

Web Application User's Manual

(Version 1.0)

Web Application Documentation (last updated: July 18, 2025)

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Please follow the user manual for using our web application. If you find our web application useful, please cite the following papers.

1. Akhter, S. and Miller, J.H., 2025. Identifying Key Predictive Features for Opioid Use Disorder Using Machine Learning. medRxiv, pp.2025-07.

Our application will automatically generate the required features of the testing data. Users can test multiple data simultaneously and augment new data to the training data to boost the predictive ability of the machine learning models through the web application. The flowchart of our web application is given below.

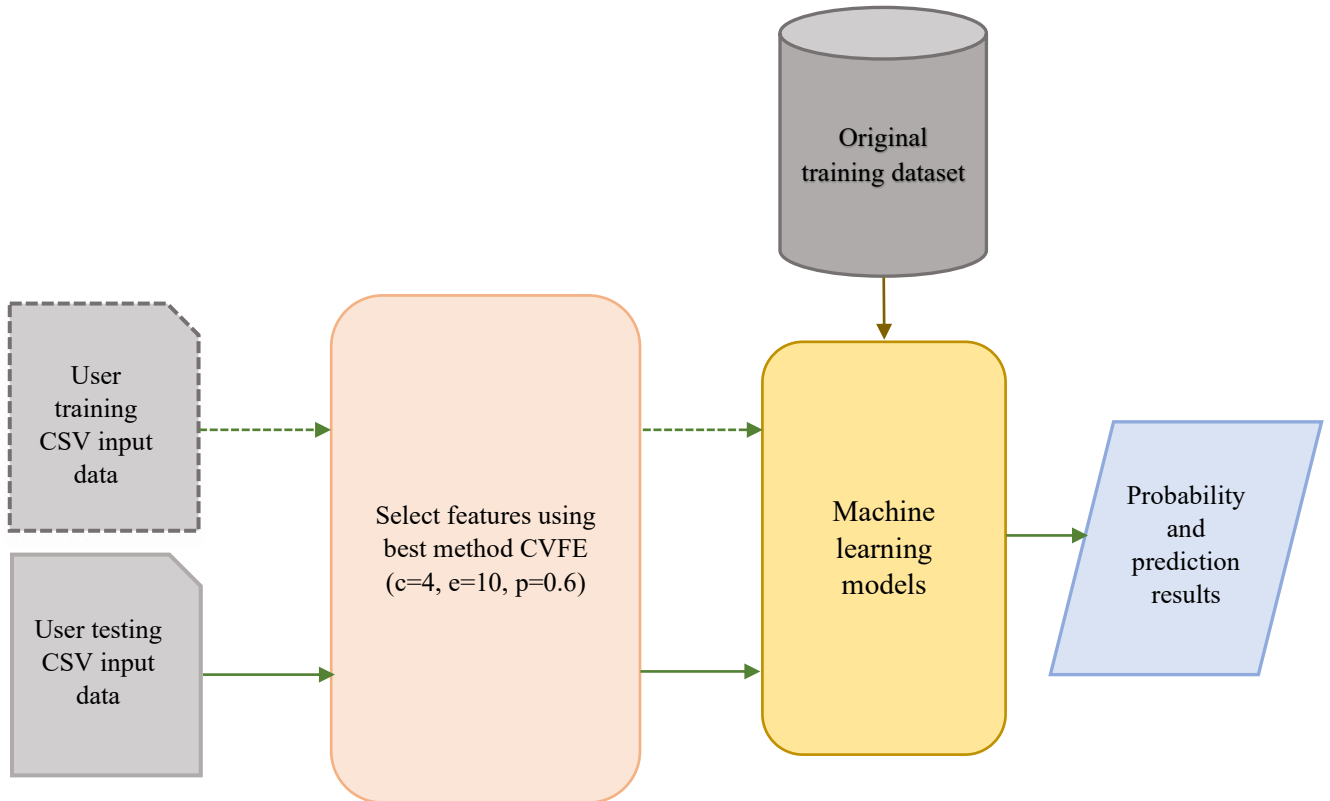


Fig 1: Workflow.

