Title of your Report

1st Given Name Surname
dept. name of organization (of Aff.)
name of organization (of Aff.)
City, Country
email address or ORCID

2nd Given Name Surname
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name of organization (of Aff.)
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***Abstract*—This document is a model and instructions for LaTeX. This and the IEEEtran.cls file define the components of your Report [title, text, heads, etc.]. *CRITICAL: Do Not Use Symbols, Special Characters, Footnotes, or Math in Report Title or Abstract.**

Two sentences of background and importance of this topic.

Two sentences defining the gap analysis (work not done in field) and your problem statement.

Two sentences of Results and your findings.

One sentence for significance of the results and your contribution.

***Index Terms*—component, formatting, style, styling, insert**

I. General instructions

This document is a model and general instructions for your project report.

1) You must have exactly the mentioned sections with the mentioned number of paragraphs.
2) Observe the report page limits (minimum 5 pages without figures/tables/citations/references) and no limit on maximum text.
3) In case of figures, keep your raw data table also stored as excel file in this repository.
4) Each paragraph must consist of 7-10 sentences.
5) Add references where required.
6) Total references should be between 10 and 25.
7) Use latest references with 80% references later than 2019.
8) Remove all text under the section "Other headings and reference material" in your final submission. They are meant for guiding you in the write up and should not be included in the final submission.

II. Introduction

One paragraph on introducing the field and the topic of interest.

One paragraph on the importance of the selected topic.

One paragraph on why is it significant to work on this field/topic today.

One paragraph defining the work that has been done in this field, with a table summarizing the work that has been done in literature as shown below in Table I.

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One paragraph defining what has not been done or what is still missing in the field (gap analysis).

One paragraph explaining the three research questions (one main and two sub-stories) you intend to address in this study.

One paragraph on what you are doing in this report (your contributions) and a small one-two liner summary of your results.

III. Methodology

One paragraph and one figure representing your dataset and the labels/ground truth as shown in Figure 2 OR as in Figure 1.

One paragraphs defining your methodology through a flow diagram of your work as shown in Figure 4 OR in Figure 3.

(Optional) One paragraph for hyper-parameter settings and network architecture as shown in Table II.

(Optional) One paragraph for experimental settings of your and competing methods (if any).

IV. Results

Three (or more) paragraphs explaining your results. At least one paragraph targeting one research question with at least one figure (preferably) or table (where figure is not possible). This section must contain only results and nothing else (not your own opinion or any sort of discussion on quality of results).

A sample figure is shown in Figure 5.

V. Discussion

Three to four paragraphs discussing the results (at least one paragraph for each research question). Your opinion on how good/bad the results are. Draw inferences from the results here. Explain novelty of your contributions and what was missing that you have explored here. Any other point you would like to discuss related to this study. One paragraph for what are the future directions in your opinion for continuing this study.

VI. Conclusion

One paragraph related to conclusions drawn from your whole experimentation.

References will be added automatically by using the following lines. Add the relevant citations in the attached bibliogrpahy.bib file. Get help from me where you want to work on citations.

TABLE I

LITERATURE REVIEW TABLE SHOWING THE CONTRIBUTIONS OF VARIOUS AUTHORS FOR QUANTIZATION OF NETWORKS.

Paper Name	FCNs Used	L2 Error Minim.	Applied on				Signal Quantized	Dataset used	No. of bits	Layerwise sens. Analysis	Sem. segm.
			Conv. Layer	Skip Layer	Trans. Layer	Fully Conn. Layer					
Vanhoucke et al. [1]						✓	✓	×			
Courbariaux et al. [2]			✓			✓		MNIST, SVHN, CIFAR-10	10		
Gupta et al. [3]			✓			✓		MNIST, CIFAR-10	12		
Proposed Approach	✓	✓	✓	✓	✓	×	×	Pascal VOC 2012	2,3,4,5	✓	✓

