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| 2 h each | 1. Incorporate methods for histogram time series from the package HistDAWass. 2. Incorporate methods for Bayesian analysis. |
| 1-1.5 h | 1. Show computed weights from the NN. |
| ? (1+ h) | 1. Add VECM. |
| 20 min each | 1. Produce a diagram of NN for iMLP C code and RBF(i). |
| ? (30 min) | 1. Make nnetar compute the forecasts one-step ahead, not recursively. |
| ? (15+ min) | 1. Add AIC (arima and nnet provide AIC), BIC to error measures. |
| 1+ h | 1. Add model characteristics to the exported Excel file. |
| ? | 1. Think about how to incorporate forecasts for models/methods that support explanatory variables – they need future values of explanatory variables to be able to compute the forecast (kNN (FNN), kNN (custom), knn (kknn), iMLP (C Code), nnet). |
| ? (1+ h) | 1. Improve the quality of the presented plot a little more – axes labels etc. |
| ? (30+ min each) | 1. Include other possibilities for the parameters of iMLP (distances, algorithms, functions) |
| 1+ h | 1. Add future forecasts to kNN packages: kknn, FNN. |
| 30 min-1.5 h | 1. Compare the performance (automatically) in terms of errors of MLP trained separately for Centre and Radius, and iMLP. |
| 1.5+ h | 1. Improve the zooming of the plot – give the possibility to select the range based on the **values** of x and y axes. For example, data between September 2012 and January 2013 instead of data from the 110th to the 160th item. |
| 2.5+ h | 1. Add validators for all input values and notify the user of the correct format in case of rejection. |
| ? (1+ h) | 1. Add explanatory variables for ARIMA (ARX/ARIMAX). |
| ? (1+ h) | 1. Finish the custom implementation of kNN – provide the fitted and forecasted (more than one!) values, and then compute error measures. |
| ? (5+ min) | 1. Find a benchmark for nnet vs neuralnet: speed, number of items they can handle, etc. |
| ? (1+ h) | 1. Implement innet or ineuralnet. |
| 1+ h | 1. Modify the loaded data files and create new ones. |
| 1-5+ h | 1. Revise and adapt the interface so that it looks nicer and is easier to use. |
| 1.5-3 h | 1. Add proper handling of time-consuming tasks (SwingWorker etc.). |
| ? (5+ h) | 1. Revise the code w.r.t. Java 8 (lambdas in GUI etc.) |
| ? (5 min-2 h) | 1. Fix the format of date and time displayed in the Data card after the import from Excel. |
| ? (30+ min) | 1. Show error measures just for a subset of data used in this run. |
| 20+ min | 1. Export current settings. |
| 20+ min | 1. Load saved settings. |
| ? (2+ h) | 1. Generate a comprehensive report of everything that was run: all input parameters and settings of the methods/models, all computed outputs and predictions, error measures etc. with the best-performing one highlighted. |
| ? (1+ h) | 1. Evaluate the performance (accuracy) of different R packages for MLP. |
| ? | 1. Include extensions to the proposed iMLP, e.g. allow interval weights and biases |
| ? (30+ min each) | 1. Include other R packages or other models/methods, apart from those mentioned above. |
| 20 min-1.5 h | 1. Load several data files at once. |
| ? (30+ min each) | 1. Include more R packages for MLP: neuralnet, RSNNS, AMORE, caret. |
| ? | 1. Make the decisions easier for the user by suggesting the most appropriate model for the data or suggesting the values of parameters. |
| 2+ h | 1. Add comments to the whole code – both JavaDoc and explanations. |
| ? (1+ h) | 1. Incorporate Johanssen’s cointegration test |
| 1+ h | 1. Revise the GUI so the same things look the same, are at the same place etc. |
| 1+ h | 1. Include informative messages telling the user why something “doesn’t work” or “cannot be done”. |
| 5+ min each | 1. Update the “User guide” every time new functionality is added. |
|  | 1. Tasks regarding further research: |
|  | 1. Explore the possible extensions to iMLP and related research topics: |
|  | boxplots |
|  | 1. quantile regression |
|  | * 1. Bayesian approach, Bayesian MLP |
|  | * 1. The effect of explanatory variables on the performance of the MLP. Which explanatory variables are “more important” than others? Which ones can be discarded? Compare the results with linear regression, where there are measures for determining the importance of variables. Principal component analysis for interval data. Factor analysis for interval data. |
|  | * 1. The problem of assigning weights to the explanatory variables. Heuristics, recommendations. |
|  | * 1. Structural breaks analysis. Unit root analysis. Is there a relation between the performance of a neural network and structural breaks? |
|  | * 1. Think about adding more than 1 hidden layer to iMLP – how will the complexity increase? Can the influence of the number of layers on the performance be evaluated in general? |
|  | * 1. Review existing network selection methods/criteria (AIC, BIC, …) and their suitability for iMLP. |
|  | 1. Design/implement Holt-Winters method for intervals. |
|  | 1. Design and implement iRBF. |
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|  | 1. Possible projects for students: |
|  | **The implementation of iMLP in R.\*** |
|  | 1. The reimplementation of the whole Swing GUI in R. |
|  | 1. **The implementation of iHolt in R.\*** |
|  | 1. The implementation of innet or ineuralnet in R. |
|  | 1. **\* These two have been proposed as projects for students.** |
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