

TRIBHUVAN UNIVERSITY

Institute Of Engineering

Pulchowk Campus

Department of Electronics and Computer Engineering

Graphics Project

on

“iRobot Learning to Walk ”

Submitted to

Department of Electronics and Computer Engineering

Pulchowk Campus

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by

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Introduction

This project is about creating a cartoon character - “iRobot” that can mimic the walking actions of a human being. It will also be able to demonstrate how toddlers learn to walk. As toddlers learn to walk by trial and error during their early days, the iRobot will be able to mimic that learning action.

The basic idea behind creating the animation is to create a cartoon character for iRobot having several body parts (like hands, legs, body, etc) hinged together. The angle between the hinge joints of several body parts will be varied with time (as shown in Fig. 1 in the next page) to create animation. Discrete sets of angle will be provided for the joints and the intermediate stages will be calculated by interpolation to create smooth animation.

The most interesting part of this project will be to provided the angle between the joints of iRobot from a random source of data. This will create random actions of the character and will be funny to watch.

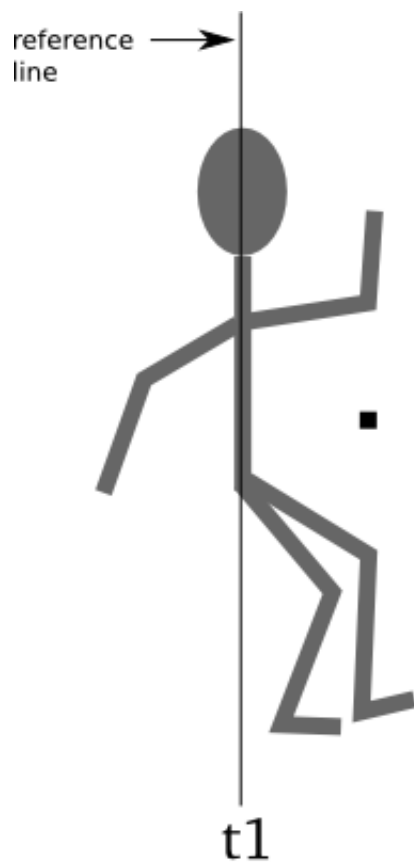


Fig. 1: Angle between the joints at any time t_1

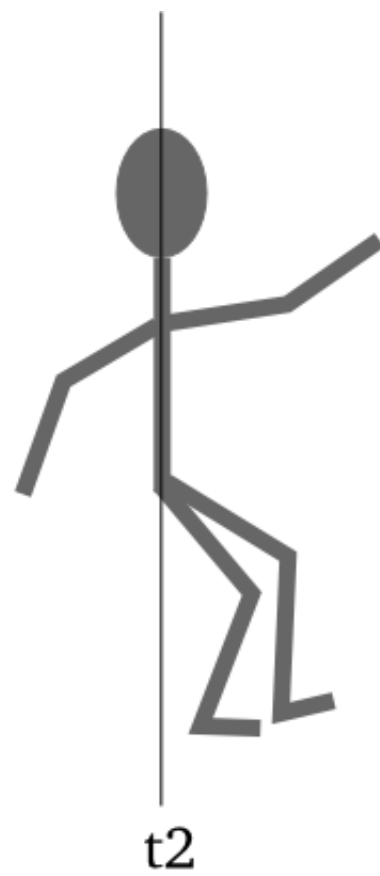


Fig. 2: Angle between the joints at any time t_2

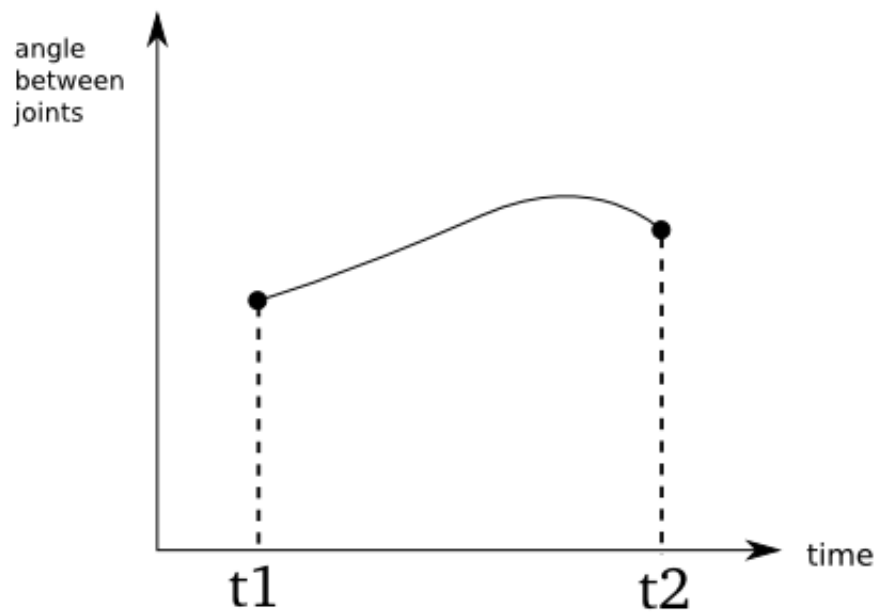


Fig. 1: Angle between joints of the cartoon character for iRobot will be varied with time to create animation effect.

Idea behind project

The ability to walk is a unique feature of human beings. The idea behind this project is to mimic the walking action of a human. A animated cartoon character – iRobot will be used to show the result of animation.

Toddlers master the art of walking by several clumsy trials to walk in their early days. This phase of learning to walk is quite interesting to watch. This learning action shows how our brains learns new skills by trial and error methods.

