Kung Fu Nao

Human-Robot Interaction (MKI50)

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1 Introduction

Introducing the reader to the topic of learning from robots.

The topic learning from demonstration is a topic that has seen a huge growth in the last few years. This topic always consists of teaching a robot how to perform a task via demonstration by a human. A new topic is that of learning a human how to perform a task from demonstration by a robot.

In this report an overview will be given of a robot capable of learning a human how to perform certain "karate" movements from demonstration by a robot. In this system a robot is able to perform a motion, teach the human how to perform this motion, assess the performance of the human and give extra information on the motions that are performed the worst by the user.

2 Hardware and Software

2.1 Hardware

In order to build this system the following components were used:

- Laptop
- Nao robot
- Microsoft Kinect

2.2 Software

In order to program this system the following software has been used:

- Microsoft visual studio 2012
- Microsoft Kinect SDK
- Choregraph

3 System

Discuss the system from an AI point of view.

3.1 Perception

A way to detect the user and the body model. Do not mention the Kinect.

3.2 Communication

Gestures + speech...

3.3 World Model

4 Individual Components

4.1 Perception

Skeleton tracking + dynamic time warping

4.2 Communication

Note here that we both use speech and gestures. Note that we use both beat gestures(gestures without semantic content) as well as metaphoric gestures (gestures indication thinking as well as gestures indication).

The metaphoric gestures are:

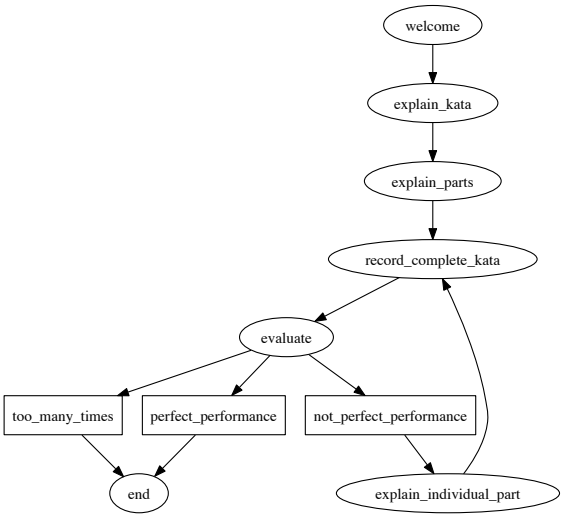
- Thinking
- Flexing of the muscles
- Bowing

4.3 World Model

4.4 Graphical User Interface

5 Interaction Patterns

Figure 1: State diagram showing in what order the behaviours of the robot are performed



6 Conclusion