

Persuading to Prepare for Quitting Smoking with a Virtual Coach: Using States and User Characteristics to Predict Behavior

Analysis Steps

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This file is meant to guide you through reproducing our analysis from the paper "Persuading to Prepare to Quit Smoking with a Virtual Coach: Using States and User Characteristics to Predict Behavior" by Nele Albers, Mark A. Neerincx, and Willem-Paul Brinkman.

Steps to Reproduce Analysis

The reproduction of our code is based on Docker and Jupyter Notebook. Take the following steps:

1. If you want to recreate the extraction of RL-samples of the form `<s, a, r, s'>` and user characteristics from the gathered data, run the file `extract_RL_samples.py` from the root directory. This will create the files `"rl_samples_list_binary_activities.csv"` and `"all_states.csv"` in the `Data-` folder. If you want to skip this step, a version of these files computed by us is already in the `Data-` folder.
2. Make sure that you have Docker installed. You can check whether you do by running `docker -v`.
3. Now choose from the following two options:
 - In the directory of this README-file, build the Docker image via `docker build . -t gbna4/aamas_persuasion_states_char`.
 - In the directory of this README-file, pull the Docker image from Dockerhub via `docker pull gbna4/aamas_persuasion_states_char`.
4. Run the Docker container via `docker run -p 8888:8888 -e JUPYTER_ENABLE_LAB=yes -v <this_working_directory>:/home/jovyan/work gbna4/aamas_persuasion_states_char`, where `<this_working_directory>` is the path to the directory that this README-file is in.
5. Go to one of the links presented in the terminal upon running the Docker container to access Jupyter Notebook.
6. Open the "work"-folder in Jupyter Notebook.
7. There is one notebook for each of the six research questions (e.g., `"analysis_q1.ipynb"` for question Q1). In addition, there is the notebook `"participant_characteristics.ipynb"` to reproduce the participant characteristics reported in the Appendix.

Explanation of Files and Folders

This directory contains the following files and folders:

- `Data`: Folder with the pre-processed data needed for the analyses.
- `Figures`: All figures from the paper as created by us. Running the corresponding parts from the notebooks will recreate these figures.

- `Intermediate_Results`: Intermediate results for more time-intensive computations for question Q6. Running the corresponding steps in the notebook for Q6 will recreate these intermediate results.
- `analysis_q1.ipynb`: Notebook to reproduce our results for question Q1, including Figure 1.
- `analysis_q2.ipynb`: Notebook to reproduce our results for question Q2, including Figure 2.
- `analysis_q3.ipynb`: Notebook to reproduce our results for question Q3, including Figure 3 and 4.
- `analysis_q4.ipynb`: Notebook to reproduce our results for question Q4, including Figure 5.
- `analysis_q5.ipynb`: Notebook to reproduce our results for question Q5, including Figure 6.
- `analysis_q6.ipynb`: Notebook to reproduce our results for question Q6.
- `Compute_RL_Actions.py`: Code for computing the mean reward per action.
- `Compute_RL_QValues.py`: Code for computing Q-values and dynamics for our MDP.
- `Compute_RL_Similarity_Weighted_All.py`: Code for computing Q-values and dynamics for our MDP when weighting all samples based on user similarity.
- `Compute_RL_Similarity_Weighted_Most_Similar.py`: Code for computing Q-values and dynamics for our MDP when increasing the frequency of samples from the most similar people.
- `Dockerfile`: To create a Docker image for a Docker container to run the analyses.
- `participant_characteristics.ipynb`: Notebook to reproduce our participant characteristics reported in the Appendix.
- `README.md/README.pdf`: This README-file.
- `Utils.py`: Some common functions needed for the Reinforcement Learning (RL)-related computations.