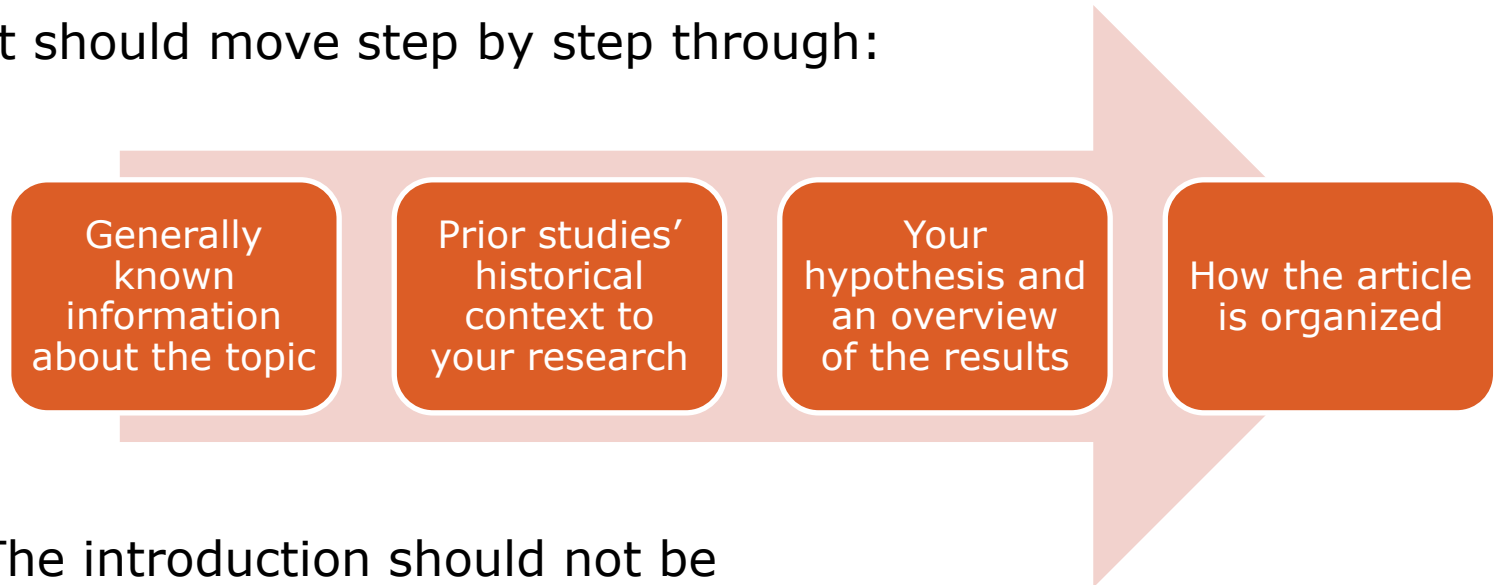
Use in the Title and
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Paper Structure

Introduction

- A description of the problem you researched
- It should move step by step through:



- The introduction should not be
 - Too broad or vague
 - More than 2 pages
 - Written in the present tense

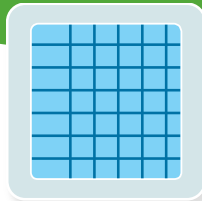
Paper Structure

Methodology

- Problem formulation and the processes used to solve the problem, prove or disprove the hypothesis
- Use illustrations to clarify ideas, support conclusions:

Tables

Present representative data or when exact values are important to show



Graphs

Show relationships between data points or trends in data



Figures

Quickly show ideas/conclusions that would require detailed explanations



Paper Structure

Results/discussion

Demonstrate that you solved the problem or made significant advances

Results: Summarized Data

- Should be clear and concise
- Use figures or tables with narrative to illustrate findings

Discussion: Interprets the Results

- Why your research offers a new solution
- Acknowledge any limitations

Discussion

Results

the SC algorithm over the whole range of ω values increase to 3–4 K, except for the TIGR₁₊₁₁ database, with an RMSE of 2 K. This last result is explained by the ω distribution, which is biased toward low values of ω in this database. When only atmospheric profiles with ω values lower than $3 \text{ g} \cdot \text{cm}^{-2}$ are selected, the SC algorithm provides RMSEs around 1.5 K, with almost equal values of bias and standard deviation, around 1 K in both cases (with a negative bias, thus the SC underestimates the LST). In contrast, when only ω values higher than $3 \text{ g} \cdot \text{cm}^{-2}$ are considered, the SC algorithm provides RMSEs higher than 5 K. In these cases, it is preferable to calculate the atmospheric functions of the SC algorithm directly from (3) rather than approximating them by a polynomial fit approach as given by (4).

