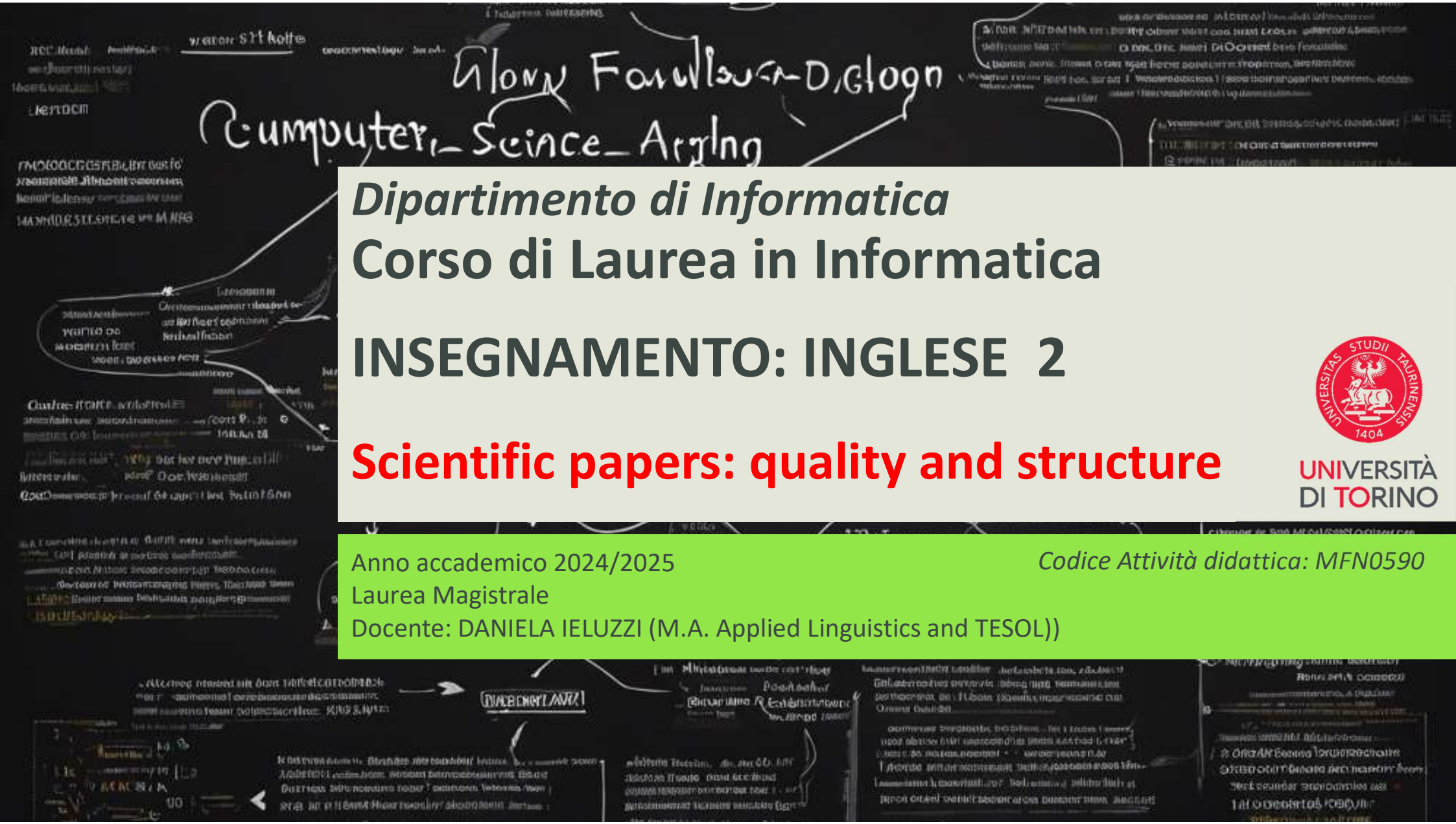


Dipartimento di Informatica

Corso di Laurea in Informatica

INSEGNAMENTO: INGLESE 2

Scientific papers: quality and structure

UNIVERSITÀ DI TORINO

Anno accademico 2024/2025 *Codice Attività didattica: MFN0590*

Laurea Magistrale

Docente: DANIELA IELUZZI (M.A. Applied Linguistics and TESOL))

LESSON PLAN: WRITING RESEARCH PAPERS

AREA	DESCRIPTION
OUTLINE	Researchers in any discipline will have to read and write research papers in English. Especially (but not exclusively) If English is not their first language, writing scientific articles and/or papers is a difficult task that needs special attention in writing concisely with no redundancy and no ambiguity.
AIMS	Learn how a paper is structured and what are the main writing skills that are important in reference to the different sections of a paper. **This topic may also help towards the outlining of your MSc dissertation* ☺ !**
RESOURCES & METHODS	Theorical presentation and class discussion. Language in use.
PRACTICE	Training on how to structure context phrases in English

THE SECTIONS OF A PAPER

1. Title
2. Abstract
3. Introduction
4. Review of the Literature

PAPER

5. Methods
6. Results
7. Discussion
8. Conclusions

1

Title

SECTIONS OF A PAPER : TITLE

The importance of a good title in research writing is emphasized because browsers often scan through numerous titles before choosing an abstract to read.
Consequently, research writing experts often devote more attention to discussing titles than any other section of a paper.

How can I generate a title? Think about the following questions:

- What have I found that will attract attention?
- What is new, different and interesting about my findings?
- What are the 3–5 key words that highlight what makes my reearch and my findings unique?

Redundant	Clearer (more impact)
A study of the factors affecting the trihyroxyindole procedure for the analysis of deoxyri bonucleic acid	Factors affecting the trihyroxyindole procedure for the analysis of deoxyribonucleic acid
An investigation into some psychological aspects of English pronunciation	Some psychological aspects of English pronunciation

Similar words that are often redundant are: inquiry, analysis, evaluation, and assessment.
However, words such as study and investigation may be useful to make your research sound less conclusive.

DECLARATIVE TITLES are frequently disapproved when state major conclusions, as these can overstate the importance of findings. For example, a title like "The consumption of one apple per day precludes the necessity of using medical services" presents the conclusion as a fact, leaving no room for doubt. This can be misleading, especially if the findings are speculative. While declarative titles are common in medicine and biology and can attract attention, they should only be used if well-supported by the paper. Authors are advised to ensure their titles reflect the truth and align with the journal's standards.

SECTIONS OF A PAPER : TITLE

QUESTIONS IN TITLES: Are questions in titles a good way to attract attention?

