



# Chapter 1

## Abstract

“We can only see a short distance ahead, but we can see plenty there that needs to be done.”

Alan Turing

## 1.1 Definition

The Abstract section is like a mini version of the whole paper with a concise statement of its main content. It functions to help readers capture the full picture of the research without reading the full paper. In other words, information in the Abstract section corresponds to the complete paper, but it is highly compressed, having generally between 150 and 250 words. However, the requirements of international academic journals both within and across disciplines may vary to some extent, so it is necessary to check the guidelines of the journal before submission.

## 1.2 Components

Although short in length, the Abstract section provides information of vital importance for both journal reviewers and readers, and therefore it needs to be taken seriously. To be more specific, during the review stage of the paper, the journal editor, based on the reading of the Abstract section, may conduct an initial evaluation with regard to its suitability for inclusion in the journal, and make a further decision on whether to proceed with peer review; peer reviewers would also like to give priority to the Abstract section and develop a first impression of the entire paper according to the writing. In fact, an open secret is that many desk rejects are attributed to a poorly written Abstract section—it tends to reduce reviewers' interest in reading while elevating the risk of rejection. In the process of paper retrieval and dissemination, the Abstract section is usually the only part of the full paper that is accessible online for free; thereby, it always attracts the most attention from readers, serving as the main basis for them to determine whether to read and pay for the remaining parts of the paper.

The guidelines for writing the Abstract section in most academic journals are mainly limited to content rather than format, and usually require the descriptions of research background, purpose, methods, results, and conclusions. In the practical writing of an Abstract section, the following tips deserve much attention:

- Stay neat and avoid being long-winded, especially for the first sentence. The writing style of the Abstract section often reflects the overall writing style of the paper. A lengthy Abstract section will obscure key information, and even lead readers to anticipate that the entire paper is unclear as redundant information will continue to be piled up, thereby reducing the attraction of the paper. An appropriate way of writing

is to present only the core points expected by the journal or concentrate on the main content of the paper, and avoid details such as examples. Besides, it is necessary to keep wording and phrasing concise and remove repetition and rhetoric.

- Avoid starting with non-critical information. As the Abstract section is limited in length, the core points of the paper should be promoted in the limited space as much as possible. Especially at the very beginning of the Abstract section, background information that is irrelevant or weakly associated with the main topic should not be involved. Otherwise, it will distract readers' attention from the main topic while squeezing the space. An appropriate way of writing is to start the Abstract section with the use of keywords and proceed with the writing by reducing the use of non-keywords.
- Avoid the misuse of tense and voice. Ambiguity caused by tense and voice is a common problem found in inexperienced Abstract writings. For example, a mixed use of the present tense and passive voice may appear without a distinction between the research conducted by the writer and by others, but it may be a nightmare to readers. A common way of writing is to combine the first-person pronouns and past tense when describing the writer's own work, and use the third-person pronouns and present tense to represent others' research.
- Explain the reasons for the research. In order to impress readers, the Abstract section not only clarifies what research has been carried out, but also brings readers to the research rationale. By and large, it is better to involve some background information that highlights the necessity and importance of the research in the first three sentences of the Abstract section.

### ▶ 1.3 Structure

The Abstract section can be usually divided into five structural components (or moves), which are research background, research purposes, research methods, research results, and research conclusions.

- **Move 1:** Research background, outlining the importance and necessity of the research topic, and illustrating the problems, gaps, challenges, or shortcomings in prior research.
- **Move 2:** Research purposes, presenting the research goal.
- **Move 3:** Research methods, outlining the study design and research procedures to carry out the research, as well as the data, tools, devices, programs, algorithms, or models used.

- **Move 4:** Research results, summarizing the major findings and achievements of the research.
- **Move 5:** Research conclusions, presenting the significance and implication of the research.