V. DISCUSSION AND CONCLUSION

The two Landsat-8 TIR bands allow the intercomparison of two LST retrieval methods based on different physical assumptions, such as the SC (only one TIR band required) algorithms (two TIR bands required). Direct inversion of the transfer equation, which can be considered the “ground-truth” algorithm, is assumed to be a “ground-truth” algorithm because the information about the surface and L_{at} is accurate enough. The SC algorithm in this letter is a combination of the previous SC algorithm developed for Landsat-4 and Landsat-5 TIR sensors, and the ETM+ sensor on board the Landsat-7 platform [9], and it could be used to generate consistent LST products from the historical Landsat data using a single algorithm. An advantage of the SC algorithm is that, apart from surface emissivity, only water vapor content is required as input. However, it is expected that errors on LST become unacceptable for high water vapor contents (e.g., $> 3 \text{ g} \cdot \text{cm}^{-2}$). This problem can be partly solved by computing the atmospheric functions directly from τ , L_{at} , and L_{g} values [see (5)], or also by including the air temperature as input [15]. A main advantage of the SW algorithm is that it performs well over global conditions and, thus, a wide range of water vapor values; and that it only requires water vapor as input (apart from surface emissivity at the two TIR bands). However, the SW algorithm can be only applied to the new Landsat-8 TIRS data, since previous TM/ETM sensors only had one TIR band.

The LST algorithms presented in this letter were tested with simulated data sets obtained for a variety of global atmospheric conditions and surface emissivities. The results showed RMSE values of typically less than 1.5 K, although for the SC algorithm, this accuracy is only achieved for ω values below $3 \text{ g} \cdot \text{cm}^{-2}$. Algorithm testing also showed that the SW errors are lower than the SC errors for increasing water vapor, and vice versa, as demonstrated in the simulation study presented in Sobrino and Jimenez-Munoz [18]. Although an extensive validation exercise from *in situ* measurements is required to assess the performance of the two LST algorithms, the results obtained for the simulated data, the sensitivity analysis, as well as the previous findings for algorithms with the same mathematical structure give confidence in the algorithm accuracies estimated here.

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Paper Structure

Conclusion

- Explain what the research has achieved
 - As it relates to the problem stated in the Introduction
 - Revisit the key points in each section
 - Include a summary of the main findings, important conclusions and implications for the field
- Provide benefits and shortcomings of:
 - The solution presented
 - Your research and methodology
- Suggest future areas for research



Paper Structure

References

- Support and validate the hypothesis your research proves, disproves or resolves
- There is no limit to the number of references
 - But use only those that directly support our work
- Ensure proper author attribution
 - Author name, *article title*, publication name, publisher, year published, volume, chapter and page number
 - IEEE journals generally follow a citation numbering system

Properly cited material

We then have

$$\begin{aligned} (P_1^{h+} + P_1^{h-})^2 &= (P_1^{h+} - P_1^{h-})^2 + 4P_1^{h+}P_1^{h-} \\ &< (P_1^{h+} - P_1^{h-})^2 + 4\hat{P}_1^{h+}\hat{P}_1^{h-} \\ &= (P_1^{h+} + \hat{P}_1^{h-})^2. \end{aligned} \quad (32)$$

Since $P_1^{h+} - P_1^{h-} = \hat{P}_1^{h+} - \hat{P}_1^{h-}$, we then have $P_1^{h+} < P_1^{h+}$, and $P_1^{h-} < P_1^{h-}$. Because the operational cost is an increasing function of $\{P_1^{h+}, P_1^{h-}\}$, we obtain that

$$c_{\text{opt}}(\{P_1^{h+}, P_1^{h-}\}) < c_{\text{opt}}(\{\hat{P}_1^{h+}, \hat{P}_1^{h-}\}). \quad (33)$$

Therefore the optimal pair $\{P_1^{h+}, P_1^{h-}\}$ cannot satisfy that $P_1^{h+}P_1^{h-} = 0$, i.e., only one of P_1^{h+}, P_1^{h-} can be non-zero. ■

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