Conformal prediction enables disease course prediction and allows individualized diagnostic uncertainty in multiple sclerosis - Web-MSPredict manual

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* For research purposes only

Github:
https://github.com/caramba-uu/smsreg_pred.git

Citation:
Will be updated

Contents

1 Basic information
2 Direct predict
    2.1 For clinical visits
    2.2 For relapse
3 From file
    3.1 visit.csv
    3.2 relapse.csv
4 Predict
    4.1 Disease trajectory plot
    4.2 Disease course plot 1
    4.3 Disease course plot 2
5 Feature importance
    5.1 Barplot
    5.2 Beeswarm plot
    5.3 Force plot

1 Basic information

Parameter	Description
Birth year (YYYY)	The year of birth of the individual is in the format YYYY. e.g.,1983
Disease onset date (MM/YYYY)	Disease onset date (debut date) in the format MM/YYYY. If the onset date is unknown, input the diagnosis date. e.g.,06/1998
Date of first relapse (MM/YYYY)	The date of the first relapse occurred in the format MM/YYYY. e.g.,05/2001

2 Direct predict

2.1 For clinical visits

Parameter	Description
Number of visits	Number of follow-up visits. e.g., set n=6 if there are 6 follow-up visits
Visit date (MM/YYYY)	Follow-up visit date in the format MM/YYYY. e.g., 07/2003
EDSS Value (Number between 0 and 10)	Expanded Disability Status Scale (EDSS) score between 0 to 10. e.g., 6.5

2.2 For relapse

Parameter	Description
Relapse date (MM/YYYY)	The date at which the relapse occurred is in the format MM/YYYY. e.g., 03/2002
Mono/multifocal relapse (0-mono-focal, 1-multifocal, -1-data not available)	Type of relapse. Takes input 0,1, or -1.
Steroid treatment (0-steroid untreated, 1-steroid treated, -1-data not available)	If the individual has received steroid treatment. Takes input 0,1, or -1.
Did the symptoms completely resolve? (0-No, 1-Yes, -1-data not available)	If there is complete remission from the relapse at the time of the visit. Takes input 0,1, or -1.
Optic neuritis? (mono on) (0-No, 1-Yes, -1-data not available)	If the relapse involved optic neuritis. Takes input 0,1, or -1.
Other sensory symptoms? (afferent non on) (0-No, 1-Yes, -1-data not available)	If the relapse involved sensory symptoms other than optic neuritis. Takes input 0,1, or -1.

3 From file

3.1 visit.csv

Parameter	Description
visit_date	Follow-up visit date in the format MM/YYYY. e.g., 07/2003
edss_score	Expanded Disability Status Scale (EDSS) score between 0 to 10. e.g., 6.5

3.2 relapse.csv

Parameter	Description
relapse_date	The date at which the relapse occurred is in the format MM/YYYY. e.g., 03/2002
mono-focal	Type of relapse. Takes input 0-monofocal, 1-multifocal, or -1-data not available.
steroid_treatment	If the individual has received steroid treatment. Takes input 0-steroid untreated, 1-steroid treated, -1-data not available.
is_last_relapse_completely_remitted	Did the symptoms completely resolve? If there is complete remission from the relapse at the time of the visit. Takes input 0-No, 1-Yes, -1-data not available.
mono_on	Optic neuritis? If the relapse affects optic neuritis. Takes input 0-No, 1-Yes, or -1-data not available.
afferent_non_on	Other sensory symptoms? If the relapse affects other than optic neuritis. Takes input 0-No, 1-Yes, or -1-data not available.