GRAMMAR FOCUS: A question can be formulated using an auxiliary (e.g. does, would, can, will) and using question words (e.g. why, when, what, which, why, who).
Titles in the form of questions are particularly effective for conference abstracts.
Their informal nature engages readers by prompting curiosity about the answer. Such titles are often original, fun, and stand out from others, making them more likely to attract attention. **ATTENTION: INFORMAL NATURE**

GOOD PRACTICES/HIGHLIGHTS IN WRITING TITLES	REMARKS
Where possible use the -ing form of verbs rather than abstract nouns.	This will make your title more readable as well as making it 2–3 words shorter.
The key words in your title are likely to be nouns.	Choose these nouns very carefully
Choose adjectives that indicate the unique features of your work, e.g. low cost, scalable, robust, powerful.	Try to use adjectives that differentiate your work from any previous one in the fiels
Avoid adjectives such as innovative and novel to attract attention	Those adjectives give no indication as to how something is novel (furthermore, no one will include them when Googling papers)

SECTIONS OF A PAPER : TITLE

SHORTEN THE TITLE: Titles are often limited by character count.
In some cases, you can retain your original title but shorten it by replacing non-essential words with shorter synonyms.

LET'S ANALYSE SOME GLOSSARY

LONG VERB	SHORT VERB
achieve	gain
apportion	allot
calculate, evaluate	assess, rate
demonstrate, display, exhibit	show
determine	fix
facilitate	ease
guarantee	ensure
prohibit	block
require	need
support	aid
utilize	use

LONG NOUN	SHORT NOUN
advantages	gain, benefits, pros
examination, investigation	study
improvement	advance
modification	change

LONG ADJECTIVE	SHORT ADJECTIVE
accurate	exact
fundamental	basic
important	key, top
innovative	novel, new
necessary	needed
primary	main

The most obvious ways to make your title shorter are to:

- choose the shortest word
- remove redundant words
- use verbs rather than nouns

SECTIONS OF A PAPER : TITLE

USE OF PREPOSITIONS: Titles with more than five words usually need prepositions.
The table below outlines the common meanings of prepositions in titles and provides examples both with and without prepositions.

	MEANING	POOR / INCORRECT ENGLISH	GOOD ENGLISH
by	how something is done	Fast computing machines equation of state calculations	Equation of state calculations *by* fast computing machines
for	for the purpose of	Depression measuring inventory	An inventory *for* measuring depression
from	the origin of	Antonio Gramsci prison notebooks selections	Selections *from* the prison notebooks of Antonio Gramsci
in	where something is located, what something regards	Vertical flux of ocean particles Classical theory of elasticity crack problems	Vertical flux of particles *in* the ocean Crack problems *in* the classical theory of elasticity
of	belonging to, regarding	Reality social construction Model dimension estimation Cancer causes: cancer avoidable risks quantitative estimates	The social construction *of* reality Estimating the dimension *of* a model The causes *of* cancer: quantitative estimates *of* avoidable risks *of* cancer

SECTIONS OF A PAPER : TITLE

QUALITY OF A TITLE: You should ensure your title meets the following criteria

- Correct English: syntax, vocabulary, spelling, and capitalization.
- Clarity: avoid long strings of nouns.
- Engaging and dynamic: use strong vocabulary and possibly punctuation.
- Specific and relevant: to the content of your paper.
- Acceptable: in form for the journal you are submitting to.

Titles with at least one verb and prepositions are usually easier to understand.
For vocabulary and spelling, use tools like Google Scholar, as automatic spell checks may not suffice. Check syntax and clarity.
To determine if your title is eye-catching and specific, draft several versions (including options with two parts or as a question) and ask colleagues to pick their favorite.
You are often the best judge of whether your title accurately reflects your paper's content, though referees will likely point it out if it doesn't.

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective

*NOTE: After each section you'll find chuncks of a paper in a red frame like this one: they aim is to represent an example of how theory is put into practice, how language reflects the qualities illustrated in each of the sections. Important : This piece of work has been conceived for **EL didactics only**; it may contain facts and information untrue or not verified.*

2

Abstract

SECTIONS OF A PAPER : ABSTRACT

An abstract has to be written in a way that will enable:

- editors to make a quick decision on whether the paper is relevant to their journal
- reader to identify quickly what the paper is about, and to judge how relevant it is to their interests

Very clear and short sentences (max. 25 words)

First impressions are crucial. A poor initial impression can cause readers to stop reading quickly and negatively affect referees.
If referees find the Abstract or Introduction difficult to read, they may expect the rest of the paper to be similarly challenging and look for confirmation of this, even if the rest of the paper is well-written.

TYPICAL RECOGNIZED ISSUES:

- The author has written over 400 words in the abstract, yet only covers the background without addressing the results or implications of the work.
- The abstract fails to adequately represent the paper, as it is overly complex and difficult to follow unless the full paper has been read.
- It should be accessible to a broader economics-literate audience, not just to specialists in the author's narrow field.
- The authors have not clarified why their work matters to the scientific community or what new insights it contributes to existing knowledge.

SECTIONS OF A PAPER : ABSTRACT

TYPE OF ABSTRACT	DESCRIPTION
Unstructured abstract	A single paragraph of between 100–250 words containing a very brief summary of each of the main sections of your paper
Structured abstract	The same as the unstructured one, but divided into several short sections
Extended abstract	A mini paper organized in the same way as a full paper (e.g. Introduction, Methods, Discussion …), but substantially shorter (two to four pages).
Conference abstract	Normally a standalone abstract (sometimes up to 500 words), designed to help conference organizers to decide whether they would like you to make an oral presentation at their confer ence

CONTENTS OF AN ABSTRACT (CHECK LIST QUESTIONS):

- Why did I carry out this project?
- Why am I writing this paper?
- What did I do, and how?
- What were my results?
- What was new compared to previous research?
- What are the implications of my findings?
- What are my conclusions and/or recommendations?

