README for GitHub repository accompanying the paper:

Augmenting the availability of historical GDP per capita estimates through machine learning

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The purpose of this document is twofold. First, we want to provide explanations for the final dataset and results that we publish. Second, we want to provide detailed information on the code to ensure replicability.

For all questions regarding the repository, contact Philipp Koch (philipp.koch@ecoaustria.ac.at).

Dataset & results

The final dataset (*historicalGDPs_augmented_dataset.xlsx*) contain 5,700 observations with the following columns:

- *ID*: location_year
- *location*: denotes the code for the respective country (iso-3) or region. The classification of regions follows the NUTS-2 (2021 edition) classification in Europe, metro- and micropolitan areas in the US, metropolitan areas in Canada, and oblasts in Ukraine and Russia.
- *country_0*: This column is relevant, if the location is a region. Then country_0 denotes the country the region is in.
- *location_name*: denotes the name of the respective country or region.
- *year*: in 50-year intervals
- *GDPpc*: GDP per capita levels denoted in 2011 USD.
- *flag*: denotes whether an observation is based on source data, or an out-of-sample estimate based on our machine learning models.
- *GDPpc_lower* & *GDPpc_upper*: 90% confidence interval for out-of-sample estimates obtained by bootstrapping.

The dataset contains 5,700 observations, with 1,336 observations from source data and 4,664 out-of-sample estimates. All references for source data observations are described in detail in the manuscript and the SI Appendix.

The folder *genfiles* contains all figures included in the manuscript and the SI Appendix:

- Folder *figures*: contains raw versions of the subplots of Fig. 2, Fig. 3, and Fig. 4 H
- Folder *figures_SI*: contains several figures of the robustness checks, barcharts for Shapley values from all years, and results from the elastic net model (in the folder *LASSO_results*).
- Folder *maps*: contains several maps of the GDP per capita levels for countries and regions, e.g. those in Fig. 4 A-E in the manuscript.

Replication

The folder *scripts* contains all R scripts necessary to replicate our findings and data. The file 00_master.R calls all other scripts and reproduces the results.
It is necessary to download another folder with the data on famous individuals from here.
The downloaded folder called *famous_individuals* must be saved within the folder *raw_data* for the scripts to find it.

Below you find are all details on the used packages and R versions.

```
R version 4.2.3 Patched (2023-03-29 r84137)
Platform: aarch64-apple-darwin20 (64-bit)
Running under: macOS 14.5

Matrix products: default
LAPACK: /Library/Frameworks/R.framework/Versions/4.2-arm64/Resources/lib/libRlapack.dylib

locale:
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attached base packages:
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other attached packages:
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loaded via a namespace (and not attached):
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