New Activities for Cultural Heritage

Proceedings of the International Conference HeritageBot 2017
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The HeritageBot Project. Putting Robotics into Survey

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Abstract. The use of remote control robotic systems it’s constantly and rapidly changing, foreshadowing interesting developments especially in the architectural and archaeological research. Digital survey technology and representation techniques for the documentation of archaeological sites, has grown significantly in recent years. The contribution focuses on digital survey tools able to return point clouds, applied to remote-controlled mobile platforms. The mobile platforms equipped with XYZ or RGB data acquisition sensors can overcome some physical limits not solvable by making use of traditional instruments. The gap created by dimensional reasons it could be exceeded using this kind of tools. All this to complete the limit in the traditional survey and increase the level of knowledge of architectural and archaeological artifacts. This research has been made by the Laboratory of the University of Cassino DART, through a series of examples and a trial made on the Casinum Archaeological area, the studio will define the state of art of this subject that it connects indissolubly knowledge and experimental technology.

Keywords: Robot design · Application for cultural heritage · Survey · Technological transfer · Prototype

1 Introduction

The use of remote control robotic systems it’s constantly and rapidly changing, foreshadowing interesting developments especially in the architectural and archaeological research. The combination of robotics and Cultural Heritage allows, today, to increase the modalities of access to information and knowledge of the investigated works, just by the possibility of making accessible and explore environments and situations that for logistical reasons or safety are substantially inaccessible. Miniaturization of the elements constituting a robotic platform, the reduced weight of the components provides, in certain specific contexts, the possibility to preserve the artifacts object of study by aggressive external actions and allow investigation of limiting to the minimum essential campaigns tool interactions/work.

So far robotics has had important developments in many areas, not only professional, but also in the field of leisure applications. This aspect gives a considerable impetus to the development of technologies to produce furniture and remote-controlled platforms that, also thanks to the low cost of the products and the simplification of interfaces, allow...
respect the angles and the visual cone necessary for acquiring data of the aforesaid 3D sensor. Finally, on the bottom of the body there are placed some spheroidal shape supports useful to connect the shell with the legs (Fig. 4).

Fig. 4. To the left render shell of the mobile platform with the sensor and the accompanying instrumentation slots, right wireframe views of the prototype’s shell, Patent Application n. 402017000025062–2017.03.07 (in Italian).

5 Conclusions

The activity of the DART as part of FILAS project, developed prevailingly as a support to the design of the remote controlled robotic platform, analyzing and verifying especially the characteristics, the strengths and limitations of the technology components aimed at architectural and archaeological survey. As things stand, with the project not entirely concluded yet, it comes upon that all the experiments carried out have provided useful and interesting insights, to be further explored in the remainder of the project itself. The initial expectations have found satisfactory evidence in the results achieved. All the preliminary tests described in this paper have allowed us to verify the validity of the project and resulted in significant improvements to the shape of the prototype. In the short term are planned some tests on different sites, to examine on a real field the true potential of the complete prototype, with all its components, both mechanical and survey sensors. The program also expects, throughout specific agreements and memorandum of understanding, a cultural connection with structures outside the academic area (superintendence, restoration operators, survey sensors manufacturers, etc.) with which proceed in these trials of the prototype, not only in archaeological and architectural context but also in industrial archeological areas. There are other experiments aimed to the implementation of the platform with better quality and increased data acquisition equipment, also through specific agreements with sensor manufacturers. Considering the conclusive result here reported, it is confirmed the validity of the project of a remote controlled robotic platform, with dual mobility system (the walk and small flight), as an efficient tool for investigation and survey of objects ascribable to the broad area of the Cultural Heritage, and that, once the optimizing process will be completed, HeritageBot could really be an instrument able to take us there, where no man has gone before.
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M. Ceccarelli, M. Cigola, G. Recinto (Eds.)

New Activities For Cultural Heritage
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This is the Proceedings of the International Workshop Heritagebot 2017 that was held in Cassino, Italy in September 2017. The papers cover a wide range of disciplines connected with Cultural Heritage, from humanistic fields up to engineering designs through legal aspects and financial/economical studies, treating aspects of theory, design, practice and applications.

Topics addressed during the conference were: business models and business planning; creative cities and industries; documentation, analysis and survey of cultural heritage; economics of cultural heritage; cultural heritage, business and organizational models; cultural heritage and collaborative digital systems; citizen science for cultural heritage: service robotics for cultural heritage; legal tools for the development and innovation management in cultural heritage; capital budgeting and capital structure of cultural heritage sector; field applications in cultural heritage.