

Group 67 - Research Paper

Deep Learning for Object Recognition on a Mobile Robot
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Abstract—The research paper is the write up of our research findings. It includes the methods and technologies we tested in our project and the results from those experiments. This document acts as the conclusion to the research aspect of our project.

Index Terms—Deep Learning, Online Learning, Object Recognition, Mobile Robot

A. Data Gathering

B. Image Cropping

C. Neural Network Model

D. Online Learning Techniques

III. RESULTS

CONTENTS

I	Introduction	1
II	Areas of Research	1
II-A	Data Gathering	1
II-B	Image Cropping	1
II-C	Neural Network Model	1
II-D	Online Learning Techniques	1
III	Results	1
IV	Conclusion	2
Appendix		2

LIST OF FIGURES

1	Accuracy Training	1
2	Network Model	2

I. INTRODUCTION

Our project is research oriented, meaning we spent time experimenting and investigating different technologies and techniques. Our software pipeline has several major programs that interact with each other to collect and process our data. For each of these steps we looked into alternative solutions to the problem, and analyzed details such as cost benefit analyses and the potential to scale technologies as the classification model grows.

II. AREAS OF RESEARCH

While the main goal of our project was to create a fully functional software pipeline, we incorporated research into every component of the pipeline. The problem of sequential online learning is not solved by one perfect algorithm or software library

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Epoch 21/30
175/175 [=====] - 428s 2s/step - loss: 0.2269 - acc: 0.9409 - val_loss: 0.0616 - val_acc: 0.984
Epoch 22/30
175/175 [=====] - 428s 2s/step - loss: 0.1913 - acc: 0.9520 - val_loss: 0.1788 - val_acc: 0.954
Epoch 23/30
175/175 [=====] - 428s 2s/step - loss: 0.2902 - acc: 0.9220 - val_loss: 1.4229 - val_acc: 0.781
Epoch 24/30
175/175 [=====] - 428s 2s/step - loss: 0.2389 - acc: 0.9280 - val_loss: 2.8813 - val_acc: 0.742
Epoch 25/30
175/175 [=====] - 428s 2s/step - loss: 0.2216 - acc: 0.9407 - val_loss: 0.4738 - val_acc: 0.919
Epoch 26/30
175/175 [=====] - 428s 2s/step - loss: 0.2158 - acc: 0.9423 - val_loss: 0.0785 - val_acc: 0.978
Epoch 27/30
175/175 [=====] - 428s 2s/step - loss: 0.2334 - acc: 0.9434 - val_loss: 1.3931 - val_acc: 0.869
Epoch 28/30
175/175 [=====] - 428s 2s/step - loss: 0.2196 - acc: 0.9458 - val_loss: 0.1912 - val_acc: 0.968
Epoch 29/30
175/175 [=====] - 428s 2s/step - loss: 0.1914 - acc: 0.9486 - val_loss: 2.6487 - val_acc: 0.812
Epoch 30/30
175/175 [=====] - 428s 2s/step - loss: 0.1282 - acc: 0.9577 - val_loss: 0.3093 - val_acc: 0.952
Total time: 12877.10194516182
  
```

Fig. 1: Accuracy Training

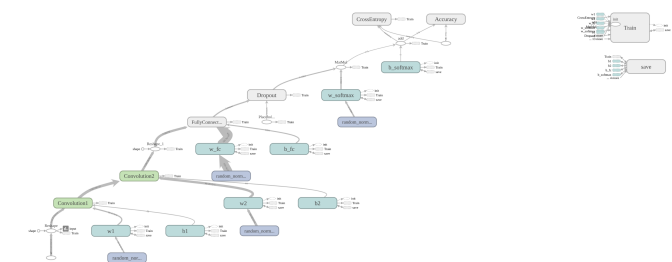


Fig. 2: Network Model

IV. CONCLUSION

APPENDIX