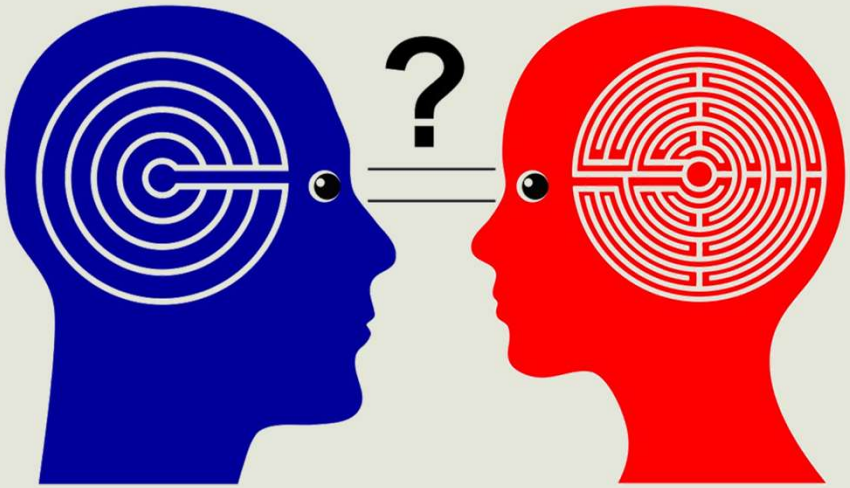
Professionals in drug chemistry and technology may prefer to concentrate not on their findings, but rather on the advantages of their discovery and its performance.

SECTIONS OF A PAPER : ABSTRACT

PAPERS MARKETING

When you read an advertisement for a product it never begins with:
"The objective of this advertisement is to convince you to buy".
Instead advertisers go straight to the point. Abstracts are like advertisements for the paper.

USE DIRECT & IMPACTING STYLE



	ORIGINAL VERSIONS (OV)	REVISED VERSIONS (RV)
1	In this paper we present the design and development of a *highly innovative* software application //, Transpeach, which allows *mobile phone users* to use their own native language when speaking to someone of another native language. The prototype version enables a Japanese mobile phone user …	To extend automatic translation from written to oral communication we developed Transpeach. This software allows, for instance, a *Japanese mobile phone* user to talk to a Greek counterpart in Greek, likewise the Greek's words are automatically translated into Japanese.
2	We present a procedure for the analysis of the content of // organic materials present in archeological samples. The procedure allows the identification of a *wide variety* of materials within the same micro sample.	Archeological samples used for identifying organic materials are by necessity extremely small. We have found a way, which *we believe* is the first of its kind, to accurately identify *glycerolipids, natural waxes, proteinaceous, resinous and polysaccharide* materials within the same micro sample.
3	In this article we conduct an exploration of the crucial of role of the // invention of the steam engine in the Industrial Revolution, and specifically the modified version created by James Watt, the Scottish inventor born in 1736. However, *we contend that the merit* for the success of the steam engine should be …	James Watt's modified steam engine is widely acknowledged as paving the road to the Industrial Revolution. But was this Scottish inventor really the brains behind the steam engine? We *contend that Henry Wallwork*, a little-known Mancunian foundry entrepreneur, should be given more credit for …

SECTIONS OF A PAPER : ABSTRACT

GRAMMAR FOCUS: What tenses has to be used?

The most commonly used tenses in abstracts are the present simple (we show) and the past simple (we showed), to:

- describe the contents of the paper
- describe the common opinion that were put into question
- refer to what was done during the experiments phase
- give conclusions

You can use the present perfect and the present perfect continuous when you describe a situation that began in the past and is still true now. This is typical when you are giving the context / background in which the new findings were based.

What to not mention / avoid in an abstract

- Background information that is too broad for your audience
- Claims that lack support within the paper
- Terms that are overly technical or too generic, depending on your audience
- Definitions of key terms
- Mathematical equations (except in a math paper)
- Generic quantifications (e.g., many, several, few, a wide variety) and excessive or unwarranted use of subjective adjectives (e.g., innovative, interesting, fundamental)
- Unnecessary details better suited for the Introduction, such as the name of your institution or place names unfamiliar to readers
- References to other papers; however, if your entire paper builds upon or challenges a finding from a specific author, you should mention that author's name.

SECTIONS OF A PAPER : ABSTRACT

QUALITY OF AN ABSTRACT: You should ensure your abstract meets the following criteria

- Follow the journal's instructions to authors. Ensure compliance with the specified guidelines.
- Adhere to the correct structure and style. Use the appropriate format (structured or unstructured) and maintain consistency in voice (active vs. passive).
- Cover all relevant points in your work:
  - Provide background/context.
  - Clearly state the research problem/aim, highlighting the gap you intend to fill.
  - Detail the methods used.
  - Present the results effectively.
  - Discuss the implications and/or conclusions.
- **Choose keywords carefully**. Ensure that selected keywords **enhance the discoverability** of your abstract by readers.
- Ensure clarity of information provided. Communicate clearly so that readers understand the relevance of the information presented.
- Reduce redundancy in your abstract. Aim to condense the abstract by 25% without losing any essential content.
- Use tenses correctly. Apply:
  - Present simple for established knowledge,
  - Present perfect for background information from the past to the present,
  - Past simple for detailing your contributions.

SECTIONS OF A PAPER : ABSTRACT

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective

(ABSTRACT)

This paper explores the evolution of Large Language Models (LLMs) within the broader field of Natural Language Processing (NLP). The rapid development of LLMs, particularly since the advent of models like GPT-3 and GPT-4, has revolutionized how machines understand, generate, and interact with human language. By reviewing key advancements, this study aims to provide an overview of the significant progress made, methodologies employed, and their implications for future research. Experimental results demonstrate the increased capacity of LLMs to handle complex linguistic tasks, while also identifying critical challenges, such as ethical concerns and computational limitations. We conclude by discussing future directions, emphasizing responsible development in the field.

Keywords: Transformer architecture, Self-attention mechanism, Deep learning, Machine translation

3

Introduction

SECTIONS OF A PAPER : INTRODUCTION

The introduction provides **essential background information** to help readers understand how the paper's findings advance current knowledge in the field. It equips them with the context and motivation for the experiments, outlining the topic's development and guiding them through the argument. A thorough understanding of previous work on the topic is needed to decide what information is most relevant for the reader.

TYPICAL PROBLEMS ABOUT INTRODUCTION

- The introduction is overly lengthy, includes too many general statements, and lacks clear organization.
- The rationale and objectives are not well defined, making it unclear what problem the author is addressing or why the chosen methodology is used.
- Much of it repeats the abstract, and there is no connection between the background information and the paper's objectives.
- The introduction fails to outline what the reader can expect in terms of results and structure.

The author should also consider less experienced readers by providing explanations or references for specialized terms and concepts.

CONTENTS OF AN INTRODUCTION (CHECK LIST QUESTIONS):

(You can use the answers to these questions to structure your Introduction)

- **What is the problem?**
- Are there any existing solutions (i.e. in the literature)?
- Which solution is the best?
- What is its main limitation? (i.e. What gap am I hoping to fill?)
- What do I hope to achieve?
- Have I achieved what I set out to do?

