

# Visual Attention based Scene Classification & Labelling

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## Activity Report

**Abstract**—The task performed by our team in the Minor Project pertains to Visual Attention Based Scene Labelling and Classification. We have been working on the task at the Vision and AI Research Team, DTU under the guidance of Prof. O.P. Verma. We employed a multi-modular approach for same. Module-1 for our model involved cross-training the generic AlexNet architecture on the Image-Net and CIFAR-10 dataset. The same formed the basis for a pseudo-attention based mechanism for our system. This enabled fast convergence and better boundary detection for the model. In module 2, we tweaked the AlexNet architecture, adding a hidden layer for hash code generation. Inspired from the Artistic Representation of Neural Style, we sought to exploit the segregation of capabilities of shallow and deep features to add the latent layer at penultimate position. Following scene labeling, we employed a lazy supervised classifier for retrieval of nearest match image from an existing image reservoir. After a thorough literature review and a discussion of the model architecture, we perform a comparison of the pipeline performance with various existing models on standard established baselines through precision and recall measures. We also compare the computational costs of different distance metric to justify our choice of hamming distance. We conclude by representing the model capabilities as well as our future attempts towards building a truly robust system to cater to more realistic images.

**Index Terms**—Computer Vision, Scene Classification, Hash based Image Search

## 1 INTRODUCTION

THIS demo file is intended to serve as a “starter file” for writing the Activity/Learning Reports of Independent Studies, produced under L<sup>A</sup>T<sub>E</sub>X using IEEEtrans class Central Processing Unit (CPU).

## 2 SCORING RUBRICS

The table of Scoring Rubrics (at the bottom of the first page of each Report) depends on the Report Type (ACTIVITY or LEARNINGS). Therefore, you must pay attention to have the correct table displayed when you select your Report Type in lines 21 or 22 of the

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The scoring Rubrics correspond to the evaluation of different aspects of your Report, and have the following meanings:

### ACTIVITY table

This table contains the rubrics that evaluate the Activity Report as an objective, factual document, describing the purpose of the activity, the tasks performed, the execution environment, the constraints, results etc.

**Intro** This rubric evaluates how you introduce the Activity described in the document. A competent introduction should describe at least the significance of the topic and the purposes of the work.

**Object** This rubric evaluates how you describe the Objectives of the work. You should provide clear and concise description of the proce-

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0.6-Good														
0.4-Fair														
0.2-Weak														

dures/tasks that were performed.

**Plan** This rubric evaluates how you planned/prepared your work.

**Exec** This rubric will evaluate how you describe all the phases/steps/task of the work/activity, and will consider items such as when, where, how, what, with/for whom, duration, etc.

**Result** This rubric will evaluate how you describe the results of the work performed. You should report your results neutrally.

#### LEARNINGS table

This table contains the rubrics that evaluate the learning experience in terms of non-technical (soft) skills acquired or perfected.

**Intro** This rubric evaluates how you introduce the subject (your own experience) to be described. A competent introduction should describe at least the significance of what you have done and what you have learned from doing it.

**Motiv** This rubric evaluates how you describe your motivation for choosing and performing the activity.

**Skills** This rubric evaluates all the soft-skills described as perfected and/or acquired during the execution of the activity.

**Reflect** This rubric evaluates your analysis over the learning experience and how well you describe it.

**Sugg** This rubric will evaluate your Comments regarding the activity performed, as well as your Recommendations or Suggestions for improvements or variations.

#### DOCUMENT table

This table contains the rubrics that evaluate the document form and structure.

**Struct** Evaluation the structure of the document in terms of contents.

**Orthog** Evaluates the quality of the orthography (spelling, appropriate-

ness, etc.).

**Gram** Evaluates the grammar construction.

**Form** Evaluates the format conformance of the document in terms of components.

**Abstr** Evaluates the quality of the abstract, if it is really a summary of the document. The abstract is what is initially previewed by readership to determine if the remainder of the document is worth reading.

**Concl** This rubric evaluates how concise and analytic you are on drawing conclusions from what you have done. The Conclusion is comprised of some final, summative statements that reflect the flow and outcomes of the subject described in the document.

#### PENALTY table

This table contains the rubrics related with the Titles of the document, file names and identification(s) of author(s).

**Titles** Evaluates if the Main Title, subtitle, abridged title, etc. are adequate.

**Files** Evaluates conformation of the file names of the submitted documents with the rules.

**IDs** Evaluates the correct information related with the identification of author(s), submission dates, etc.

## 3 FEATURES

This section describes some of the common features used on writing documents with L<sup>A</sup>T<sub>E</sub>X.

### 3.1 Abbreviations and Acronyms

This template is ready to define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. For the students of Instituto Superior Técnico (IST) it becomes very easy to make references to the School just using the respective acronym. The first time it was used,

in previous paragraph, the name of IST was presented in extended form, but now only the acronym was typed.

3.2 Equations

Writing equations or math expressions, for example  $\alpha + \beta = \chi$ , is also very easy.

Another method to write math expressions or equations is the following construct, normally numbered automatically:

$$\delta + \epsilon = \theta$$

(1)

With this construct the reference in text to Equation 1 is straightforward.

3.3 Figures

Placing figures is also very easy, as for example the following Fig. 1:



Figure 1. The Soft-Skills Tree

With this construct the reference in text to Figure 1 is straightforward

4 ANOTHER SECTION

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## 5 CONCLUSION

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## ACKNOWLEDGMENTS

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## REFERENCES

- [1] R. Braden, D. Clark, and S. Shenker, *Integrated Services in the Internet Architecture: an Overview*, IETF, June 1994.
- [2] L. Lamport, *TeX: A Document Preparation System*. Reading, Mass.: Addison-Wesley, 1986.



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## APPENDIX

### STATEMENTS OF EXECUTION

STATEMENT OF EXECUTION IS ONLY MANDATORY FOR SELF-INITIATIVE ACTIVITIES.

Place here your Statements of Execution of the Activity, using a PDF document.