4 Predict

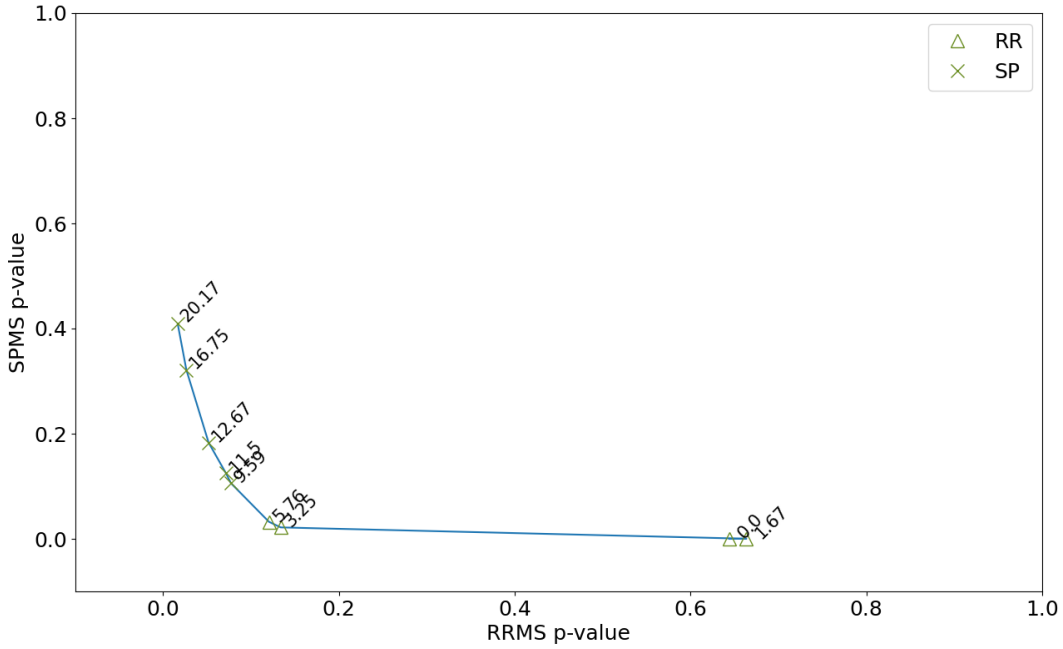
Predictions using either direct input or from files. Produces plots using the predictions from the model.

Plot legend

The model can gives four outputs based on the confidence level given.

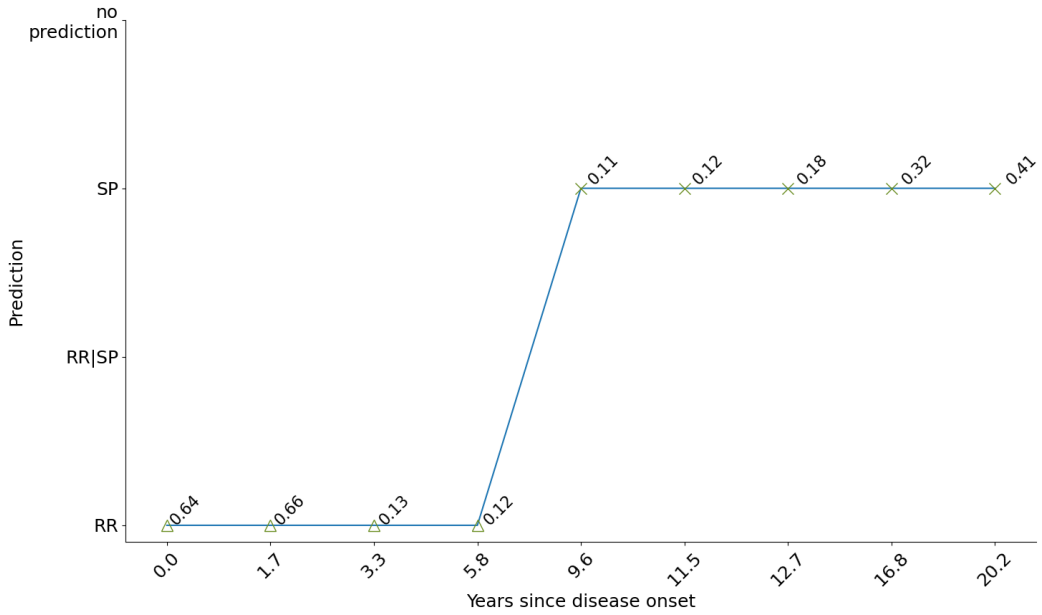
△	'RRMS'	- Visits having RRMS
X	'SPMS'	- Visits having SPMS
■	'RRMS|SPMS'	- Visits that are both RRMS|SPMS
I	'{}'	- Visits having no prediction