SECTIONS OF A PAPER : INTRODUCTION

INTRODUCTION SECTION	DESCRIPTION
Definition of the topic plus background	This section should focus on notations, technical definitions, and key terms. Here the topic's importance and the motivation behind the research are emphasized.
Accepted **state of the art** plus problem to be resolved	From the general context to the specific area of the research. Focus is on the gap that the authors want to fill and that the readers should be most interested in. This part should state in simple and clear language exactly what the issue is, why it was chosen, and why it is important.
Authors' objectives	Here we outline the main objectives, and how we intend to fill the gap.
Introduction to the literature	This section introduces the background literature that the authors use to justify their research, highlighting the gaps in current knowledge on the topic.
Survey of pertinent literature	This section reviews literature specific to the author's field, highlighting unresolved problems or gaps in previous studies. It focuses only on what is relevant to the paper's objectives, with much of the literature later used for comparison in the Discussion section.
Authors' contribution	Clear statement of how what they describe in the paper represents an advance on current knowledge
Aim of the present work	The statement of the research goal is crucial in the Introduction. It should clearly outline the research objectives and expected outcomes. The method used, and possibly the reason for choosing it, should be explained to ensure clarity for readers and referees.
Main results of the present work	Although the main results will be given in other sections of your paper, it is possible to announce them here to show how the background situation plus the paper contribution have led to particular results
Future implications of the work	This section is not mandatory, but mentioning implications here gives readers an instant idea of the possible importance of the work, which may be useful for them as they read the rest of the paper.
Outline of structure	Detailing the order of the research elements is necessary if the paper does not follow the standard structure of the chosen journal.

CLASSROOM EXERCISE

- Look for the described sections in one of the following papers (choose one) and highlight them.
- Are all the section present?
- The described goals of the sections have been fulfilled?

AI Computer Science

Distributed Storage Strategy

SECTIONS OF A PAPER : INTRODUCTION

GRAMMAR FOCUS: Which tenses should be used?

- The present simple is generally used to begin the Introduction in order to describe the general background context, i.e. what is known already.
- The present perfect is then used to show how the problem has been approached from the past until the present day.
- At the end of the Introduction, the present simple is used again when the authors state what they will do in the rest of their paper (*we explain, I hypothesize*).
- The future simple can be used to talk about claim/conclusion. This usage of the future tends to be confined to where authors set out to prove a hypothesis, rather than to give hard results.

QUALITY OF AN INTRODUCTION: You should ensure your introduction section meets the following criteria

- Ensure that your research question is clear.
- Your Introduction must serve as a **clear roadmap for understanding the paper**.
- It should differ sufficiently from the Abstract, without cut-and-paste sections, though some overlap is acceptable.
- Include only what your readers specifically need to know and will be referenced in the Discussion.
- Keep the content as concise as possible.
- Use the correct tenses: present simple for general background and what will be done, present perfect for past-to-present solutions, and past simple (or sometimes present or future simple) for describing your contribution.

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective

(INTRODUCTION)

In recent years, the field of Natural Language Processing (NLP) has undergone significant transformations with the development of increasingly complex and powerful Large Language Models (LLMs). These models have had a profound impact on a wide range of applications, including machine translation, automated summarization, sentiment analysis, and dialogue systems. Among the most notable advancements are models such as OpenAI's GPT series, Google's BERT, and DeepMind's AlphaCode, which have pushed the boundaries of machine understanding of human language.

The rapid evolution of LLMs can be attributed to advancements in computational power, access to vast amounts of textual data, and improved deep learning techniques. Despite these successes, however, several challenges persist, including issues related to model interpretability, bias, ethical considerations, and the need for massive computational resources.

This paper aims to provide a comprehensive overview of the evolution of LLMs within the context of NLP, focusing on key milestones in the field, methodologies used to develop these models, experimental results, and the implications of these advancements for future research.

4 Review of the Literature

SECTIONS OF A PAPER : REVIEW OF THE LITERATURE

The key is to provide the right amount of literature to contextualize the research—neither too much nor too little. Background information helps to systematically highlight the achievements and limitations of other studies and relate the new findings to them.

TYPICAL PROBLEMS ABOUT LITERATURE REVIEW

- The author fails to clarify the relevance of some references, which appear to be included solely to lengthen the paper without effectively supporting the author's approach.
- The review lacks an international perspective and relies too heavily on studies from selected country.
- There are discrepancies between the bibliography and the text, with some papers cited in one but not the other

CONTENTS OF A LITERATURE REVIEW (CHECK LIST QUESTIONS):

- What are the seminal works on my topic? Do I need to mention these?
- What progress has been made since these seminal works?
- What are the most relevant recent works? What is the best order to mention these works?
- What are the achievements and limitations of these recent works?
- What gap do these limitations reveal?
- How does my work intend to fill this gap?

SECTIONS OF A PAPER : REVIEW OF THE LITERATURE

GRAMMAR FOCUS: What tenses have to be used?

- The present simple or present perfect are generally used to introduce the literature review.
- Use the present perfect again to refer to ongoing situations, i.e. when authors are still investigating a particular field.

QUALITY OF A LITERATURE REVIEW: You should ensure your literature review section meets the following criteria

- Ensure that you mention only what your readers specifically need to know and what you will refer to in the Discussion.
- Verify that the papers you mention are presented in a logical order and clearly justify your choices.
- Assess whether you have included a disproportionate number of papers from your own country.
- Follow your journal's instructions for referencing the literature, using a variety of citation methods where possible.
- Eliminate any redundancy when reporting the literature.
- Use tenses correctly: present simple for established scientific facts, present perfect for general overviews and past-to-present evolutions, and past simple for specific dates and introducing an author's findings.

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective
(LITERATURE REVIEW)

The development of NLP can be traced back to early computational linguistics, where symbolic methods were employed to process human language. Early efforts in the 1950s and 1960s focused on rule-based approaches, where grammatical rules were manually encoded into machines to allow for basic language parsing and translation **(Chomsky, 1957).** These methods were largely deterministic and required extensive human intervention to design the rules.

By the 1980s and 1990s, statistical methods began to emerge, driven by advances in probability theory and access to larger datasets (**Brown et al., 1993**). The introduction of probabilistic models such as Hidden Markov Models (HMMs) and later Conditional Random Fields (CRFs) enabled more flexible and scalable approaches to NLP tasks. Despite these advancements, these models still suffered from limitations in handling long-range dependencies and the nuanced, contextual nature of human language.

The advent of deep learning in the early 2010s brought a paradigm shift to NLP. Recurrent Neural Networks (RNNs), particularly Long Short-Term Memory (LSTM) models, allowed for the processing of sequences of words and captured context more effectively than previous models (**Hochreiter & Schmidhuber, 1997**). However, these models were soon eclipsed by the introduction of the Transformer architecture **(Vaswani et al., 2017**), which eliminated the need for recurrence and vastly improved the efficiency and scalability of NLP models.