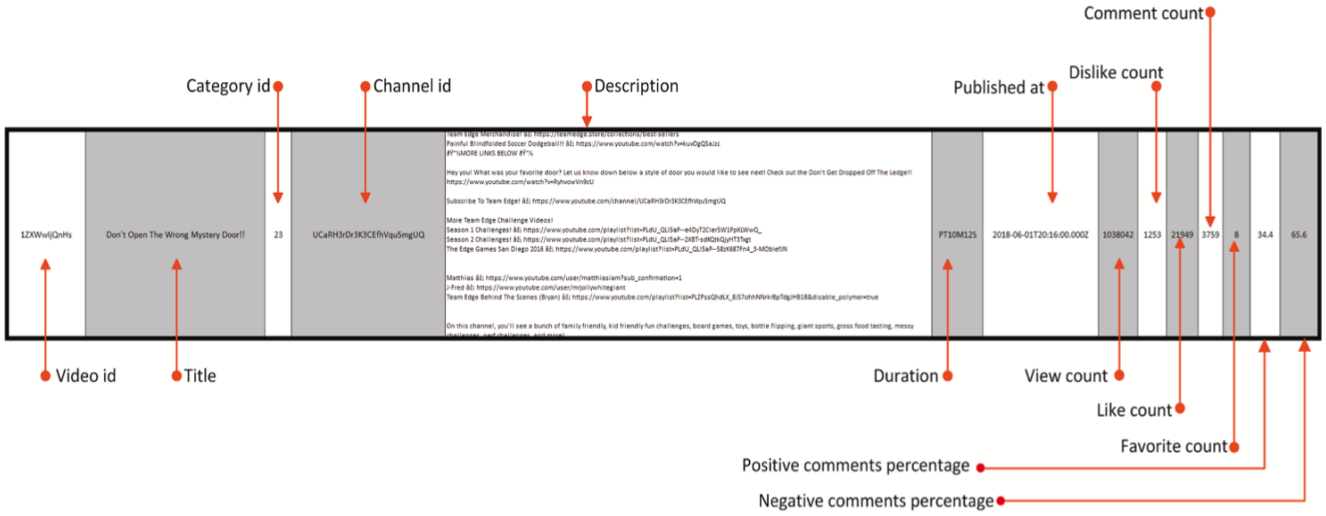

Fig. 2. A screenshot of the captured data.

Fig. 1. Image showing some sample images present in the dataset, their pixel-wise labels and resulting pixel labels from floating point network, hybrid quantized network, and two configurations of quantized networks. The legend displays the color and class (name) of the object to be identified in the image. Five sample images containing aeroplane, dogs, person, and chair are shown along with their classification. The data and the pixel labels (ground truth) are taken from Pascal VOC 2012 dataset.

TABLE II

CONFIGURATION TABLE SHOWING THE NETWORK CONFIGURATION OF FCN USED IN THIS STUDY. THE TABLE SHOWS THE VARIOUS CONFIGURATION SETTINGS USED FOR FCN8.

Network Configuration	
Epochs	50
Learning rate	0.0001
Mini batch size	20
Optimizer	SGD
Momentum	0.9
Weight decay	0.0002
L_2 Regularization	None
Samples in training set	8498
Samples in validation set	786

REFERENCES

[1] V. Vanhoucke, A. Senior, and M. Z. Mao, "Improving the speed of neural networks on cpus," in *Deep Learning and Unsupervised Feature Learning Workshop, NIPS 2011*, 2011.

[2] J. David, M. Courbariaux, and Y. Bengio, "Training deep neural networks with low precision multiplications," *Computer Science*, 2014.

[3] S. Gupta, A. Agrawal, K. Gopalakrishnan, and P. Narayanan, "Deep learning with limited numerical precision," in *International Conference on Machine Learning*, 2015, pp. 1737–1746.

