SNMMI AI Taskforce - FDG PET/CT Radiomics Machine Learning Challenge 2023

**Participation and submission info sheet**

1. **Contact details (obligatory)**

* Name of individual or team (optional, a pseudonym may be used): Mauro Namías
* Affiliation/Institute/Department (optional): Fundación Centro Diagnóstico Nuclear, Buenos Aires, Argentina. Research and development department.
* Phone number (optional): +54 11 7078 7870 ext 140
* E-mail address (obligatory, need to be valid and actively read email address): mnamias@fcdn.org.ar
* Do you want to be mentioned as participant in later publications? Yes
  + In case of “No” your submission will be represented as “Submission X”, X being a number
  + If yes, by
    - ~~Name of individual or team who participates~~
    - ~~Institute~~
    - ~~By Both Name/Institute as indicated above~~
    - Name and full affiliation

1. **Submission details**
   1. **Feature preprocessing and selection**
      1. **Feature normalization**
         * **~~Log transform~~**
         * **~~Min-Max~~**
         * **Yeo-Johnson: Radiomic features and PFS estimates**
         * **Other, please mention method, website, literature. In case of a home brew method, please provide a description of the method/key aspects:**  KNNImputer with 5 neighbors to remove NaNs from the training dataset. Removal of constant columns. Z normalization. Yeo-Johnson transform for features and PFS estimates. Autoencoder to reduce dimensionality to 10 features.
      2. **Feature selection**
         * **None (autoencoder)**
         * **~~MRMR~~**
         * **~~ReliefF~~**
         * **~~Univariate~~**
         * **~~Lasso~~**
         * **~~Other, please mention method, website, literature. In case of a home brew method, please provide a description of the method/key aspects~~**
      3. **Dimension reduction**
         * **~~PCA or factor analysis~~**
         * **~~Pair wise elimination based on correlations (Spearman or Pearson)~~**
         * **Other? please mention method, website, literature. In case of a home brew method, please provide a description of the method/key aspects:** Trained a simple autoencoder to reduce 502🡪 10 features, then used this embedding to train a Random Forest Regressor.
   2. **Machine learning method(s) used**
      1. **Machine learning methods**
         * **Random Forest**
         * **~~Support vector machine (please mention type of kernel etc)~~**
         * **~~Linear discriminant analysis~~**
         * **~~Logistic regression~~**
         * **~~Ridge regression~~**
         * **~~Lasso regression~~**
         * **Neural network (**Autoencoder for reduced dimensions)
         * **~~other? please mention method, website, literature. In case of a home brew method, please provide a description of the method/key aspects~~**
      2. **Data balancing (for training)**
         * **~~down-sampling majority class~~**
         * **~~up-sampling minority class~~**
         * **other, please describe method, website,literature. In case of a home brew method, please provide a description of the method/key aspects: none**
   3. **Performance evaluations**
      1. **Type of performance measures used for internal validation**
         * **squared mean error**
         * **~~correlation coefficient~~**
         * **~~other, please mention method, website, literature. In case of a home brew method, please provide a description of the method/key aspects~~**
      2. **Interval validation**
         * **k-fold cross-validation (please mention folds, repeats etc):** leave-one-out
         * **~~hold-out dataset (please indicated if this is done with or w/o stratification for cases, in case of binary classification)~~**
         * **~~none~~**
         * **~~other, please mention method, website, literature. In case of an home brew method, please provide a description of the method/key aspects~~**
   4. **Outcome measures provided for external validation/testing – please use provided excel reporting sheets!**
      1. **Outcome measures (one or both options below)**
         * **~~Probability for 1,2 and 3 years’survival~~**
         * **Continuous survival in months (use decimals)**
   5. **Code or tool availability (by the participants, i.e. the challenge team will not post code or tools)**
      1. **Availability of tools**
         * **~~Tools/code will NOT be made available~~**
         * **~~Tools/code will be made available for the SNMMI AI Challenge team only, without permission to share it to others~~**
         * **Tools/code are posted on a public repository (github, zenodo etc) by the participants themselves – if so, please mention URL:** <https://github.com/mnamias/SNMMI_Radiomics_Challenge_AE_RF_V2>