The Transformer's self-attention mechanism enabled the development of models like BERT **(Devlin et al., 2019)** and GPT **(Radford et al., 2019),** which demonstrated unprecedented performance across a range of NLP tasks. These LLMs, trained on vast corpora using unsupervised learning techniques, have since dominated the field, setting new benchmarks in tasks like question-answering, text generation, and machine translation.

More recent advancements, such as GPT-4 and PaLM, have taken the concept of LLMs to new heights by increasing the scale of training data, parameters, and computational power. However, despite their remarkable capabilities, these models have raised concerns around interpretability, ethical usage, and the environmental impact of training such large-scale models **(Bender et al., 2021**).

5

Methods

SECTIONS OF A PAPER : METHODS

To write this section effectively, clearly describe the materials and methods used in your experiments with enough detail for others to follow or replicate your work. Ensure the descriptions are both complete and concise.
Write clearly, typically limiting each sentence to two steps and presenting information logically.
Researchers often find the Methods section the easiest to write since the methods are usually clear in their minds, making it a good starting point for drafting the manuscript.

TYPICAL PROBLEMS ABOUT METHODS SECTION

- The methods are insufficiently described and incomplete. It is unclear how many samples were collected during each sampling, what sampling method was employed and why, and which fraction was analyzed.
- There is no presentation of data treatment, such as statistics or replicates; statistical analysis must be included.
- Some of the procedures used were not clearly explained, so the authors need to justify their rationale for choosing them.
- The authors repeated a significant amount of well-known published data instead of simply providing a reference.

SECTIONS OF A PAPER : METHODS

CONTENTS OF A METHODS SECTION (CHECK LIST QUESTIONS): May be not every question has to be fulfilled, obviously this depends on the discipline

Typical questions:

- What / Who did I study? What hypotheses was I testing?
- Where did I carry out this study and what characteristics did this location have?
- How did I design my experiment / sampling and what assumptions did I make?
- What variable was I measuring and why?
- How did I handle / house / treat my materials / subjects? What kind of care / precautions were taken?
- What equipment did I use and where did this equipment come from
- What protocol did I use for collecting my data?
- How did I analyze the data? Statistical procedures? Mathematical equations? Software?
- What probability did I use to decide significance?
- What references to the literature could I give to save me having to describe something in detail?
- What difficulties did I encounter?
- How does my methodology compare with previously reported methods, and what significant advances does it make?

Ensure that you cover every step required. As you are familiar with your methods, you may leave out key information either thinking that it is implicit (and thus not worth mentioning) or simply because you forget to include it.

SECTIONS OF A PAPER : METHODS

TYPICAL WAYS TO BEGIN A METHODS SECTION

- Making a general statement about your method
- Referring to another paper
- Stating where you obtained your materials from
- Explaining how you found your subjects
- Indicating where (i.e. a geographical region) your investigation was focused
- Referring the reader to a figure which shows the experimental set up
- Starting directly with the first step in your procedure
- …

CLASSROOM EXERCISE

- Look for the methods section in one of the following papers (choose one)
- How is it introduced? (try and identify the steps mentioned above)
- Does it answer all typical questions (previous slide) ?

Chemical

Oils

SECTIONS OF A PAPER : METHODS

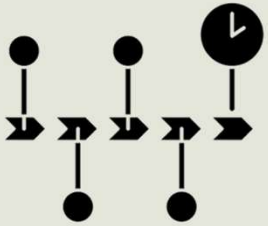
GRAMMAR FOCUS: What tenses have to be used?

Most Methods sections are written in the past simple using the passive form. The past simple is required because the actions described took place in the past. The past simple also helps to distinguish what you did from what others have done (which is often described in the present simple).

The passive is good style here because the focus is on what was done rather than who did it. There is a general English language advice that tells the passive should always be avoided. It should be avoided, but only where it is not necessary.

In the Methods section the passive is both necessary and appropriate.

TIMELINE



Is chronological order important? The main idea is to present experiments, trials, and procedures in a way that makes the most sense to the reader. If the sequence of events may not be relevant to them, chronological order is not necessary.

EVALUATION

An evaluation of this initial data demonstrated that X = Y,

- thus giving an insight into the function of Z.
- thereby providing a basis for investigating the function of Z.

An evaluation of this initial data demonstrated that X = Y.

- Consequently the next step was to investigate the function of Z.
- The next step was thus / therefore / consequently to investigate ...

SECTIONS OF A PAPER : METHODS

QUALITY OF A METHODS SECTION: You should ensure your methods section meets the following criteria

- Methods are effectively described in a way that is easy for readers to follow and allows them to replicate the work.
- Every step is covered, and the structure is clear and complete.
- Section is concise and uses references to previous works rather than repeat information that readers can easily find elsewhere.
- Each paragraph contains a manageable number of steps, and sentences flow smoothly without sounding like lists.
- The writing style consider how readers prefer to receive information—ensuring clarity, avoiding back referencing, presenting everything in chronological order, and using headings and bullet points.
- Grammar has been checked, and includes terms like infinitive and gerund, to clearly outline how and why certain choices have been made.
- Verb tenses are used correctly, **employing past simple in the passive form** to describe my actions and present simple for established scientific facts.

SECTIONS OF A PAPER : METHODS

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective (METHODS)

To investigate the evolution of LLMs in NLP, this study employs a multi-faceted approach that includes a review of key technological advancements, experimental evaluation of selected models, and an analysis of their performance across various NLP tasks. The methodological framework can be divided into three core components:

Data Collection

The research begins with a comprehensive review of existing literature, datasets, and technical reports that document the development of LLMs. Additionally, open-source NLP models such as GPT-2, BERT, and T5 were selected for experimental evaluation. These models were chosen based on their widespread use, accessibility, and representativeness of different stages of LLM evolution.

Model Selection and Training

The selected models were fine-tuned on various NLP tasks, including text classification, summarization, and machine translation. Fine-tuning was conducted using publicly available datasets, such as the Common Crawl corpus and the WikiText-103 dataset, which contain large volumes of diverse text. For each model, hyperparameters such as learning rate, batch size, and epoch count were optimized to ensure fair comparisons across experiments.

Evaluation Metrics

Performance was evaluated using standard NLP metrics, including accuracy, F1 score, BLEU score (for translation tasks), and ROUGE score (for summarization tasks). Additionally, computational efficiency was measured in terms of training time, memory usage, and scalability across different hardware configurations.

