Review 1: State-of-the-art regarding the Semantic Perception of Scenes using RGB-Depth cameras

General Description

Semantic perception for intelligent systems such as robots has seen a lot of progress recently. As intelligent systems move away from laboratory setups towards complex real-world scenarios, both the perception capabilities of these systems and their abilities to acquire and model semantic information must become more cognitive and powerful.

Recognizing objects and occlusion is currently one of the most challenging task in the field of 3D computer vision and robotics, because 3D data usually suffer from distortions due to noisy sensors, viewpoint changes and point density variations. However, research in the field of 3D object recognition has been fostered by the availability of low-cost, real-time 3D sensors (also called RGB-Depth cameras) such as the Microsoft Kinect and the Asus Xtion. Several 3D object recognition approaches exist which are commonly grouped in global and local approaches. Global approaches are characterized by highly efficient methods which however require segmentation capabilities to hypothesize about objects. Whereas local approaches are able to handle cluttered and occluded objects without segmentation at the price of higher computational times due to less compact local representation of the models [1].

Keywords: review, state-of-art, discussion, RGB-Depth cameras, 3D object recognition.

Orientative Tasks

1. Use Google, GoogleScholar and the Web of Science to find out relevant works in the literature developed in the last 2 years (2011-2013).
2. Read the abstract, the introduction and the conclusions to find out if the paper is suitable to be included in the review.
3. If so, write a summary about the paper in 10 lines or less.
4. Classify the works in the literature by filling in a table similar to Table 1.
5. Write the Review/State-of-the-art [2] using the following research paper structure: Title, Authors, Abstract, Introduction, Methods, Results, Discussion, Future Work and References.
   5.1. In the *Introduction,* you should explain why the review you are doing is important for the scientific community.
   5.2. In the *Methods,* you should explain which data bases you used to search for the papers, your queries and keywords, your allowed dates, how many colleges have you discussed with to decide if a paper was relevant or not, how you classified the papers into categories, etc.
   5.3. In the *Results,* you should explain your classification of the papers (include your table) and compare them using the 10-line-summary you have written.
   5.4. In the *Discussion,* you should give your critical opinion regarding the advantages and disadvantages of each of the approaches in the papers. And you should justify your opinion with facts found in the papers.
   5.5. In the *Future Work,* you should explain what do you think will be the future trends in this subject. You should use facts and citations to works in the literature to justify your opinion or to contrast your opinion to their opinion.

5.6. In the *References*, you should mention the papers you have selected as relevant for the review. And you should number the papers in square brackets in the order in which they appear in the text. Note that you should:

Examples of references in the text: *"....as demonstrated [3,6]. Barnaby and Jones [8] obtaines a different result...."*

Example of reference to a journal publication:

[1] J. van der Geer, J.A.J. Hanraads, R.A. Lupton, The art of writing a scientific article, J. Sci. Commun. 163 (2000) 51-59.

Example of reference to a book:

[2] W. Strunk Jr., E.B. White, The Elements of Style, third ed., Macmillan, New York, 1979.

Example of reference to a chapter in an edited book:

[3] G.R. Mettam, L.B. Adams, How to prepare an electronic version of your article, in: B.S. Jones, R.Z. Smith (Eds.), Introduction to the Electronic Age, E-Publishing Inc., New York, 1999, pp. 281-304.

Table 1. Orientative categorization of the papers for the review.

	HW System	SW System	Libraries	Detection of Objects	Detection of People	Detection of Movement
Authors Paper 1	Which one? For example: Kinect Xbox, Asus Xtion, Kinect Microsoft, etc.	Which one? For example: Linux, Ms Windows, MacOS, etc.	Which one? For example: OpenCV, OpenNI, etc	Yes/No Method? For example: SURF, SIFT, etc.	Yes/No Method?	Yes/No Method?
Authors Paper 2						
…						

	Semantic Information of Objects	Semantic Information of People	Semantic Information of Movement	Qualitative Modelling	Reasoning Techniques	Learning Techniques
Authors Paper 1	Yes/No Which one? Colour? Shape? Name? Method?	Yes/No Which one? Face? Pose? Name? Activity?	Yes/No Which one? Direction? Intention? Activity? Method?	Yes/No Which one? Method?	Yes/No Which one? For example: Symbolic Reasoning, Description logics reasoning, etc.	Yes/No Which one? For example: Support Vector Machines (SVMs), Neural Networks, Case-based reasoning, etc.
Authors Paper 2						
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References

[1] Serials of 'Semantic Perception Mapping and Exploration (SPME)' workshop: http://www.spme.ws/2012

[2] The Writers Handbook, the University of Wisconsin: http://writing.wisc.edu/Handbook/ReviewofLiterature.html