CS CAPSTONE REQUIREMENTS DOCUMENT

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HOW TO MAKE AN EFFECTIVE ROBOT COMEDIAN

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Abstract

A comedian can observe an audience and improvise a delivery of a joke to connect the audience to the content. This makes the experience more authentic and genuine for the observer. The purpose of this project is to to discover what makes an entertaining interaction by studying a robot that performs comedy. We propose that a performance is enhanced when (1) the comedian interacts spontaneously with the audience, (2) the comedian has and conveys a coherent, well-developed character, and (3) the comedian adapts its act to cater to an audience based on their reaction. This document covers the technical requirements for our project, as well as a description of software, hardware, and outside limitations.

CONTENTS

1 INTRODUCTION

1.1 Purpose

This requirements document outlines the deliverable research goals we have for the robot comedian. The findings of our research will be assembled into a paper. We will use the robot to perform stand-up sets to explore topics under our research questions.

1.2 Scope

The purpose of this project is to create an effective robot comedian. Our robot will tentatively be named Caspar. We want to explore the dynamics of a human and robot interaction within the context of Stand-up comedy; specifically, we are researching spontaneous audience interactions during a stand-up performance and adaptive audience reaction recognition with a robot presenting a character. To connect our audience to the content coming from the robot, we intend to have the robot deliver content based on personality and character decisions.

Caspar will perform stand-up comedy, and incorporate aspects such as gesturing, effective timing, and tone of voice, to create effective comedy. In addition, the robot will also interact spontaneously with the audience, convey a coherent character, and adapt an act to cater to the audience. These aspects will be preset and changeable. Our robot will run a configuration during a stand-up performance to tell jokes and adapt to the audience. This system will be made using the software Choregraphe that describes the state machine of the robots decision making.

Caspar will benefit the field of research in Human-Robot Interaction by providing insight into how conveying character, spontaneous interactions (crowd control), and adaptation may add to the entertainment value of human-robot interaction. Additionally, Caspar will achieve the goal of creating an effective robot comedian, and will be beneficial to answering the question of what it is that creates effective comedy.

1.3 Definitions, acronyms, and abbreviations

This document will use the following conventions:

HRI	Human-Robot Interaction
NAO	The model of robot we will be using, from Softbanks Robotics
Character	A distinctive personality

1.4 References

Knight, Eight lessons learned about non-verbal interactions through robot theater, in International Conference on Social Robotics. Springer, 2011, pp. 4251.

1.5 Overview

This document will describe Caspars place in HRI research, and interactions between Caspars software, hardware, and controlling user. The document will also describe Caspars functions, target audience, constraints, and assumptions we take to fulfill the requirements. Finally, the requirements

2 Overall Description

2.1 Product Perspective

Caspar is not the first robot to attempt to do comedy. In previous studies, robots utilizing non-verbal communication, as well as attempts at adaptive robots comedians have been done. In particular, Heather Knight has observed the importance of character and spontaneous interactions in creating effective comedy. Caspar will aim to examine the effectiveness of character and spontaneous interactions in comedy. Aside from the role of Caspar in the general field of HRI, the software itself will include the following limitations.

2.1.1 Software Interfaces

We will be using the NAO V3/4/5 along with Choregraphe. All of the code will be written in Python and C++ modules. Choregraphe will run gestures, scripts, and other actions on the NAO robot. Documentation can be found at http://doc.aldebaran.com/1-14/software/choregraphe/index.html.

2.1.2 Hardware Interfaces

The Choregraphe file will be loaded onto the NAO robot. The NAO robot itself includes limbs and joints that can be manipulated in Choregraphe. I think the previous sentence goes in another section (constraints). Pretty sure this section is just talking about ways the hardware can connect to the software. Havent even seen the bot yet so idk

2.1.3 Site Adaption Requirements

For each venue, adaptations include the crowd size, stage area, lighting, and formality. These parameters will affect the sensitivity of Caspar's sensors and its set list.

2.2 Product Functions

Caspar is able to

1) Spontaneously interact with the audience
2) Convey a coherent character from statements spoken that define personality
3) Adapt to an audiences response
4) Use gestures in its delivery
5) Time joke delivery effectively
6) Use vocal tones to deliver expressively

2.3 User Characteristics

Casper will be performing in front of a live studio audience. We will use audience feedback to retain metrics for how well the set went. We want the audience to observe Caspers performance as a show, in a realistic setting for stand-up comedy.

We think that the best context for this show is during an open mic event, as the audience will not be composed of people who specifically decide to see robot comedy. This will reduce a bias of people who favor robot comedy.

2.4 Constraints

The most limiting software constraint that will be the balance between comedy content and dynamic audience adaptation. We want to make sure the content and delivery of the robot is given without technical difficulties and nonsense dialogue, while still presenting a set with a robots character. The character of the robot is the most important feature of the design. The adaptation and dynamic jokes will be internal choices, and not be completely evident to the audience. As long as during the set the robot appears to be giving dynamic responses, we can measure the audiences reaction.

We will also need an IRB to perform research on human subjects. This will be important to protect the rights of the test subjects. However, signing a form before a comedy show does not always set up an appropriate context for the audience. It will be important to make sure we can reliably quantify the type of audience we are getting, and make sure that we can compare audience models to each other.

To measure the audiences reaction to the set, it is also important to make sure that we are not creating a response bias, and not only sampling strong responses from the audience.

2.5 Assumptions and Dependencies

One of our research questions studies the adaptation of the set from the audience interactions. This is dependent on a comprehensible audience model for the robot. Our audience is going to be pretty variable, since we do not know the exact audience until we have seen it. This will be a goal that will be achieved later in the design of the robot, and will be dependent on the success of the robots non-adaptive set.

3 Specific Requirements

Our software will be a Choregraphe *.pml configuration of the behaviors, content and decision making for the set. We will need to cover the edge cases present in the block model inside of the software, in addition to any blocks that have Python modules written into the configuration.

The Python modules can be tested separately, to verify that its input and output are verified for the Choregraphe configuration. Outside of a performance, we will need to test that our robot can successfully handle the task blocks, so that if there is a technical difficulty during the show, we can accurately correlate audience response to the performance of a block.

Outside of the software, we need to quantify the responses to the set so that our data can represent the qualities of our research questions; this is so that our research is on track with answering our research questions.