Paper titles

What does a title do?

- *Conveys content.* It tells you what's in the paper.
- *Catches interest.* It attracts the reader's attention.
- *Contains keywords.* Accessible via web search.

Most people will find a paper via a web search. They will see only the title... then decide whether or not to read your paper.

> **Everything should be made as simple as possible, but no simpler.**
>
> — *Albert Einstein*

(This quote is attributed to a lot of people; I'll act as if it's by Einstein. I don't really know.)

This goes for everything in papers, but it's especially important in titles.

We should be especially strict about every word in the title: *does the reader need this word?*

What should I cover?

I've thought a lot about how to teach this; it's tricky!

- I can't talk about all possible grammar errors.
- Even if I could, there are problems other than grammar, and I couldn't possibly talk about all of these.
- Important topics are usually contested (i.e., someone will say the opposite).
- There's exceptions to virtually every rule in English.

Thus, I'll pick a small number of topics which:

1. come up often, and
2. the usefulness of studying these topics extends beyond the title.

General advice...

- ▶ You can't say everything—describe only the main **new** findings.

- ▶ Avoid mathematical expressions in titles (if possible). Paper titles are used in many places, and this is an obstacle.

- ▶ Avoid acronyms, abbreviations, and jargon (but don't oversimplify).

- ▶ I recommend avoiding jokes and "catchy" titles: they can be hard to understand for those who struggle with English. And they may not seem so clever later on.

- ▶ Avoid titles which are questions; answer the question instead!

- ▶ Avoid pointless phrases like "Design and Implementation of X" and just write "X".

(...and know when and when not to break these rules.)

Paper titles

(Unnecessarily long titles)

How can we improve this title?

> What Are the Most Important Factors for Accounting Information Quality and Their Impact on AIS Data Quality Outcomes?
> — Xu (2015).

(AIS = "accounting information system".)

We change this to:

> Factors Affecting the Data Quality of Accounting Information Systems

Maybe "Accounting Information Quality" and "AIS Data Quality Outcomes" are important to distinguish—but they're **not important enough to distinguish within the title!**

Remember the purpose of a title: The reader is deciding whether or not to read the paper.

> A Technical Demonstration of Large-Scale Image Object Retrieval by Efficient Query Evaluation and Effective Auxiliary Visual Feature Discovery
> — Kuo et al. (2010).

Breaking this down:

- ▶ ~~Technical Demonstration~~ Demonstration
- ▶ Large-Scale   ✓
- ▶ Image Object Retrieval   ✓
- ▶ ~~Efficient~~
- ▶ ~~Query Evaluation~~ (implied in "Image Object Retrieval")
- ▶ ~~Effective~~
- ▶ Auxiliary Visual Feature Discovery   ✓

So we change this to:

> Demonstration: Large-Scale Image Object Retrieval through Auxiliary Visual Feature Discovery

Consider the reader: Does there exist a reader who would read the first paper but not the second?

Paper titles

(Capitalization)

Capitalization: title case

Ordinarily, we use title case[1] for titles (with rare exceptions; some conferences and journals use sentence case).

> A Framework for Ontology-Driven Subspace Clustering
> — Liu et al. (2004).
>
> iPhone's Digital Marketplace: Characterizing the Big Spenders
> — Kooti et al. (2017).

We capitalize each word except for articles ("a", "the", etc.), conjunctions ("and", etc.), and prepositions ("of", "for", "with", etc.).

Also the first word should be capitalized (with rare exceptions, e.g. if the first word is "iPhone").

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[1]`https://en.wikipedia.org/wiki/Letter_case` and see the section "Title case"

Capitalization: title case (cont.)

> Gesture Search: A Tool for Fast Mobile Data Access
> — Li (2010).

We capitalize the "A" in the above example, since it comes after a colon (this is a matter of personal preference; some don't capitalize it).

More examples:

> Propagation-Based Social-Aware Replication for Social Video Contents
> — Wang et al. (2012).
>
> Revisiting the TTL-based Controlled Flooding Search: Optimality and Randomization
> — Chang et al. (2004).

Sometimes it's unclear what to do. Compare: "Propagation-Based" and "TTL-based". Here, whatever you think is best is fine.

What's wrong with this title's capitalization?

Which words should be capitalized below?

> Sensing-based modeling and service for Conditional Connection of EDEVS component
> — Yang et al. (2012).

It should be:

> Sensing-based Modeling and Service for Conditional Connection of EDEVS Components

(I also changed "component" to "Components".)

Paper titles

(Compound adjectives)

Compound adjectives

Compound adjectives are adjectives formed from combining two or more words. For example:

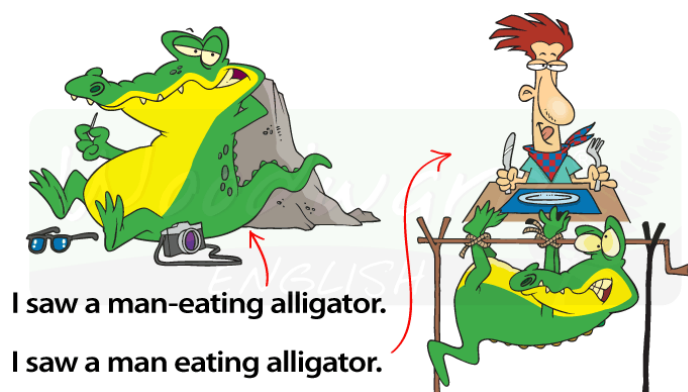> Multidimensional mining of large-scale search logs: a topic-concept cube approach
>
> — Kang et al. (2011).

