README.docx for Figshare repository of: ‘Brain activity of professional investors signals future stock performance’. February 2024

1. **Repository description**

This is the README.docx file for the repository for our paper entitled ‘Brain activity of professional investors signals future stock performance’.

In this study we used fMRI to record professional investors’ brain responses to complex real-world investment cases, and assessed whether these responses relate to future performance on the stock market.

This README.docx lists and explains the contents of the repository. It also explains the relationships between the different contents (e.g., the *SPPT\_Betas.ipynb* takes as input the whole-brain beta-estimate maps archived in *Nibs.zip*, and outputs the *Df\_betas\_repo.csv* table).

Additional descriptions can be found in the analysis scripts.

For further details on the study participants, the experimental task and stimuli, data processing and data analysis we kindly refer to the description in the paper. A link to the paper can found on the homepage of the repository.

1. **Contents**

In this repository we share the stimuli, data and scripts used for our paper. Below we list the files together with a brief explanation:

1. Stimuli
   1. *Stimuli.zip* – Images of the information screens of the investment cases used in the Stock Performance Prediction Task (SPPT). There are 45 investment cases, each consisting of 5 information screens, totaling 225 .jpg files.
   2. *Stock\_stimuli*.csv – A .csv table that details the origins of the investment cases. Specifically, for each investment case, the table contains the name of the company, the ticker, the sector, the start date and end date of the 1-year time period, and the label (number) of the corresponding stimuli (images of information screens, see above).
   3. *Stock\_metrics*.csv – A .csv table containing the stock metrics that are displayed on the information screens of the investment cases. This table is used for the analysis in the *SPPT\_Analysis\_repo.Rmd* script.
2. Behavioral Data
   1. *Survey\_scores.csv* – A .csv table containing participants’ responses to the survey at the end of the experiment. This table is used for the analysis in the *SPPT\_Analysis\_repo.Rmd* script.
   2. *Task\_answers.zip* – Text files containing the predictions and confidence ratings of the participants (N=36).
3. fMRI Data
   1. *Events.zip* – BIDS-formatted task events files, specifying the precise timing of events during the task, required for *NiBetaSeries* analysis.
   2. *fMRIprep\_func.zip* – BIDS-formatted functional fMRI data, preprocessed with fMRIprep. The functional data is required for *NiBetaSeries* analysis.
   3. *fMRIprep\_confounds.zip* – BIDS-formatted data frames containing confounds extracted during fMRIprep preprocessing. The confounds are required for *NiBetaSeries* analysis.
   4. *Nibs.zip* – Whole-brain beta-estimate maps computed using *NiBetaSeries*. For each participant, investment case and information screen there is a whole-brain beta map. The whole-brain beta maps are used to extract activation estimates per VOI, using the *SPPT\_Betas.ipynb* script.
   5. *Masks.zip* – Brain masks used to extract activity from VOIs of the Whole-brain beta-estimate maps, using the *SPPT\_Betas.ipynb* script.
   6. *Df\_betas\_repo.csv* – A .csv table containing beta-estimates (brain activity) per VOI, per participant, per information screen. This dataframe is the output of the *SPPT\_Betas.ipynb* script, and input of the *SPPT\_Analysis\_repo.Rmd* script.
4. Scripts
   1. *Fmriprep\_command.sh* – A shell script used to preprocess the data using a Singularity container of fMRIprep 20.2.0.
   2. *Nibs\_command.sh* – A shell script used to preprocess the data using a Singularity container of NiBetaSeries 0.6.0.
   3. *SPPT\_Betas.ipynb* – Python script for extracting activation estimates from VOIs, as reported in the manuscript.
   4. *SPPT\_Analysis\_repo.Rmd* – R script for all analyses reported in the manuscript*.*
   5. *SPPT\_Analysis\_repo.nb.html* – html copy of the R script.
5. Figures
   1. *NAcc\_plot.jpg* – Figure created with the *SPPT\_Analysis\_repo.Rmd* R script that is presented in the paper.
6. **Notes**

* The initial task name, which was used for the BIDS specification of the fMRI data, is ‘nnip’ (‘Nationale Nederlanden Investment Partners’), which refers to the affiliation of author RCD. For the paper, we changed the name of the task name to ‘SPPT’ (‘Stock Performance Prediction Task’). We opted to not change the original data and leave the initial task name in place, though in our analyses and paper we refer to the task as ‘SPPT’.
* To keep the data anonymous, we only share fMRIprep pre-processed skull-stripped and normalized functional scans.