Ethical and Bias Analysis

Given the growing concerns around biases in LLMs, this study also includes an analysis of bias in the generated outputs. The selected models were tested for gender, racial, and political biases using existing benchmarks, such as the Stereoset and Winogender schemas.

6

Results

SECTIONS OF A PAPER : RESULTS

In some journals, the *Results* section is combined with the *Discussion* under a single title, *Results and Discussion*.
If there is a separate *Results* section, it typically presents findings with minimal interpretation or discussion, making it one of the shortest sections in a paper. The main task is to select key, representative results and organize them in a logical sequence that addresses the research aims, hypotheses, or questions outlined at the start of the paper.
From an English point of view the key skill is in reporting your results simply and clearly. If the referees of your paper cannot understand your results, then your contribution to the current knowledge base will be lost.

TYPICAL PROBLEMS ABOUT RESULT PRESENTATION

- The paper seems to include all the findings, making it unclear which results are significant. There may also be missing contradictory data.
- While brevity is important, key findings that don't support the authors' logic shouldn't be excluded!
- The Results section is too lengthy and much of it is repeated in the Discussion.
- The findings themselves seem obvious, with little novelty.
- Instead of focusing on the relevant results, the authors have simply repeated everything shown in their figures and tables, making the paper tedious and difficult to follow, especially in terms of understanding the significance of the data.

SECTIONS OF A PAPER : RESULTS

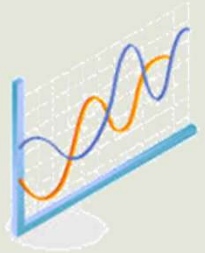
CONTENTS OF A RESULT SECTION (CHECK LIST QUESTIONS): This section should answer the following questions.

- What did I find?
- What did I not find?
- What did I find that I was not expecting to find? (e.g. that contradicts my hypotheses)

GRAMMAR FOCUS: What tenses have to be used?

Your results are things that you found before you started writing the paper. They therefore relate to past events, consequently the past simple is used to report them, often in a mixture of the active and passive forms.
Impersonal style can be useful to add element of objectivity to the findings

The most common way is to simply go directly to your results, often by inviting readers to look at one of your figures or tables, either in the first sentence or very shortly after



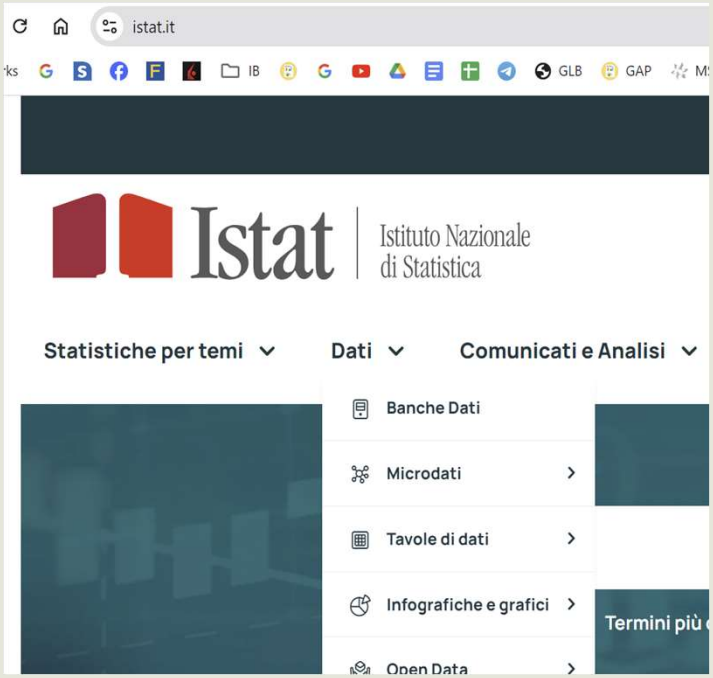
Rather than telling the reader that a result is interesting or significant, show them how it is interesting or significant… show the reader what they need to know to come to their own conclusion about the result

NOTE: the adjective **interesting** means something very definite **for the author**, but not for the reader who has not been given the tools to assess why a certain result is interesting.
Such descriptive adjectives (interesting, intriguing, remarkable) are rarely helpful

SECTIONS OF A PAPER : RESULTS

CLASSROOM EXERCISE

- Visit the ISTAT web site, choose some **infographics** you find interesting (infographic is a visual representation of information, data, or knowledge intended to present complex information quickly and clearly, often through the use of **charts, diagrams, or illustrations**)
- Build a convenient way to present the data (choose graphical style and method) and comment them, in English.
- Present them in an objective way, as if they were results of your research



Distinguishing between objective reporting and subjective interpretation is a challenging skill to develop. If you're concerned that your Results section includes subjective elements that may be inappropriate for your field or the journal's guidelines, consider seeking feedback from someone experienced in writing.

This is a logical and not a language-related issue!

NOTICE: a common issue when presenting data in figures and tables is a lack of conciseness. Avoid using phrases like "can be seen" or "we can see." Instead, just place the figure or table reference in brackets at the end of the sentence.

Do not repeat information that should already be included in the table, i.e. in a legend/key.

SECTIONS OF A PAPER : RESULTS

QUALITY OF A RESULTS SECTION: You should ensure your results section meets the following criteria

- Clearly express your findings to ensure the contribution of your results is evident to referees and readers.
- Focus on reporting the key results or trends conveyed by each figure and table, without reiterating individual values.
- Avoid drawing conclusions in the Results section, especially if it is separate from the Discussion.
- Select the best format (figure or table) to present your data, ensuring no redundancy between figures and tables.
- Make your tables comprehensive, including all relevant results, not just those that support your argument.
- Include only the information that readers need and that you will refer to in the Discussion.
- Mention any methodological aspects, such as selection and sampling procedures, that could have influenced your results.
- Use tenses correctly: past simple for findings (in passive form) and present simple for established scientific facts.

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective

(RESULTS)

The experimental evaluation **revealed several key findings** that reflect the broader trends in LLM evolution.

Performance Improvements Across Tasks

Across the NLP tasks tested, more recent models (e.g., GPT-3 and BERT) outperformed earlier models (e.g., GPT-2 and traditional RNNs) by significant margins. For instance, in machine translation tasks, GPT-3 achieved a BLEU score of 45.6 on the WMT-14 English-to-German dataset, compared to 36.8 achieved by GPT-2. Similarly, in text summarization, GPT-3 demonstrated a ROUGE-L score of 41.2, indicating more coherent and contextually appropriate summaries than its predecessors.