The animation of the cartoon character will be achieved by varying the angle between the joints of several body parts of the character. The animation will be more interesting and unpredictable if the variation of angle is extracted from a random source of data.

Objectives

To create an animated character which will be animated to perform the following actions

1. mimic the walking style of a human being
2. show how toddlers learn to walk
3. the movement of animated character will also be controlled by a random data source which will create some bizarre animations and will be fun to watch

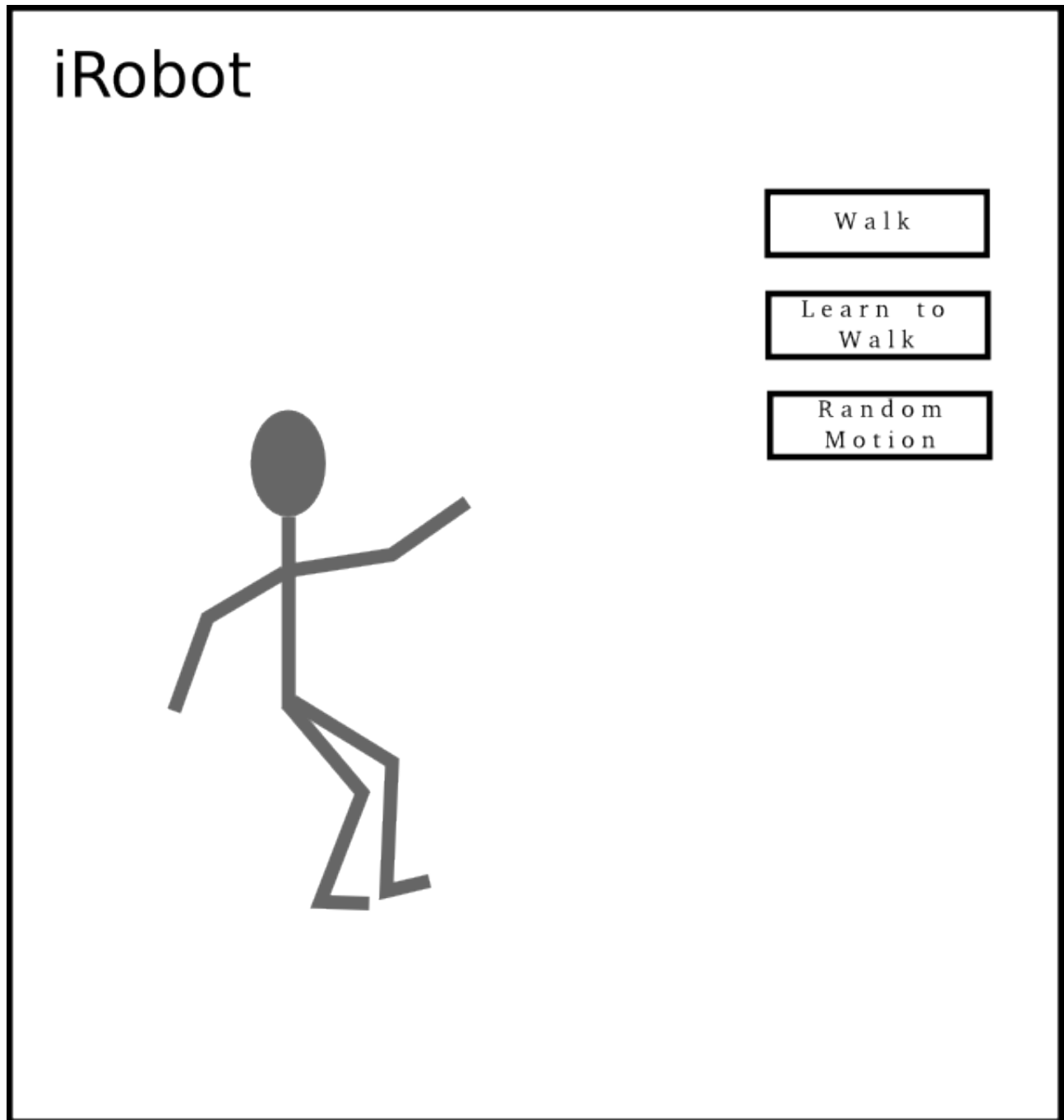
Methodology

We will use Java programming language as the platform for this project. We will use features like Double Buffering (which helps reduce flickering of animation) and Java2D API (only use of simple 2D API functions for drawing line, circle, polygon) extensively in his project. Our prior programming experience in Java platform is also one of the reasons for choosing for this platform.

Netbeans 5.5.1 IDE will be the development tool that will be extensively used by the team members. Several “Developer Collaboration” features of the IDE will be utilized to communicate and collaborate code between the members.

For code collaboration, we will use Subversion (a popular version control system) hosted at Google Code [<http://code.google.com/hosting>].

Expected result(GUI)



Scope of the project

The project is quite simple and hence cannot be used directly for any commercial purpose. However, the project can be used to create simple and short length cartoon films that can be used for illustration purpose. It can also be used to create illustrations which require animated characters that can perform actions of a human being.

Project Schedule

Project work starts from 14 October 2007.

Week 1 Study the Java Graphics Environment and basic of “Articulated Motion”

Week 2 Create the design of software

Week 3,4,5 Coding

Week 6 Perform Testing

Week 7 Fix Bugs and prepare documentation

References

1. “Articulated Models” - Animation 1: Interpolation and Kinematics, Page. 20, Lecture Notes for Courses > Electrical Engineering and Computer Science > 6.837 Computer Graphics, Fall 2003 from MIT Open Course ware [<http://ocw.mit.edu>]
2. “Style Translation for Human Motion” - Homepage of Jovan Popović, MIT Computer Science and Artificial Intelligence Laboratory [<http://people.csail.mit.edu/jovan/>]