### ↪ Case Study One

Excerpt (Fawzi et al., 2015)	Moves
<p>① Classifiers based on sparse representations have recently been shown to provide excellent results in many visual recognition and classification tasks. ② However, the high cost of computing sparse representations at test time is a major obstacle that limits the applicability of these methods in large-scale problems, or in scenarios where computational power is restricted. ③ We consider in this paper a simple yet efficient alternative to sparse coding for feature extraction. ④ We study a classification scheme that applies the soft-thresholding non-linear mapping in a dictionary, followed by a linear classifier. ⑤ A novel supervised dictionary learning algorithm tailored for this low complexity classification architecture is proposed. ⑥ The dictionary learning problem which jointly learns the dictionary and linear classifier is cast as a difference of convex (DC) program and solved efficiently with an iterative DC solver. ⑦ We conduct experiments on several datasets and show that our learning algorithm that leverages the structure of the classification problem outperforms generic learning procedures. ⑧ Our simple classifier based on soft-thresholding also competes with the recent sparse coding classifiers, when the dictionary is learned appropriately. ⑨ The adopted classification scheme further requires less computational time at the testing stage, compared to other classifiers. ⑩ The proposed scheme shows the potential of the adequately trained soft-thresholding mapping for classification and paves the way towards the development of very efficient classification methods for vision problems.</p>	<p><b>Move 1: Research background</b> Sentence ①: Importance of the research topic Sentence ②: Problems, gaps, challenges, or shortcomings in prior research</p> <p><b>Move 2: Research purposes</b> Sentence ③: Goal of the research</p> <p><b>Move 3: Research methods</b> Sentence ④: Study design and research procedures Sentences ⑤⑥: Data, tools, devices, programs, algorithms, or models</p> <p><b>Move 4: Research results</b> Sentences ⑦–⑨: Major findings and achievements of the research</p> <p><b>Move 5: Research conclusions</b> Sentence ⑩: Significance and implication of the research</p>

## ➔ Case Study Two

Excerpt (Adewoyin et al., 2021)	Moves
<p>① Climate models (CM) are used to evaluate the impact of climate change on the risk of floods and heavy precipitation events. ② However, these numerical simulators produce outputs with low spatial resolution that exhibit difficulties representing precipitation events accurately. ③ This is mainly due to computational limitations on the spatial resolution used when simulating multi-scale weather dynamics in the atmosphere. ④ To improve the prediction of high resolution precipitation, we apply a deep learning (DL) approach using input data from a reanalysis product, that is comparable to a climate model's output, but can be directly related to precipitation observations at a given time and location. ⑤ Further, our input excludes local precipitation, but includes model fields (weather variables) that are more predictable and generalizable than local precipitation. ⑥ To this end, we present TRU-Net (Temporal Recurrent U-Net), an encoder-decoder model featuring a novel 2D cross attention mechanism between contiguous convolutional-recurrent layers to effectively model multi-scale spatio-temporal weather processes. ⑦ We also propose a non-stochastic variant of the conditional-continuous (CC) loss function to capture the zero-skewed patterns of rainfall. ⑧ Experiments show that our models, trained with our CC loss, consistently attain lower RMSE and MAE scores than a DL model prevalent in precipitation downscaling and outperform a state-of-the-art dynamical weather model. ⑨ Moreover, by evaluating the performance of our model under various data formulation strategies, for the training and test sets, we show that there is enough data for our deep learning approach to output robust, high-quality results across seasons and varying regions.</p>	<p><b>Move 1: Research background</b> Sentence ①: Importance of the research topic Sentences ②③: Problems, gaps, challenges, or shortcomings in prior research</p> <p><b>Move 2: Research purposes</b> Sentence ④: Goal of the research</p> <p><b>Move 3: Research methods</b> Sentences ④–⑦: Study design and research procedures</p> <p><b>Move 4: Research results</b> Sentences ⑧⑨: Major findings and achievements of the research</p> <p><b>Move 5: Research conclusions</b> [Not appear] Significance and implication of the research</p>

## 1.4 Phrases and Sentences in Moves

### Move 1: Research Background

#### A. Outlining the importance and necessity of the research topic

- Typical collocations

- \* *a critical issue*
- \* *a crucial aspect*
- \* *a key problem*
- \* *a pivotal/vital/essential/important role*
- \* *a problematic field*
- \* *a prominent part*
- \* *a valuable/interesting topic*
- \* *all-important status*
- \* *be widely studied*
- \* *significant research*
- \* *worthwhile work*

