

Research plan

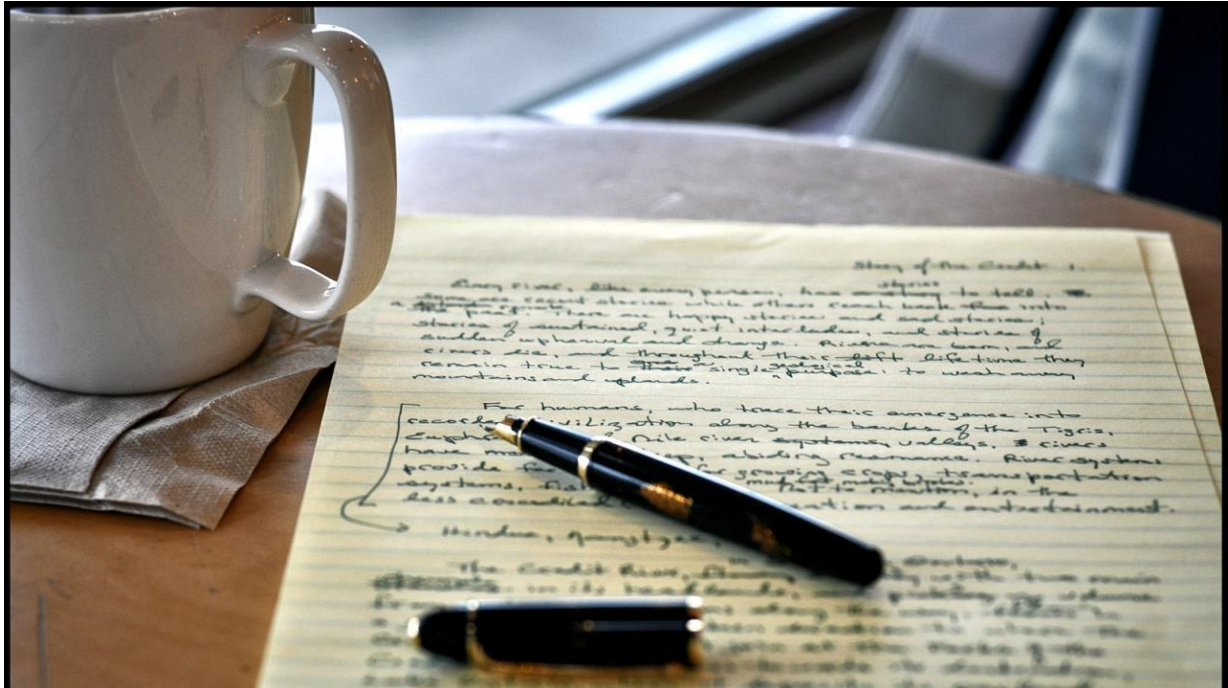


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1 Introduction

Within this document you will find a global overview of our research plan. It contains the problem domain of our project that explains what problem the CBS is currently having and why our problem owner wants to have this subject researched. The global research plan also explains our current main research questions that is divided into multiple sub questions. By answering all sub questions, you can answer the main research questions.

Within the project we will be following the scrum methodology. You can find more about that in the 'planning' section of this document. If anything is not clear, or you want a better explanation please reach out to us.

2 Issue/research questions

2.1 Problem domain

Statistics Netherlands (CBS) wants to research if their respondents are having at least 150 minutes of moderate intense physical activity. Currently, they are measuring by asking their respondent or health surveys. The issue with this is that people are not very good at estimating the time they spent on moving and sport. The respondents are estimating either to low or to high in certain activities, making the data collection very inaccurate and unusable.

Therefor CBS has been looking into alternatives like the accelerometer in combination with machine learning to give better and more accurate results when measuring the intensity of certain activities. They wanted a low cost device that could measure moderate physical activity and would be easy to wear for all age categories.

After doing extensive research CBS concluded that the ActivPal accelerometer would give the best results when looking into recognizing activities and the intensity of those activities. therefor CBS have chosen to do further research to find out how the combination of the ActivPal accelerometer in combination with machine learning can predict if respondents have done their moderate physical activity for 150 minutes per week.

Because of this the CBS started to collect lab tests and started to measure the movements of 41 correspondents in their regular workweek by using the Activepal Accelerator. The group of correspondents exist of the age 21 to 82 and varies between correspondents that are fit, and are not fit.

2.2 Research questions

Within the ActivePal project we will be working with three main research questions. To give a good answer to main research question. We have decided to split the questions up in different topics. The main questions are marked as bold, the sub questions are marked as Italic.

How can Machine Learning be used to predict the intensity of activities performed in a lab situation by a person, who is being monitored with Vyntus One and wearing ActivPal accelerometer?

- *What measurement does ActivPal use for intensity and why?*
- *Is it possible to extract this intensity measurement values from just Vyntus One data, if so, how?*

How can Machine Learning be used to predict the intensity of activities performed by a person wearing only the ActivPal accelerometer, based on the data gathered from Vyntus One and ActivPal accelerometer in the lab situation?

- *What machine learning model can best be used to measure the intensity for each activity?*

How can Machine Learning be used to determine whether people did their 150 minutes of moderate activity in ActivPal accelerometer data of an entire week?

- *How can Machine Learning be used to recognize the activities, performed in the lab situation, in the ActivPal accelerometer data?*

Every research question will be put into the Jira project management board, and the Jira Roadmap. With the corresponding tasks linked to it, by answering all questions and doing the corresponding tasks we can answer the main research questions.

3 Work planning

For the ActivePal project management we have been using the Agile (scrum) method. To follow the scrum method, there will be daily standups. Within our project the daily standup time is 9:30 and since day 1, we have been following this method every day. Within the daily standup we discuss the progress of the prior day and the plans for today. Also, we discuss issues that you might encountered. If you are stuck or not sure what you should be doing next, we make sure that clear that up and make new working pairs.

At the end of the sprint, we hold a retrospective. This is the best way to look back at the last two weeks and make an evaluation of the progress that have been made. Also, we use this time to see how everybody is feeling and if we need to make changes to make sure that everybody is happy.

Since we are using the Scrum method, this also means that every project member has a certain role. Every sprint we rotate the roles within our project group, to make sure that everybody is getting more experienced with Scrum and working together.

The infrastructure/tool we have been using for this is Jira. Jira is a plan, track and manage software that is mostly used for software development. Within the ActivePal project Jira is not only used for software development but also for the research development from week 1.

The main research questions have been divided into smaller tasks called research sub tasks. Every sub research question has a few tasks that help to answer the question and guide us to the right approach to give an answer. By combining Jira with our sub questions, we can put all the sub questions into the Jira Road Map. This gives the whole group a good overview of the questions that still need to be answered and the tasks needed to answer the sub questions.

To get access to our Jira board you can contact one of the ActivePal group members for an invite and a brief explanation.