Affective Motivational Collaboration Theory

by

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ABSTRACT

Abstract Here!

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CHAPTER 1
INTRODUCTION

1.1 Motivation

1.2 Thesis Statement and Scope

1.3 Contributions

Throughout this work we aim to show how a robot can leverage emotion-driven processes using appraisal algorithms to improve collaboration with humans. As such, in this thesis work, we introduce a novel framework, called Affective Motivational Collaboration (AMC) framework, which allows a robotic agent to collaborate with humans incooperating the underlying emotion-driven processes and the expressed emotion of human collaborator. Such a framework is built based on computational models of collaboration and appraisal allowing for task-driven interaction with robots or other agents. The theoretical foundation, computational models and algorithms as well as the overall framework, and the end-to-end evaluation of the framwork make the following contributions:

1. **Developing new computational models and algorithms for *Affective Motivational Collaboration Theory*; specifically for the**:

   (a) **appraisal of internal and external events during collaboration**

   I will create computational models and algorithms to compute the value

of appraisal variables in a dyadic collaboration. Applying cognitive appraisal theory in the collaboration context is novel. Other models of the appraisal theory have not paid attention to the dynamics of the collaborators' mental states and behaviors.

(b) **functions of emotions during collaboration**

I will develop new algorithms for the various functions of emotions specifically in the context of collaboration. Existing models and implementations of emotions focus only on how emotions regulate and control internal processes and sometimes behaviors. In my work, I also investigate the details of how emotions result in collaborators' mental states. This in turn sheds light on the dynamics of collaborators' mental states and how appraisal of the self and the environment contributes to these functions.

(c) **motivation-based belief and intention formation**

I will create a motivation mechanism that employs appraisal processes to dynamically form new beliefs and intentions related to the collaboration structure. This mechanism will help the agent overcome impasses during collaboration. Existing cognitive models do not include an account of the influence of motivation on collaborative behaviors.

2. **Developing and implementing a computational model based on *Affective Motivational Collaboration Theory*:**

My computational model will implement the key algorithms related to *Affective Motivational Collaboration Theory* as well as minimal implementation of other processes which are required for validation of the model but are not part of my thesis contributions. The emphasis of the model is on underlying cog-

nitive processes embracing collaboration and appraisal concepts, rather than the Perception and the Action mechanisms.

3. **Validating *Affective Motivational Collaboration Theory:***

   I have identified eight key social characteristics (see Section **??**) which occur during the course of a collaboration. I will validate how the various functions of emotions give rise to these characteristics during collaboration. Specifically, I will first incrementally validate one or more of the computational components in my model starting with appraisal. Finally, I will conduct an end-to-end system evaluation with human subjects and a simulated robot.

1. **Contribution 1**
2. **Contribution 2**
3. **Contribution 3**
4. **Contributions 4**

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5.5 Results and Evaluation

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IMPROVING HUMAN-ROBOT COLLABORATION LATEX ERROR: THERE'S NO LINE HERE TO ENDSEE THE LATEX MANUAL OR LATEX COMPANION FOR EXPLANATION.YOUR COMMAND WAS IGNORED.TYPE I ¡COMMAND¿ ¡RETURN¿ TO REPLACE IT WITH ANOTHER COMMAND,OR ¡RETURN¿ TO CONTINUE WITHOUT IT.

= *

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