- Typical sentences

- \* *Because X occupies a broad range of frequencies, some redundant components are introduced...*
- \* *Currently, X, Y, and Z are attracting significant attention from researchers...*
- \* *These proposed models have now become essential tools for use in all stages of system development and are reported to be particularly important for CBM...*
- \* *With a profusion of network applications, X plays a crucial role in network...*
- \* *X and Y are significant and increasing causes of mortality and morbidity...*
- \* *X and Y are two important issues in Z where various statistical and machine learning techniques have been employed to develop prediction models.*
- \* *X is an important aspect of fostering effective ways to self-regulate these experiences...*
- \* *X is an important part of different focus-related applications such as autofocus, focus stacking, and depth estimation...*
- \* *X is one of the major security concerns...*
- \* *X is reconstructed by the KinectFusion...*

- \* *X, one of the major exponents of the third generation of artificial neural networks, **has not been thoroughly studied as an online learning approach...***
- \* *X **plays a critical role in a variety of data-centric applications...***
- \* *X **protects the runtime integrity of MapReduce applications...***

## B. Illustrating the problems, gaps, challenges, or shortcomings in prior research

### ● Typical collocations

- \* *a challenging condition/problem/scenario/task/topic*
- \* *a defect/limitation in*
- \* *bridge/minimize/narrow the gap (between)*
- \* *demand of*
- \* *insufficient knowledge/performance/research/study*
- \* *lack/paucity/short of*
- \* *limited application/data/discussion/number/size*

### ● Typical sentences

- \* *A number of studies have shown that...However, important questions regarding X **remain unanswered.***
- \* *Currently, X **is the only option for** detailed player monitoring in Y...*
- \* *Despite decades of research on X, Y **has been less than satisfactory.***
- \* ***Few attempts have been made to** investigate the role of X in the field of Y.*
- \* ***Few studies in the field of X have sought to** examine Y...*
- \* *However, in a large-scale wireless network such as a wireless mesh network, X **has not been fully investigated...***
- \* *However, **most works only focused on** applying specific feature selection methods over either X or Y...*
- \* *However, obtaining meaningful information from large volumes of raw data **represents a significant challenge...***
- \* *However, the research community **is still constrained by the lack of** a comprehensive dataset, and **there exists no insightful understanding of** mobile ransomware in the wild.*
- \* *However, the type of data in the real world **is usually mixed,** i.e., there are both numeric and categorical attributes together...*
- \* *However, the use of current thermometers in circadian rhythm monitoring **is impractical in daily life.***
- \* *However, this assumption **is not valid for** those images with serious intensity inhomogeneity,*

- which inevitably leads to poor segmentation performance of existing models.*
- \* *Previous research in the field of X has been largely restricted to Y.*
  - \* *The high cost of X is a major obstacle...*
  - \* *The key challenge of deriving transmission capacity is to characterize the aggregate interference of X...*
  - \* *The lack of a reliable automatic monitoring system impedes investigations about the risk factors of overuse injuries...*
  - \* *The resulting lack of stationarity in the distribution of the produced data calls for efficient and scalable algorithms for X to such changes.*
  - \* *To the best of our knowledge, no forensic technique has yet been invented to identify whether an image is colorized.*
  - \* *X has been thought of largely as a relay nucleus, and its intrinsic connectivity has not been incorporated in significant detail, in any model thus far...*
  - \* *X has not been previously studied and compared with each other extensively...*
  - \* *X is an important area of enquiry; however, relatively little is known about Y.*

## Move 2: Research Purposes

### Presenting the research goal

- Typical collocations

- \* *aim/attempt/intend/try to*
- \* *an aim/goal/objective/purpose of*
- \* *an overall aim (of)*
- \* *be aimed at*
- \* *be concerned with*
- \* *be demonstrated/conducted/presented/proposed/studied (to)*
- \* *explore the link/relationship (between)*
- \* *focus/operate on*
- \* *gain insight(s) into*
- \* *highlight the issue (of)*
- \* *look at (how)*
- \* *offer/undertake an analysis (of)*
- \* *provide data/information on/about*
- \* *seek to*
- \* *set out to*



