Project proposal for MSc Embedded Systems

TU Delft – Interactive Intelligence

Finding Appropriate Moments for Support in Socially Adaptive Electronic Partners

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# Synopsis

This study will focus on finding what defines an appropriate moment in regards to providing support through a Social Adaptive Electronic Partner (SAEP).

Table of Contents

[Synopsis 2](#_Toc511874009)

[1 Project fundamentals 4](#_Toc511874010)

[1.1 Introduction 4](#_Toc511874011)

[1.2 State of the art 5](#_Toc511874012)

[1.3 Research description 5](#_Toc511874013)

[2 Planning 6](#_Toc511874014)

[2.1 Staging 6](#_Toc511874015)

[2.2 Deliverables 6](#_Toc511874016)

[2.3 Risk analysis 6](#_Toc511874017)

[2.4 Time planning 6](#_Toc511874018)

[3 Personalia 7](#_Toc511874019)

[2.5 Contact details 7](#_Toc511874020)

[2.6 Supervision 7](#_Toc511874021)

[2.7 Time planning 7](#_Toc511874022)

[4 References 8](#_Toc511874023)

# 1 Project fundamentals

## Introduction

The use of technology to support the daily lives of people is an ever prevalent topic. Through applications in smart homes, wearables, virtual coaches and many others, we can improve our health, efficiency and be more connected. Conversely, the abundance of apps and notifications cause us to grow immune to the constant stream of information that is presented to us in a daily basis. In order to create a truly effective support agent, it is crucial to not only generate feedback in relation to the user’s actions, but provide this feedback at an appropriate time.

But what actually is an appropriate time? The appropriate time for feedback is inherently linked to the nature of the user’s action. To illustrate this, consider the following example.

Our user, Joanna, forgets to call an important client during the day. She wants to be reminded the next day at work.

In the first example, a simple reminder notification will suffice. A naïve solution would be to use a simple alarm or reminder app in which she sets a time that deemed appropriate. However, what happens if the next day, that time is no longer appropriate because, for example, a meeting is planned. Most likely, she will ignore the phone and forget about it once again, because at that moment, the meeting has a higher value to her. Ideally, her phone would analyze her schedule and remind her outside of meetings and before the end the day.

The difficulty of this lies in the generalization. While the above example can be implemented relatively easy at design time, it is likely not to be able to handle diversions from normal behavior. Existing technologies are often made by hardwiring norms and as such are very rigid und unable to adapt to evolving norms. [1] Furthermore, dealing with different problems, such as remembering to turn on the alarm system before leaving work, would require a completely different implementation.

## State of the art

The concept of a Socially Adaptive Electronic Partner (SAEP) has been previously introduced by van Riemsdijk. [1] It follows the ideology that technology should adapt to the user and not vice versa. As such, its logic incorporates the norms and values of the social context. Subsequent work has been done expanding on this, including temporal logic and analyzing actions and habits. [2]–[4].

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## Research description

The research in this thesis will focus on combining the concepts of a SAEP and expanding on the existing research as discussed before. The overall research question is:

Given a user’s daily activity, what is considered an appropriate time for support feedback, taking into consideration the user’s norms and values?

To support answering this question, several sub-questions are defined:

R1: What are the possibilities of defining and modelling “appropriate time”?

R2: How can a scenario be modelled using a technique found in R1?

R3: How can the goal be broken down into a number of norms?

R4: How can the model and norms be combined to indicate an appropriate time?

# 2 Planning

## Staging

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## Deliverables

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## Risk analysis

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## Time planning

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# 3 Personalia

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## Supervision

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## Time planning

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# 4 References

[1] M. B. van Riemsdijk, C. M. Jonker, and V. Lesser, “Creating Socially Adaptive Electronic Partners: Interaction, Reasoning and Ethical Challenges,” in *Proceedings of the 2015 International Conference on Autonomous Agents and Multiagent Systems*, Richland, SC, 2015, pp. 1201–1206.

[2] M. S. Kließ and M. B. van Riemsdijk, “Requirements for a Temporal Logic of Daily Activities for Supportive Technology.”

[3] P. Pasotti, M. B. van Riemsdijk, and C. M. Jonker, “Representing human habits: towards a habit support agent,” in *Proceedings of the 10th International workshop on Normative Multiagent Systems (NorMAS’16)*, 2016.

[4] P. Pasotti, C. M. Jonker, and M. B. van Riemsdijk, “Towards a formalisation of Action Identiﬁcation Hierarchies∗.”