Scalability and Computational Efficiency

Transformer-based models like GPT-3 and BERT showed better scalability and efficiency compared to earlier architectures, such as RNNs and LSTMs. The self-attention mechanism in Transformers allowed for parallelized training, significantly reducing the time required to process large datasets. However, despite these gains in efficiency, the computational demands of training models like GPT-3 remain prohibitively high, with training requiring several thousand GPUs and extensive energy consumption.

Bias and Ethical Considerations

A critical finding was the persistence of biases in LLM outputs. For example, GPT-3 frequently generated stereotyped associations when prompted with gendered or racial queries, mirroring biases present in the training data. Although efforts have been made to mitigate these biases, they remain a significant challenge for the ethical deployment of LLMs in real-world applications.

7

Discussion

SECTIONS OF A PAPER : DISCUSSION

Discussing the results may be the most difficult part of the paper to write.
There is no standard template to apply on this, but there is a general pattern or structure to most Discussions. The secret is to sound both convincing and credible at the same time. You can do this by being positive about your own limitations, and constructive when discussing what you believe to be the limitations of others. In the discussion section, the aim is to interpret the results without repeating them.

TYPICAL PROBLEMS ABOUT DISCUSSING RESULTS SECTION

- The Discussion section does not adequately connect the study's findings to relevant literature, nor does it address the implications and limitations of the results.
- The main finding that “X = Y” lacks thorough explanation, with the authors only referencing previously documented research without offering deeper insight. This makes the discussion feel speculative and narrow.
- The claim of “improved Z” is unsupported by experimental data comparing the new performance to traditional methods. Objective results to support every claim have to be provided.

SECTIONS OF A PAPER : DISCUSSION

CONTENTS OF A DISCUSSION SECTION (CHECK LIST QUESTIONS): This section should answer the following questions. Better if the logical/numerical order is maintained..

1. Do my data support what I set out to demonstrate at the beginning of the paper?
2. How do my findings compare with what others have found? How consistent are they?
3. What is my personal interpretation of my findings?
4. What other possible interpretations are there?
5. What are the limitations of my study? What other factors could have influenced my findings? Have I reported everything that could make my findings invalid?
6. Do any of the interpretations reveal a possible flaw (i.e. defect, error) in my experiment?
7. Do my interpretations contribute some new understanding of the problem that I have investigated? In which case do they suggest a shortcoming in, or an advance on, the work of others?
8. What external validity do my findings have? How could my findings be generalized to other areas?
9. What possible implications or applications do my findings have? What support can I give for such implications?
10. What further research would be needed to explain the issues raised by my findings? Will I do this research myself or do I want to throw it open to the community?

NOTICE: Whether you answer questions 8–10 will depend on whether you have a separate Conclusions section, if so, the Conclusions may be a more appropriate place.

SECTIONS OF A PAPER : DISCUSSION

SET UP A DISCUSSION SECTION

ITEMS TO COVER	EXAMPLE
Remind readers of your goals, preferably in a single sentence	*One of the main goals of … was to attempt to find a way to predict …*
Refer back to the questions (hypotheses, predictions etc.) that you posed in your Introduction	*These results … of the hypotheses. It was predicted that … would result in … , but this turned out ...*
Refer back papers you cited in your Review of the Literature	*Previous studies … with the data presented in the Results …*
Briefly restate the most important points from your Results	*The overall direction of results showed … that could be helpful to learning about …*

GRAMMAR FOCUS: Active or passive?

In the Discussion you will constantly be comparing your work with other author's. In your head you know what you did, and you know what other authors have done. But the reader doesn't. You need to make a very clear distinction, so that in every sentence the reader is 100% clear about whose work you are referring to. Passive sentences do not reveal the author of the action and so the reader will not understand if you are referring to your findings or another person. So, to avoid ambiguity, where possible use active sentences.

CLASSROOM EXERCISE

- Go back to results you produced before (i.e. from Istat web site sources) and now present them with more focus on discussion
- Try to generate some interpretations of the facts shows (this is an exercise, so exceed in fantasy, there is no need to be rigorous now)
- Try to expand discussion over results, suggesting generalizations, implications, application, solutions, issues and so on
- Make hypothesis about future research that can be useful in the presented field

SECTIONS OF A PAPER : DISCUSSION

HOW TO GIVE DATA INTERPRETATION WHILE TAKING INTO ACCOUNT OTHER POSSIBLE INTERPRETATION (ALSO IF WE DO NOT AGREE WITH)

Strategies to anticipate possible objections:

- admit that he might be wrong
- put forward an alternative interpretation
- reiterate that his data could be used to confirm this alternative interpretation
- give reasons for not agreeing with this alternative interpretation
- propose his own conclusion

In a scientific discussion it is important to present one's evaluations in a clear and transparent way, giving space to alternative interpretations and discussing their validity in a comparative way with respect to the main hypothesis.
This helps to anticipate any questions and exceptions from the referees.

PAPER TITLE: Chickens prefer beautiful humans
AUTHOR: Magnus Enquist

Here is an extract of the Discussion section of this paper, about the fact that chickens are able to discriminate between good looking and ugly human beings.

1. We cannot of course be sure that chickens and humans processed the face images in exactly the same way.
2. This leaves open the possibility that, while chickens use some general mechanism, humans possess instead a specially evolved mechanism for processing faces.
3. We cannot reject this hypothesis based on our data.
4. However, there are at least two reasons why we do not endorse this argument. First, it is not needed to account for the data. We believe that the existence of a task-specific adaptation can be supported only with proofs for it, rather than with absence of proofs against. Second, the evolutionary logic of the argument is weak.
5. From observed chicken behavior and knowledge of general behavior mechanisms we must in fact conclude that humans would behave the same way with or without the hypothesized adaptation. There would thus be no selection pressure for developing one.