Home Page:

Fig 2. shows the home page of our web application.

OUDP: A Web Application for Opioid Use Disorder Prediction

Welcome Predicted OUD Probability Scores Help Data

Upload Files

This web application predicts opioid use disorder from an input CSV file. The CSV file must include the following columns: QUESTID2, EDUD5PNRMIS, SUTRTPY, MEDICARE, ASTHMAEVR, PYUD5HER, SMIPY, PYUD5ALC, CATAG6, DIABETEVR, AMDEYR MHTRTPY, MRJYR, SUICHTNK, IRWRKSTAT, PYUD5COC, PRVHLTN, IREDUHGHST2, TOBYR, NEWRACE2, PYUD5MRJ, ALCYR, INCOME IRMARIT, NOBOOKY2, COUTYP4, IRHHSIZ2, HRTCONDYR, IRSEX, BOOKED, and UD5OPIANY. If any of these columns are missing, the application will return an error. A sample input file is provided below. The user manual can be found under the Help menu.

To predict OUD, please upload a CSV file using the data fields listed above. If you wish to add new data to the model (training set), please use the 'Add new opioid use disorder data to training (CSV)' upload box for opioid use disorder and the 'Add new non-opioid use disorder data to training (CSV)' upload box for non-opioid use disorder, respectively.

After uploading the necessary file, click the 'OUD prediction' button. Once the classification results are generated, you will be automatically redirected to the 'Predicted OUD' page. Then, click the 'Probability estimation' button to view the probability scores on the 'Probability Score's page.

Download Results

The prediction and probability results can be downloaded by clicking the 'Prediction results' and 'Probability results' buttons, respectively. Additionally, the training/testing datasets are available in the 'Data' menu.

CSV Formatting

An example CSV file can be obtained by clicking on the 'Download Input Samples' button. To predict new data, the example CSV file should be in the form shown below:

Download Input Samples

If you find our web application useful, please cite the following paper.
Akhter, S. and Miller, J.H., 2025. Identifying Key Predictive Features for Opioid Use Disorder Using Machine Learning, medRxiv, pp.2025-07.

Fig 2. home page

Opioid Disorder Prediction

To identify opioid and non-opioid disorder prediction, users need to follow the steps below:

1. First, users can upload the input test data file (CSV file) by clicking on the “Browse” button under “Choose an input CSV file.” For example, in Fig. 3, the "input_sample.fasta" file is uploaded. During the upload of the input CSV file, all action buttons (OUD prediction, Probability estimation, Prediction results, and Probability results) are inactive. After completing the upload of data, they will become active and ready to use.