4.1 Disease trajectory plot



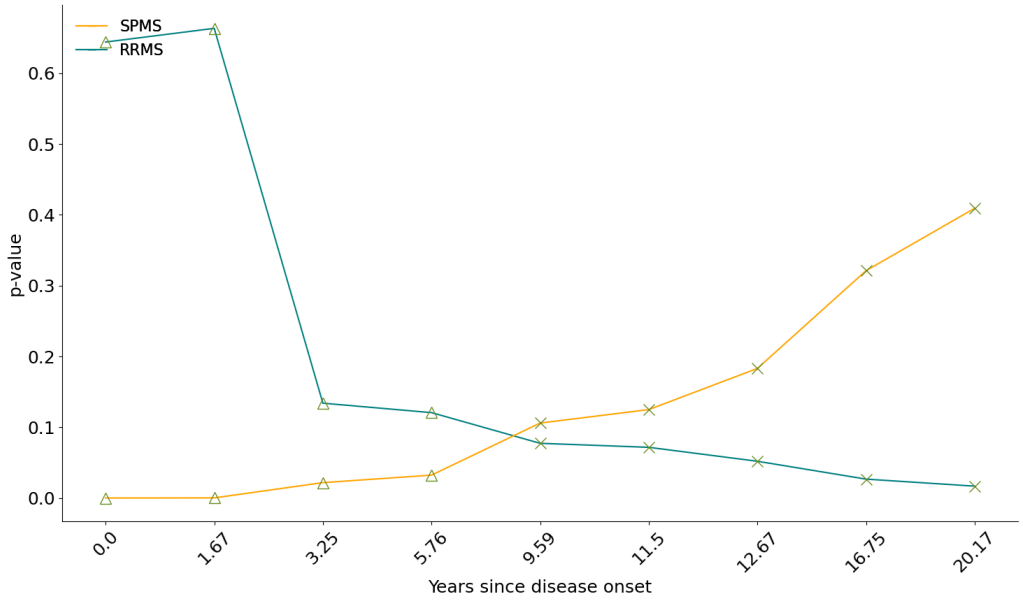
Represents the direction in which the disease is headed. As the disability accumulates, the trajectory moves from left to right, i.e., by decreasing of high RRMS p-value to increasing of SPMS p-value

4.2 Disease course plot 1



Displays the clinical visits plotted over the years, where the corresponding values for the visits show the p-values of RRMS and SPMS.

4.3 Disease course plot 2

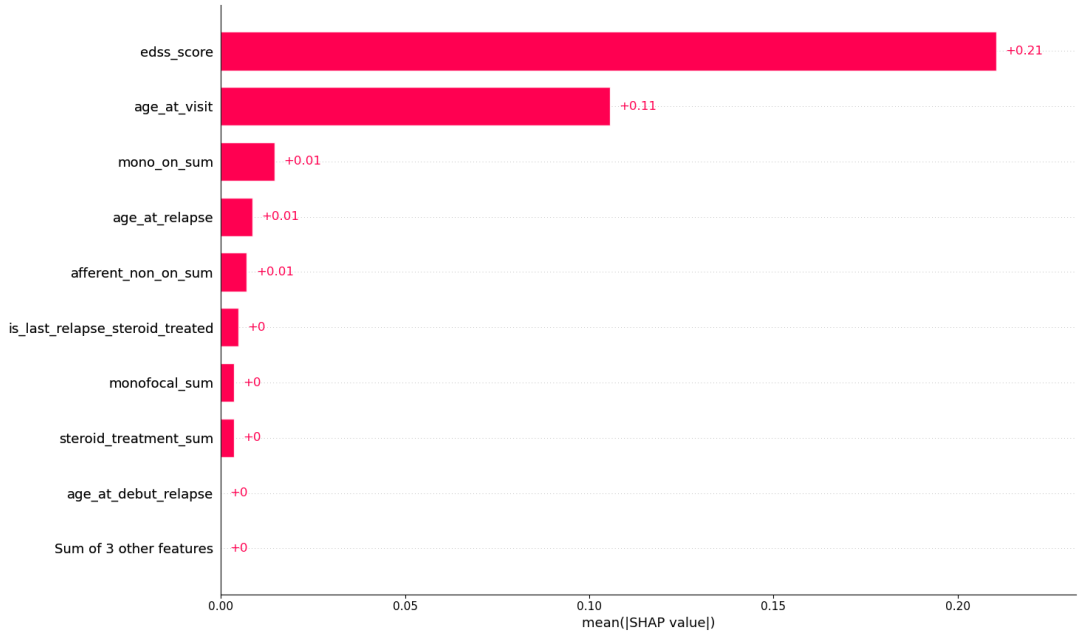


Displays the p-values of RRMS and SPMS plotted over the course of clinical visits in years.