This has two compound adjectives: "large-scale" and "topic-concept".

Compound adjectives distinguish how sentences are read:

- A "topic-concept cube" is a "cube" which has the "topic-concept" property.
- A "topic concept cube" is a "concept cube" which has the "topic" property.

Funny example (found online)...

I saw a man-eating alligator.

I saw a man eating alligator.

http://www.grammar.cl/english/compound-adjectives.htm

Compound adjectives (cont.)

Exception: We don't use the hyphen after adverbs ending in -ly.

For example:

> Deep People Counting in Extremely Dense Crowds
>
> — Wang et al. (2015).

Here, we don't write "Extremely-Dense" even though "Extremely Dense" describes "Crowds". (The adverb "extremely" modifies the adjective "dense".)

(We also don't write "Deep-People" since the adjective "deep" describes "people counting".)

There's some exceptions; I won't go into detail.

What's wrong with these titles?

> Video Telephony for End-Consumers: Measurement Study of Google+, iChat, and Skype
>
> — Xu et al. (2014).

"End-Consumers" is not used as an adjective! Here it should be "End Consumers".

> kMemvisor: Flexible System Wide Memory Mirroring in Virtual Environments
>
> — Wang et al. (2013).

"System Wide" is used as a compound adjective to describe "Memory Mirroring"; it needs a hyphen: "System-Wide".

Paper titles

(Countable nouns and noun phrases)

A common grammar error

> 3SE: A Semi-Structured Search Engine for Heterogeneous Data **in Graph Model**
>
> — Zhong and Liu (2009).

The noun phrase "graph model" is *countable* (one graph model, two graph models, and so on). We can ask: *Which* graph model?

We need to write one of the following:

- ... in a graph model, where we refer to one particular (but unspecified) graph model.
- ... in graph models, where we refer to some particular (but unspecified) graph models (more than one; possibly all models).
- E.g. ... in the Erdős-Rényi Graph Model or ... in Erdős and Rényi's Graph Model, where we refer to a definite (specified) graph model.
- (Useful alternative.) ... Heterogeneous Graph-Model Data. We can also replace the noun phrase "graph model" with a (suitably placed) compound adjective "graph-model".

> 3SE: A Semi-Structured Search Engine for Heterogeneous Data **in Graph Model**
>
> — Zhong and Liu (2009).

We can fix this (grammatically) in these ways:

> 3SE: A Semi-Structured Search Engine for Heterogeneous Data in **a Graph Model**

> 3SE: A Semi-Structured Search Engine for Heterogeneous Data in **Graph Models**

> 3SE: A Semi-Structured Search Engine for Heterogeneous **Graph-Model** Data

Importantly, they have different meanings.

Chinese Pinyin Phrasal Input **on Mobile Phone**: Usability and Developing Trends

— Liu and Wang (2007).

We can fix this (grammatically) as follows:

Chinese Pinyin Phrasal Input **on a Mobile Phone**: Usability and Developing Trends

Chinese Pinyin Phrasal Input **on Mobile Phones**: Usability and Developing Trends

Chinese Pinyin Phrasal **Mobile-Phone** Input: Usability and Developing Trends

(Maybe "Mobile Input" is better here.)

Another incorrect example:

Data Logging plus E-diary: Towards an Online Evaluation Approach **of Mobile Service Field Trial**

— Liu et al. (2010).

Fixing this (and the compound adjective) leaves another error:

Data Logging plus E-diary: Towards an Online Evaluation **Approach of Mobile-Service Field Trials**

Fixing this gives:

Data Logging plus E-diary: Towards an Online Evaluation **Approach to** Mobile-Service Field Trials

We've fixed the grammar, but this is not what the authors mean: "An X approach to Y" implies we conduct Y using X. The paper is instead about "user experience evaluation in field trials" (copy/pasted from their abstract).

Online User Experience Evaluation in Mobile-Service Field Trials

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Another incorrect example:

Agent-Based Online Quality Measurement Approach **in Cloud Computing Environment**

— Liu et al. (2008).

Actually, this title has the same error twice:

Agent-Based Online Quality Measurement Approach in Cloud Computing Environment

Fixing these:

Agent-Based Online Quality Measurement in Cloud Computing

- ▶ "Approach" is countable: one approach, two approaches, and so on.
- ▶ "Environment" is countable: one environment, two environments, and so on.
- ▶ "Quality Measurement" is used in a way in which it is not countable. (Meaning something like "the study of measurement quality".)
- ▶ "Cloud Computing" is not countable.

Another incorrect example:

A Robust and Efficient Shot Boundary Detection Approach **Based on Fisher Criterion**

— Zhang and Wang (2012).

Here, the "Fisher Criterion" is definite. So we write one of the following:

- ▶ ... Based on the Fisher Criterion.
- ▶ ... Based on Fisher's Criterion.

More incorrect examples:

WADE: Writeback-Aware Dynamic Cache Management for NVM-Based Main Memory System

— Wang et al. (2013).

Group-Based Extension and Computation of Argumentation Framework

— Xie (2017).

Multi-Screen Cloud Social TV: Transforming TV Experience into 21st Century

— Jin et al. (2013).

Design and Implementation of Synchronization System Based on Web Service Database

— Xu (2013).

This is a very common error.