[4] T. S. S. Hashmi, N. U. Haq, M. M. Fraz, and M. Shahzad, "Application of deep learning for weapons detection in surveillance videos," in *2021 International Conference on Digital Futures and Transformative Technologies (ICoDT2)*. IEEE, 2021, pp. 1–6.

[5] S. Narejo, B. Pandey, C. Rodriguez, M. R. Anjum *et al.*, "Weapon detection using yolo v3 for smart surveillance system," *Mathematical Problems in Engineering*, vol. 2021, 2021.

[6] U. Nepal and H. Eslamiat, "Comparing yolov3, yolov4 and yolov5 for autonomous landing spot detection in faulty uavs," *Sensors*, vol. 22, no. 2, p. 464, 2022.

[7] "Ultralytics/yolov5: Yolov5 in pytorch onnx coreml tflite." [Online]. Available: https://github.com/ultralytics/yolov5

[8] J. Solawetz, "What is yolov5? a guide for beginners." Nov 2022. [Online]. Available: https://blog.roboflow.com/yolov5-improvements-and-evaluation

[9] S. Gutta, "Object detection algorithm-yolo v5 architecture," Aug 2021. [Online]. Available: https://medium.com/analytics-vidhya/object-detection-algorithm-yolo-v5-architecture-89e0a35472ef

[10] A. Bochkovskiy, C.-Y. Wang, and H.-Y. M. Liao, "Yolov4: Optimal speed and accuracy of object detection," *arXiv preprint arXiv:2004.10934*, 2020.

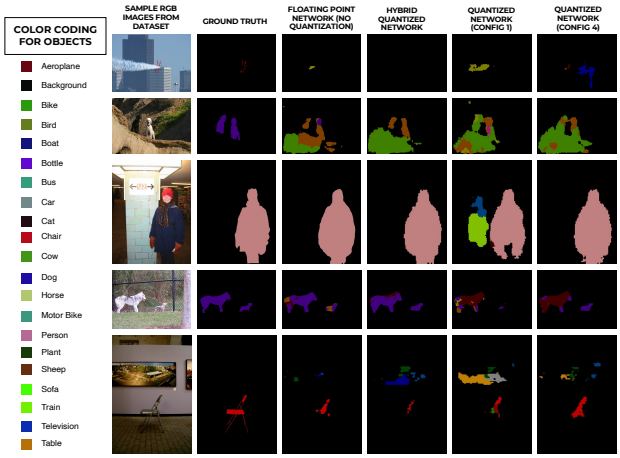

Fig. 2. Image showing some sample images present in the dataset, their pixel-wise labels and resulting pixel labels from floating point network, hybrid quantized network, and two configurations of quantized networks. The legend displays the color and class (name) of the object to be identified in the image. Five sample images containing aeroplane, dogs, person, and chair are shown along with their classification. The data and the pixel labels (ground truth) are taken from Pascal VOC 2012 dataset.

VII. Other Headings and Reference Material

A. Ease of Use

1) Maintaining the Integrity of the Specifications: The IEEEtran class file is used to format your Report and style the text. All margins, column widths, line spaces, and text fonts are prescribed; please do not alter them. You may note peculiarities. For example, the head margin measures proportionately more than is customary. This measurement and others are deliberate, using specifications that anticipate your Report as one part of the entire proceedings, and not as an independent document. Please do not revise any of the current designations.

B. Prepare Your Report Before Styling

Before you begin to format your Report, first write and save the content as a separate text file. Complete all content and organizational editing before formatting. Please note sections VII-B1–VII-B5 below for more information on proofreading, spelling and grammar.

Keep your text and graphic files separate until after the text has been formatted and styled. Do not number text heads—LaTeX will do that for you.

1) Abbreviations and Acronyms: Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, ac, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.

