Towards an Intelligent Service Robot

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I would like to dedicate this thesis to my loving parents ...

And I would like to acknowledge ...

Abstract

The understanding of the environment have been a tough problem in the field of the computer vision and robotics for the past decades. The understanding the environment have been formulated in many different forms, e.g, the problem is formulated as a classification problem. Moreover, from a given scene

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Chapter 1

Introduction

The standard to define a robot can be summarized as the following three parts, the motion control, the sensing ability, and the cognition ability. In the past few decades, the previous robotics researches are mainly focused on the first two parts, motion control, and sensing ability. However, there are few kinds of researches focus on the cognition of the robots due to the limitations of the era. Recently, thanks to the ImageNet and the development of high-performance GPUs, many deep learning based algorithms have demonstrated many successful applications, e.g, image classification, object detection, object tracking, person re-id, face recognition and many more. All of these techniques are changing the way of algorithms to perceive our world.

1.1 The Environmental Descriptors

Lorem Ipsum is simply dummy text of the printing and typesetting industry (see Section 1.3). Lorem Ipsum [2] has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged. It was popularised in the 1960s with the release of Letraset sheets containing Lorem Ipsum passages, and more recently with desktop publishing software like Aldus PageMaker including versions of Lorem Ipsum [1, 3, 4].

The most famous equation in the world: $E^2 = (m_0c^2)^2 + (pc)^2$, which is known as the **energy-mass-momentum** relation as an in-line equation.

A *LaTeX class file* is a file, which holds style information for a particular LaTeX.

$$CIF: \quad F_0^j(a) = \frac{1}{2\pi\iota} \oint_\gamma \frac{F_0^j(z)}{z-a} dz \tag{1.1}$$

1.2 CNN for Image Understanding

It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters, as opposed to using 'Content here, content here', making it look like readable English. Many desktop publishing packages and web page editors now use Lorem Ipsum as their default model text, and a search for 'lorem ipsum' will uncover many web sites still in their infancy. Various versions have evolved over the years, sometimes by accident, sometimes on purpose (injected humour and the like).

1.3 Image Quality Assessment

Image Quality Assessment (IQA)

References

[1] Abramovich, Y. A., Aliprantis, C. D., and Burkinshaw, O. (1995). Another characterization of the invariant subspace problem. *Operator Theory in Function Spaces and Banach Lattices.* The A.C. Zaanen Anniversary Volume*, Operator Theory: Advances and Applications*, 75:15–31. Birkhäuser Verlag.

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[3] Conway, J. B. (1990). *A Course in Functional Analysis.* Springer-Verlag, New York, second edition.

[4] Ljubič, J. I. and Macaev, V. I. (1965). On operators with a separable spectrum. *Amer. Math. Soc. Transl. (2)*, 47:89–129.

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