

3D Printed Toys, Entertainment Humanoids, and Video Games: Challenges in Design and Control

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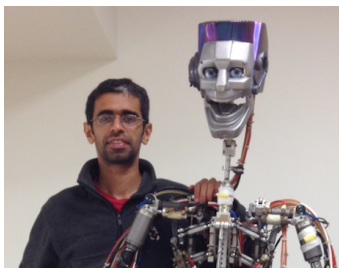
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Abstract

I will present three different topics, related challenges and our solutions. The first topic is on the use of 3D printing to create legged toys. I will demonstrate our attempts at creating a walking toy that is 3D printed as a single piece with integrated joint and requires no assembly. The toy is able to achieve walking downhill without any external power. Next, I will present the design and construction of a 3D printed linear actuator and its use in creating hopping robots, one of which is inspired by Disney's Luxo Jr. Lamp. The second topic is on creating choreographed motion for entertainment robots with application to Disney's audio-animatronics. I will highlight the challenges in creating such motions and then present a straightforward learning algorithm that improves performance by learning from errors. The learning algorithm is demonstrated on a 36 degrees of freedom human-like robot used in Disney Theme parks. The third topic is on creating control algorithms to play the popular video game called the Flappy Bird. The Flappy Bird is a smartphone game and involves tapping the screen in order to navigate a bird through gaps between series of vertical pipes. The player earns a single point every time the bird successively passes through the vertical gap. Although a straight forward concept, the Flappy Bird is hard game and scores in single digits are not uncommon. I will present three control approaches to play the game all of which achieved high scores. You can find more information about me and my lab here: http://tiny.cc/pranavb_videos

Bio



Pranav Bhounsule joined UTSA in 2014. Before UTSA, he was a postdoc at Disney Research Pittsburgh. Before Disney, he earned the PhD degree from Cornell University. Before Cornell, he earned a Masters in Engineering Mechanics from Indian Institute of Technology Madras in 2006 and Bachelors degree in Mechanical Engineering from Goa Engineering College. His research has been supported by the National Science Foundation.