Chicken Paper

SECTIONS OF A PAPER : DISCUSSION

QUALITY OF A DISCUSSION SECTION: You should ensure your discussion section meets the following recommendations:

- **Clarify Contribution to Knowledge Gap**: ensure that the significance of your findings is explicitly highlighted and that the contribution to the existing knowledge gap is clear.
- **Present Novelty with Precision**: clearly articulate what you believe to be new and important without exaggerating. Avoid over-interpreting results by not attributing unsupported interpretations.
- **Interpret Rather Than Reiterate**: go beyond reiterating results; genuinely interpret them. Clearly demonstrate how your findings confirm or reject the original hypothesis and focus on generating new theory rather than merely describing observations.
- **Maintain Balance and Offer Alternatives**: Strive for a balanced perspective by presenting alternative explanations and avoiding a one-sided narrative.
- **Differentiate Fact from Speculation**: Clearly distinguish between established facts and speculative interpretations. Ensure that readers can easily identify when you are suggesting possible interpretations rather than providing conclusive evidence.
- **Avoid Bias in Research**: Conduct research transparently by including all data and unexpected results, regardless of whether they align with initial hypotheses.
- **Include Contradictory Literature**: Acknowledge works in the literature that do not corroborate your findings. Ensure that you accurately represent the magnitude and direction of the data in the literature to avoid publication bias.
- **Contextualize Findings**: Discuss your findings in relation to the introduction and the literature review. Integrate results with previous research, including your own, to explain your observations comprehensively.
- **Justify Criticisms Constructively**: Provide justified and constructive critiques of the literature to support your arguments.
- **Avoid Introducing New Findings**: Ensure that no new findings are introduced in the discussion that were not mentioned in the results section.
- **Support Statements with Data**: Confirm that all statements made in the text are substantiated by the data presented in figures and tables.
- **Eliminate Trivial Information**: Strive for conciseness by removing trivial information and ensuring that every part of your work contributes meaningfully to the overall argument.

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective (DISCUSSION)

The results highlight the extraordinary capabilities of LLMs and their evolution from earlier statistical methods to deep learning-based architectures. The improvement in task performance, especially for contextually complex language generation tasks, underscores the value of scaling models and leveraging vast datasets. However, these advances also bring to light several key challenges.

Limitations of Scale

The primary advantage of modern LLMs lies in their scale, yet this is also one of their most significant limitations. As models grow in size, so do their computational and environmental costs. Training GPT-3, for instance, required an estimated 300,000 kWh of energy, raising concerns about the sustainability of future LLM development. Furthermore, as models become larger, they become less interpretable, creating difficulties in understanding how they arrive at specific outputs.

Addressing Bias and Ethical Issues

While LLMs have revolutionized NLP, they have also surfaced ethical issues, particularly related to bias. The presence of biases in LLM outputs poses risks in sensitive applications, such as law enforcement, hiring, and healthcare. Addressing these issues requires not only technical solutions—such as more diverse training datasets and bias detection algorithms—but also the establishment of ethical guidelines for model development and deployment.

Future Research Directions

Future research should focus on addressing the limitations of LLMs in a sustainable and ethically responsible manner. Key areas for exploration include developing more energy-efficient models, improving interpretability, and creating mechanisms for mitigating bias. Additionally, hybrid models that combine the strengths of both symbolic and statistical approaches to NLP may offer promising avenues for advancing the field without sacrificing transparency or efficiency.

8 Conclusion

SECTIONS OF A PAPER : CONCLUSION

The conclusions section, though not always the last thing readers review, is likely the final part read by referees, making it **crucial for leaving a positive impression**. Poor structure and language here can negatively influence a referee's decision to accept the paper. Key skills include understanding what referees expect, avoiding repetition of the abstract and introduction, and delivering a clear, impactful takeaway message for readers.

TYPICAL PROBLEMS ABOUT CONCLUSION

- The conclusions seem to be a simple copy-paste from different sections of the paper. Instead of offering real insights, the authors have provided a weak summary of their work.
- It reads as if the authors are more eager to return to the lab than to help readers understand how their findings contribute to the field.
- The conclusions is too verbose and should be shortened by removing irrelevant topics, as they don’t seem to serve as the logical culmination of the paper.
- The authors fail in clearly explaining why and how their findings might be relevant for future research and applications.

SECTIONS OF A PAPER : CONCLUSION

CONTENTS OF A CONCLUSION SECTION (CONTENTS CHECK LIST):

The Conclusions section is not just a summary, so do not merely repeat what said in the Abstract and Introduction.
Conclusion should be not more than one or two paragraphs long.

A Conclusions section typically incorporates one or more of the following:

- a very brief revisit of the most important findings pointing out how these advance your field from the present state of knowledge
- a final judgment on the importance and significance those findings in term of their implications and impact, along with possible applications to other areas
- an indication of the limitations of the study (though the Discussion may be a more appropriate place to do this) and suggestions for improvements
- recommendations for future work (either for the author, and/or the community)

GRAMMAR FOCUS: Tense of verbs

Many tenses and constructions are used in the Conclusions – the future, conditionals, modal verbs etc.
One distinction that many authors make is between what they did during the research (simple past) and what they did during the writing process of the manuscript (present perfect).

i.e. We have described a method to extract gold from plastic. We used this method to extract 5 kg of gold from 50 kg of plastic. We found that the optimal conditions for this process were…

The first verb (have described) says what the authors have done in the paper, whereas the second and third verbs (used, found) say what they did in the laboratory (i.e. a finished action)

SECTIONS OF A PAPER : CONCLUSION

QUALITY OF A CONCLUSION SECTION: You should ensure your Conclusion section meets the following recommendations:

- Ensure your conclusions are concise and focused. Keep them under 200-250 words to maintain clarity and relevance.
- If your conclusions are integrated into the discussion, clearly signal this to the reader with phrases like "In conclusion...“
- Limit procedural, methodological, or interview-related comments to a maximum of one line, unless methodology is the main focus of your paper.
- Avoid copying and pasting from earlier sections. Make sure your conclusions are distinct from your abstract, introduction, and the final paragraph of the discussion.
- Ensure that your conclusions are engaging and relevant to the reader.
- Maximize the impact of your conclusions by avoiding redundant expressions and ensuring they stand out.
- Avoid unsupported or exaggerated statements. Make sure your conclusions are fully justified by your research.
- Be truthful about the completeness of your work and avoid making inferences that are not yet fully supported.
- Briefly introduce potential avenues for future research or highlight the potential impact of your findings without delving into too much detail.
- Make sure your suggested applications are realistic, and that your recommendations are appropriate and practical.
- Use the correct tenses: present perfect for describing the writing process, past simple for actions performed in the lab, field, or surveys.

SECTIONS OF A PAPER : CONCLUSION

Language Sample

Evolution in Large Language Models (LLMs) and Natural Language Processing (NLP): A Scientific Perspective

(CONCLUSION)

The evolution of LLMs represents a significant leap forward in NLP, enabling machines to understand and generate human language with unprecedented accuracy and complexity. From early rule-based systems to the Transformer-based architectures that dominate today, the journey of LLMs reflects broader trends in AI, where increasing scale and computational power have driven remarkable progress. However, the continued development of LLMs will require careful consideration of the ethical, environmental, and societal impacts they bring.

Responsible development practices, combined with advances in reducing bias and improving efficiency, will be crucial to ensuring that LLMs contribute positively to the future of AI and human-computer interaction.