5 Feature importance

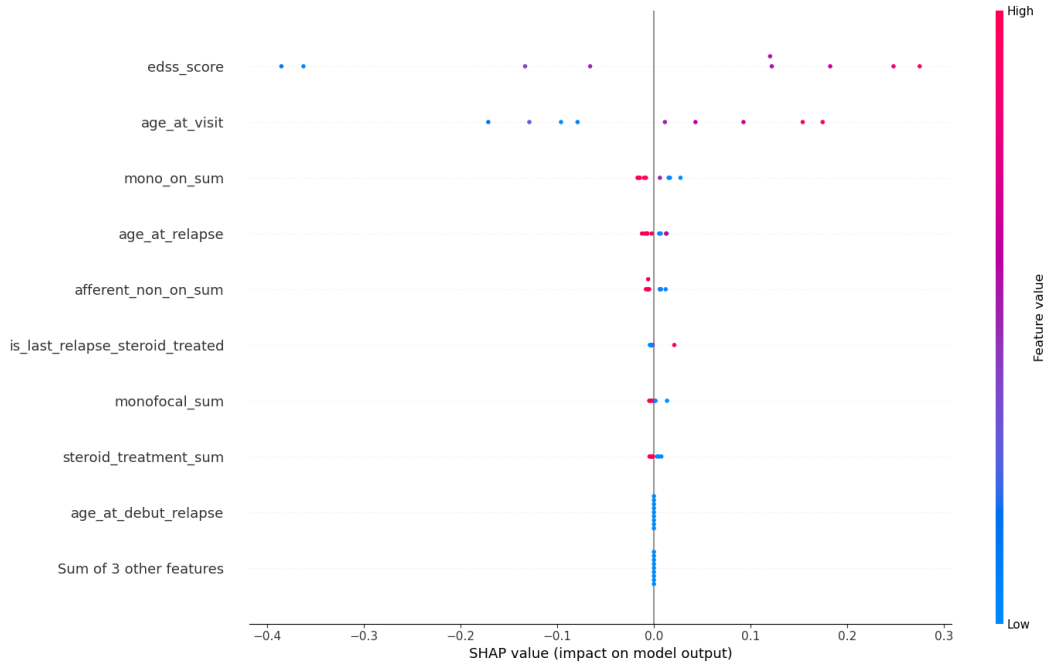
Calculates feature global and individual feature importance using SHAP.

5.1 Barplot



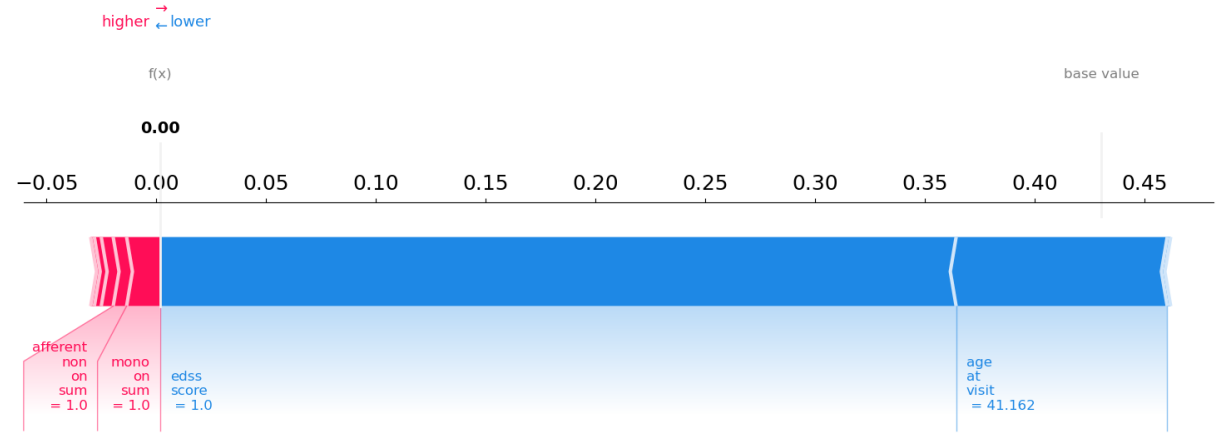
Displays the relative feature importance for the predictions.

5.2 Beeswarm plot



Displays the global feature importance for the predictions.

5.3 Force plot



Displays feature importance for the prediction of individual clinical visits.