2) Units:

- Use either SI (MKS) or CGS as primary units. (SI units are encouraged.) English units may be used as secondary units (in parentheses). An exception would be the use of English units as identifiers in trade, such as "3.5-inch disk drive".
- Avoid combining SI and CGS units, such as current in amperes and magnetic field in oersteds. This often leads to confusion because equations do not balance dimensionally. If you must use mixed units, clearly state the units for each quantity that you use in an equation.
- Do not mix complete spellings and abbreviations of units: "Wb/m^2" or "webers per square meter", not "webers/m^2". Spell out units when they appear in text: ". . . a few henries", not ". . . a few H".
- Use a zero before decimal points: "0.25", not ".25". Use "cm^3", not "cc".)

3) Equations: Number equations consecutively. To make your equations more compact, you may use the solidus (/), the exp function, or appropriate exponents. Italicize Roman symbols for quantities and variables, but not Greek symbols. Use a long dash rather than a hyphen for a minus sign. Punctuate equations with commas or periods when they are part of a sentence, as in:

$$a + b = \gamma \tag{1}$$

Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(1)", not "Eq. (1)" or "equation (1)", except at the beginning of a sentence: "Equation (1) is . . ."

4) LaTeX-Specific Advice: Please use "soft" (e.g., `\eqref{Eq}`) cross references instead of "hard" references (e.g., `(1)`). That will make it possible to combine sections, add equations, or change the order of figures or citations without having to go through the file line by line.

Please don't use the `{eqnarray}` equation environment. Use `{align}` or `{IEEEeqnarray}` instead. The `{eqnarray}` environment leaves unsightly spaces around relation symbols.

Please note that the `{subequations}` environment in LaTeX will increment the main equation counter even when there are no equation numbers displayed. If you forget that, you might write an article in which the equation numbers skip from (17) to (20), causing the copy editors to wonder if you've discovered a new method of counting.

BibTeX does not work by magic. It doesn't get the bibliographic data from thin air but from .bib files. If you use BibTeX to produce a bibliography you must send the .bib files.

LaTeX can't read your mind. If you assign the same label to a subsubsection and a table, you might find that Table I has been cross referenced as Table IV-B3.

LaTeX does not have precognitive abilities. If you put a `\label` command before the command that updates the counter it's supposed to be using, the label will pick up the last counter to be cross referenced instead. In particular, a `\label` command should not go before the caption of a figure or a table.

Do not use `\nonumber` inside the `{array}` environment. It will not stop equation numbers inside `{array}` (there

