PuppetMaster: Fabricating Interactive Puppets for Manipulating Interaction Space around Public Displays

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ABSTRACT

Increasingly wide number of animated characters with range of kinematic motions are being 3D printed. However once printed, the functional use of such characters remain constant and non-interactive. In this paper we examine approaches to fabricate functional interactive puppets that can be applied for variety of interactive tasks to help users ranging from public displays to touch screen devices. In addition to interactive tasks the kinematic motions and behaviors of such puppets are of great importance in settings where they are deployed autonomously. We demonstrate the potential of such puppets through three field studies with public displays.

Author Keywords

3D printing, fabrication, motion input, gestures, interactive characters, public displays

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

INTRODUCTION

Robotic assistants [8], [6], [9] for accomplishing interactive tasks are increasingly gaining interest in the scientific community. Designing such robotic assistants for tasks specific to interaction remains a challenge due to a range of input motions involved in accomplishing the tasks. Fabrication of mechanical characters [2], [7], [3] that perform motion based on user input are being explored. This opens up avenues for fabricating puppets for specific interaction tasks based on the motions desired by the interaction designers.

Apart from being able to control such puppets for interaction tasks, they can be deployed "in the wild" to help facilitate interaction with devices such as public displays. Public displays in the past have suffered from Interaction blindness [] and display blindness []. Previous studies [5], [4], [1] have shown that external physical objects with motion can encourage interaction with public display and can help in overcoming such blindness problems.

Hence in this paper we examine address these problems through following contributions

• We introduce methods for fabricating interactive puppets that perform a range of motions based on desired input motions.

• Example applications for how such puppets can be utilized in interactive tasks and behaviors in interactive context

• We present the results of such puppets in an in the wild study and also report on various usages with public displays

BACKGROUND

Digital fabrication: Tools and Systems

REFERENCES

1. Breazeal, C., Brooks, A., Hancher, M., Strickon, J., Kidd, C., McBean, J., and Stiehl, D. Public anemone: An organic robot creature. In *ACM SIGGRAPH 2002 Conference Abstracts and Applications*, SIGGRAPH '02, ACM (New York, NY, USA, 2002), 7676.

2. Cal, J., Calian, D. A., Amati, C., Kleinberger, R., Steed, A., Kautz, J., and Weyrich, T. 3D-printing of non-assembly, articulated models. *ACM Trans. Graph. 31*, 6 (Nov. 2012), 130:1130:8.

3. Coros, S., Thomaszewski, B., Noris, G., Sueda, S., Forberg, M., Sumner, R. W., Matusik, W., and Bickel, B. Computational design of mechanical characters. *ACM Trans. Graph. 32*, 4 (July 2013), 83:183:12.

4. Houben, S., and Weichel, C. Overcoming interaction blindness through curiosity objects. In *CHI '13 Extended Abstracts on Human Factors in Computing Systems*, CHI EA '13, ACM (New York, NY, USA, 2013), 1539–1544.

5. Ju, W., and Sirkin, D. Animate objects: How physical motion encourages public interaction. In *Persuasive Technology*, T. Ploug, P. Hasle, and H. Oinas-Kukkonen, Eds., no. 6137 in Lecture Notes in Computer Science. Springer Berlin Heidelberg, Jan. 2010, 40–51.

6. Pedersen, E. W., and Hornbk, K. Tangible bots: Interaction with active tangibles in tabletop interfaces. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '11, ACM (New York, NY, USA, 2011), 29752984.

7. Skouras, M., Thomaszewski, B., Coros, S., Bickel, B., and Gross, M. Computational design of actuated deformable characters. *ACM Trans. Graph. 32*, 4 (July 2013), 82:182:10.

8. Somanath, S., Sharlin, E., and Costa Sousa, M. Spidey: a robotic tabletop assistant. No.

9. Somanath, S., Sharlin, E., and Sousa, M. Integrating a robot in a tabletop reservoir engineering application. In *2013 8th ACM/IEEE International Conference on Human-Robot Interaction (HRI)* (2013), 229–230.