## ● Typical sentences

- \* *A new X scheme is **proposed to** solve the variational problem...*
- \* *In this paper, we **focus on** MapReduce, a popular big data computing framework...*
- \* *In this paper, we **present a novel framework for** X...*
- \* *In this paper, we **present a novel** Spatial Contextual Super-pixel **Model for**...*
- \* *In this paper, we **propose a novel** transformation-based **method for**...*
- \* *In this paper, we **propose an** attribute-aware encrypted traffic **classification**...*
- \* *In this study, we **analyze and compare** the discrimination capability of...*
- \* *In this work, we **present an experimental study** comparing X and Y using Z.*
- \* *In this work, we **present an** unobtrusive automatic monitoring **system for**...*
- \* ***One of the central claims of this study is that**...*
- \* ***Our goal is to** find X which captures the intrinsic structure from the data itself...*
- \* ***Our main goal is/was to** gain a better understanding of X.*
- \* ***Part of the aim of this project is to** develop software that is compatible with...*
- \* ***The aim of this paper is to** study several strategies for X in variational optical flow methods...*
- \* ***The goal of this work is to** present a computational model for contour detection...*
- \* ***The objective of the paper is to** introduce a non-invasive diagnosis procedure for...*
- \* ***The objective of this study is twofold.** The first is to...; the second is to...*
- \* *The study **is conducted to** examine the effect of...*
- \* *The study **uses X to** generate a numeric equivalent from mixed datasets...*
- \* *This paper **describes a study to** test the accuracy of a method that...*
- \* *This paper **develops a novel approach to** find the PS plane in...*
- \* *This paper **presents an** integrated interval fuzzy logic approach **that**...*
- \* *This study **attempts to** establish the connection between X and Y.*
- \* *This study systematically reviews the data for..., **aiming to** provide...*
- \* ***To enable** the analytical calculation, X for the proposed mechanisms **are acquired**...*
- \* ***To increase** the diversity of application fingerprints, we **develop** a new...*
- \* ***To solve** this leakage problem, in this study, we **propose** using X **that** occupies the same frequency ranges as the original signals to improve Y...*
- \* *We **aim to** assess the financial health of enterprises and individuals...*
- \* *We **build X that** controls a robotic arm by solving inverse kinematics in...*
- \* *We **explore X to** build a neural architecture that controls a robotic arm by...*
- \* *We **propose a** combined deep and handcrafted visual **feature**...*
- \* *We **propose a** self-organizing neural **architecture for**...*
- \* *We **propose an** accurate plane-finding **solution based on**...*

- \* *We study a classification scheme that applies...*
- \* *We suggest a novel spatially continuous approach for...*
- \* *We try to develop a new method by incorporating...*
- \* *With an aim to detect the manipulation of digital images...*
- \* *X is studied in this paper for a full duplex wireless network ...*

### Move 3: Research Methods

Outlining the study design and research procedures, as well as the data, tools, devices, programs, algorithms, or models used

- Typical collocations

- \* *a characteristic/feature/property of*
- \* *a combination of*
- \* *a variety/volume/number/quantity of*
- \* *an adaptation/adoption of*
- \* *be based on*
- \* *be categorized/classified into*
- \* *be commonly used (to)*
- \* *be composed/consisted of*
- \* *be defined/formulated as*
- \* *be drawn from*
- \* *be gathered through*
- \* *be referred/restricted to*
- \* *by means of*
- \* *compare with*
- \* *conduct experiments (to)*
- \* *cost of*
- \* *depend on*
- \* *instead of*

- Typical sentences

- \* *A classification is formulated as a solution of finding the maximum posterior...*
- \* *A law is proposed to provide the finite L2-gain property...*
- \* *A model encodes the probabilistic mapping between...*
- \* *A number of feature measurements are extracted from the available images...*
- \* *A robot is trained to find the shortest path to...*