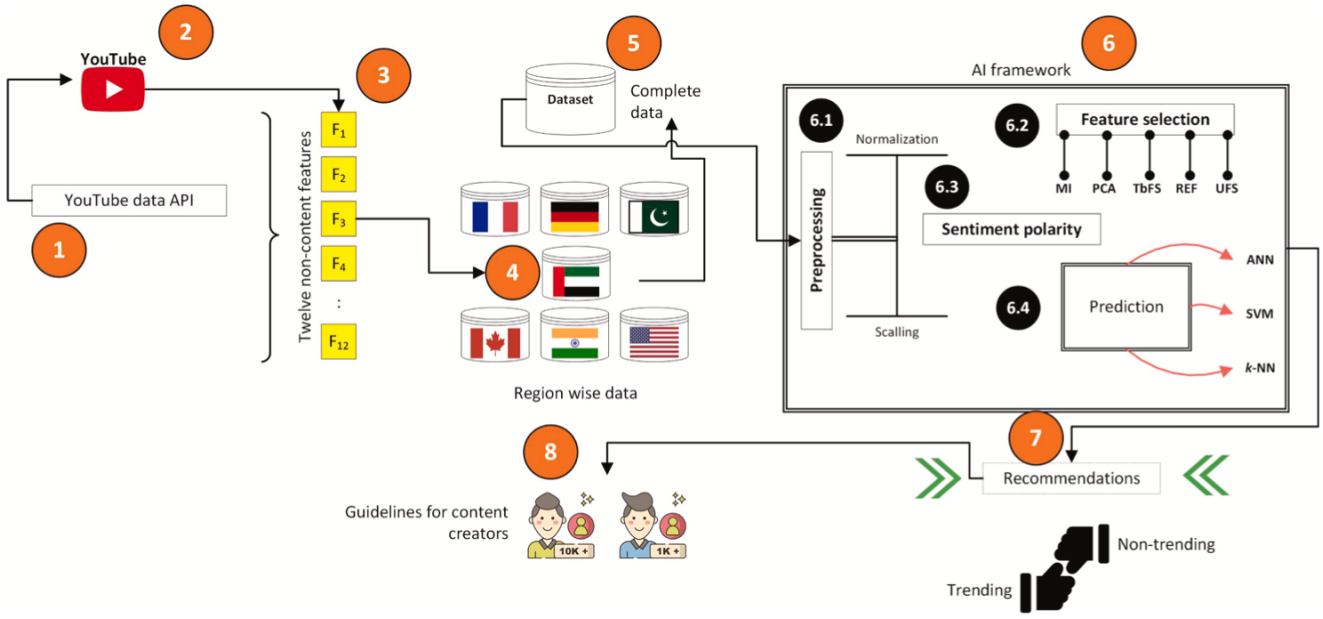

Fig. 1. The overall working of the proposed solution.

Fig. 3. Figure showing the flowchart proposed for FCN-8 quantization and the comparison pipeline followed (for quantization technqiues, i.e., Direct Quantization, Llyod's Quantizer and L_2 error minimization) in the current study based on pixel accuracy, mean IOU, and mean accuracy.

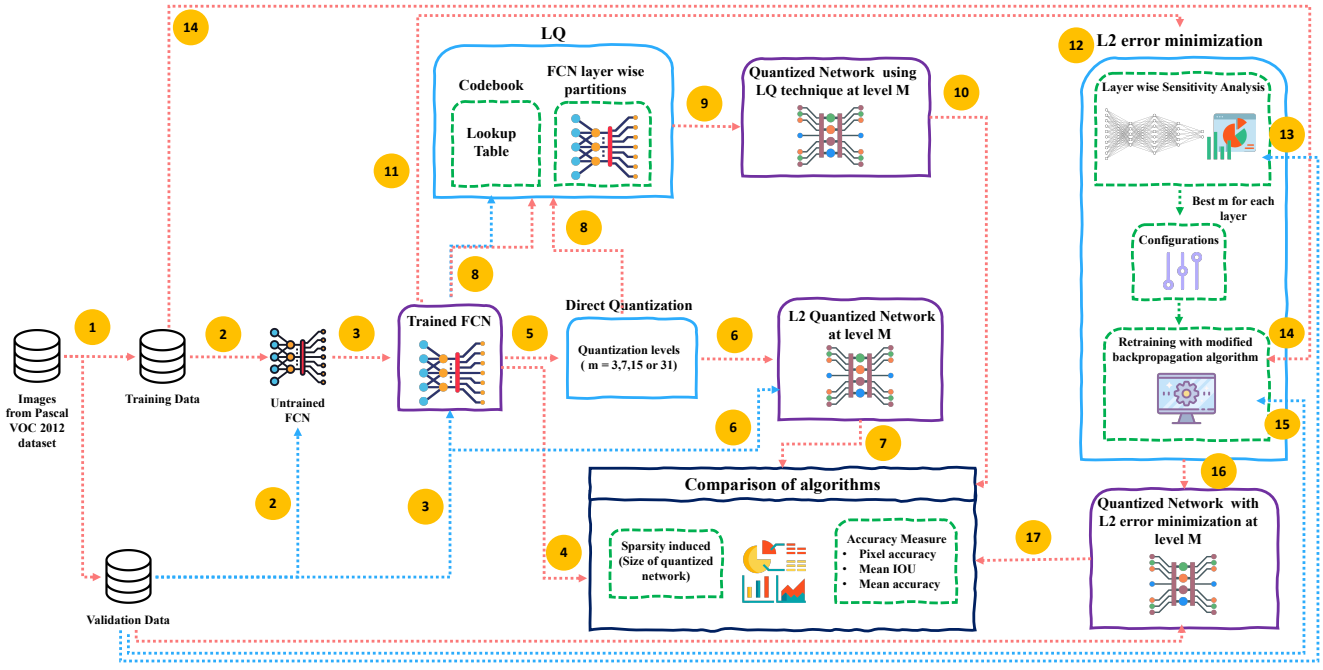

Fig. 4. Figure showing the flowchart proposed for FCN-8 quantization and the comparison pipeline followed (for quantization technqiues, i.e., Direct Quantization, Llyod's Quantizer and L_2 error minimization) in the current study based on pixel accuracy, mean IOU, and mean accuracy.

won't be any anyway) and it might stop a wanted equation number in the surrounding equation.

5) Some Common Mistakes:

- The word "data" is plural, not singular.
- The subscript for the permeability of vacuum μ_0, and other common scientific constants, is zero with subscript formatting, not a lowercase letter "o".
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited,

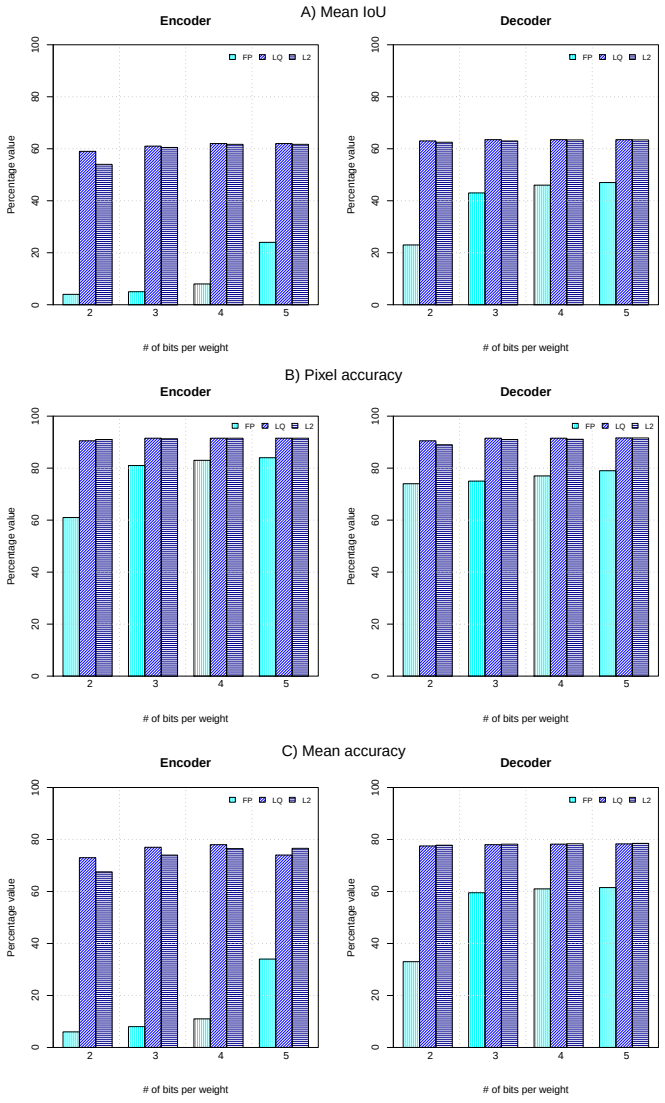

Fig. 5. Figure comparing the three quantization techniques Fixed Point (FP), Lloyd's quantizer (LQ) and L_2 error minimization (L_2) on the three performance metrics divided into encoder and decoder layers. Mean IoU is shown for the three techniques in Panel A), pixel accuracy in Panel B), and mean accuracy in Panel C) respectively. Note that FP is consistently worse than both LQ and L_2, while L_2 and LQ are of comparable accuracy. Also, FP is most sensitive to number of bits in all metrics while L_2 and LQ are relatively insensitive.

such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)

- A graph within a graph is an "inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you really mean something that alternates).
- Do not use the word "essentially" to mean "approximately" or "effectively".
- In your Report title, if the words "that uses" can accurately replace the word "using", capitalize the "u"; if not, keep using lower-cased.
- Be aware of the different meanings of the homophones "affect" and "effect", "complement" and "compliment", "discreet" and "discrete", "principal" and "principle".
- Do not confuse "imply" and "infer".
- The prefix "non" is not a word; it should be joined to the word it modifies, usually without a hyphen.
- There is no period after the "et" in the Latin abbreviation "et al.".
- The abbreviation "i.e." means "that is", and the abbreviation "e.g." means "for example".

An excellent style manual for science writers is [4].

6) Authors and Affiliations: **The class file is designed for, but not limited to, six authors.** A minimum of one author is required for all conference articles. Author names should be listed starting from left to right and then moving down to the next line. This is the author sequence that will be used in future citations and by indexing services. Names should not be listed in columns nor group by affiliation. Please keep your affiliations as succinct as possible (for example, do not differentiate among departments of the same organization).

7) Identify the Headings: Headings, or heads, are organizational devices that guide the reader through your Report. There are two types: component heads and text heads.

Component heads identify the different components of your Report and are not topically subordinate to each other. Examples include Acknowledgments and References and, for these, the correct style to use is "Heading 5". Use "figure caption" for your Figure captions, and "table head" for your table title. Run-in heads, such as "Abstract", will require you to apply a style (in this case, italic) in addition to the style provided by the drop down menu to differentiate the head from the text.

Text heads organize the topics on a relational, hierarchical basis. For example, the Report title is the primary text head because all subsequent material relates and elaborates on this one topic. If there are two or more sub-topics, the next level head (uppercase Roman numerals) should be used and, conversely, if there are not at least two sub-topics, then no subheads should be introduced.

8) Figures and Tables:

a) Positioning Figures and Tables: Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert figures and tables after they are cited in the text. Use the abbreviation "Fig. 6", even at the beginning of a sentence.

Figure Labels: Use 8 point Times New Roman for Figure labels. Use words rather than symbols or abbreviations when writing Figure axis labels to avoid confusing the reader. As an example, write the quantity "Magnetization", or "Magnetization, M", not just "M". If including units in the label, present them within parentheses. Do not label axes only with units. In

TABLE III
TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	*Subhead*	*Subhead*
copy	More table copy[a]		

[a]Sample of a Table footnote.

Fig. 6. Example of a figure caption.

the example, write “Magnetization (A/m)” or “Magnetization {A[m(1)]}”, not just “A/m”. Do not label axes with a ratio of quantities and units. For example, write “Temperature (K)”, not “Temperature/K”.

Acknowledgment

The preferred spelling of the word “acknowledgment” in America is without an “e” after the “g”. Avoid the stilted expression “one of us (R. B. G.) thanks . . .”. Instead, try “R. B. G. thanks. . .”. Put sponsor acknowledgments in the unnumbered footnote on the first page.

References

Please number citations consecutively within brackets [5]. The sentence punctuation follows the bracket [6]. Refer simply to the reference number, as in [7]—do not use “Ref. [7]” or “reference [7]” except at the beginning of a sentence: “Reference [7] was the first . . .”

Number footnotes separately in superscripts. Place the actual footnote at the bottom of the column in which it was cited. Do not put footnotes in the abstract or reference list. Use letters for table footnotes.

Unless there are six authors or more give all authors’ names; do not use “et al.”. Reports that have not been published, even if they have been submitted for publication, should be cited as “unpublished” [8]. Reports that have been accepted for publication should be cited as “in press” [9]. Capitalize only the first word in a Report title, except for proper nouns and element symbols.

For Reports published in translation journals, please give the English citation first, followed by the original foreign-language citation [10].

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