OUDP: A Web Application for Opioid Use Disorder Prediction

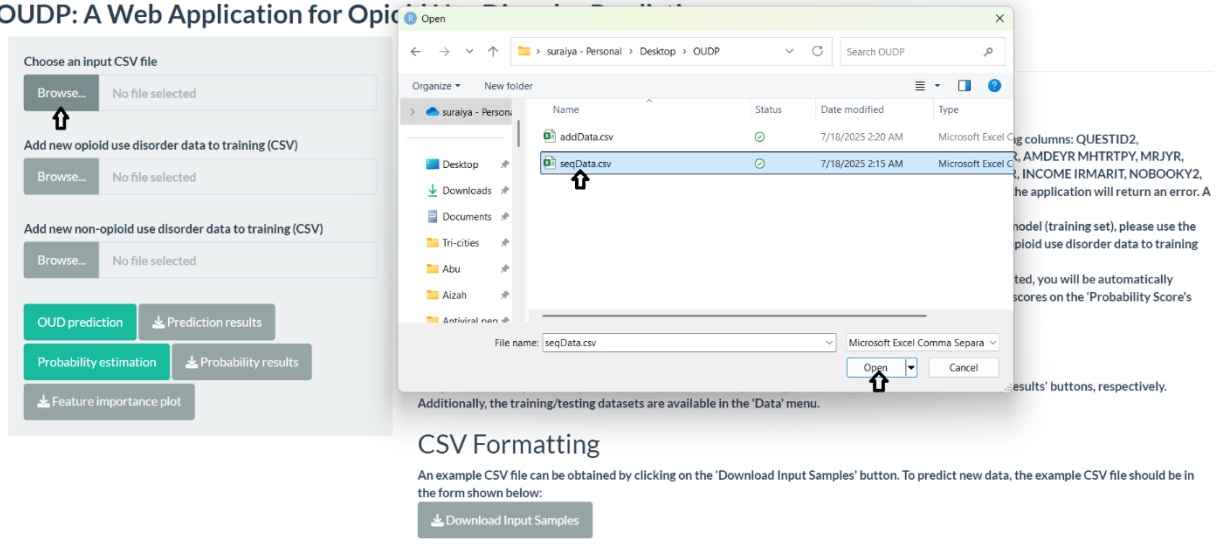


Fig 3: File upload

- Once the necessary files are uploaded, please click the ' OUD prediction ' button first. This will automatically navigate you to the 'Predicted OUD' page once the classification results are generated. Refer to the example in Fig. 4 below.

OUDP: A Web Application for Opioid Use Disorder Prediction

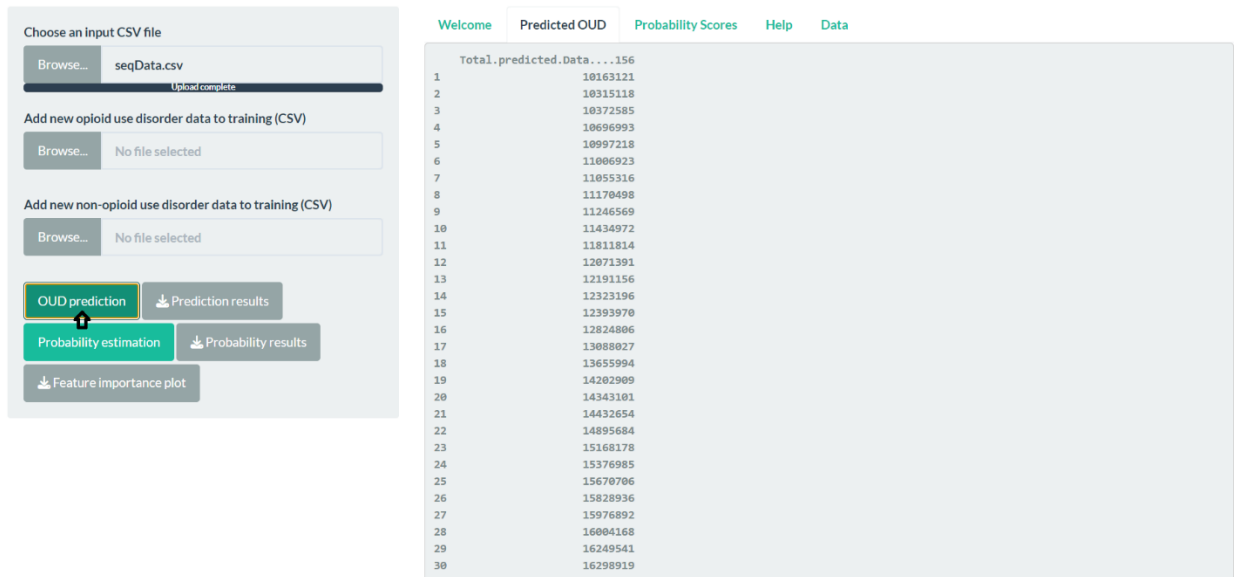


Fig 4: OUD prediction

- Next, click the Probability estimation button to navigate to the 'Probability Scores' page containing the probability values of the data. Refer to the example in Fig. 5 below.

OUDD: A Web Application for Identifying Key Predictive Features for Opioid Use Disorder



Fig 5: Probability estimation

4. SHAP Analysis:

Our web application generates box plot based on the best method (bin=10 and $\beta = 25$). See the following plot for the best model .

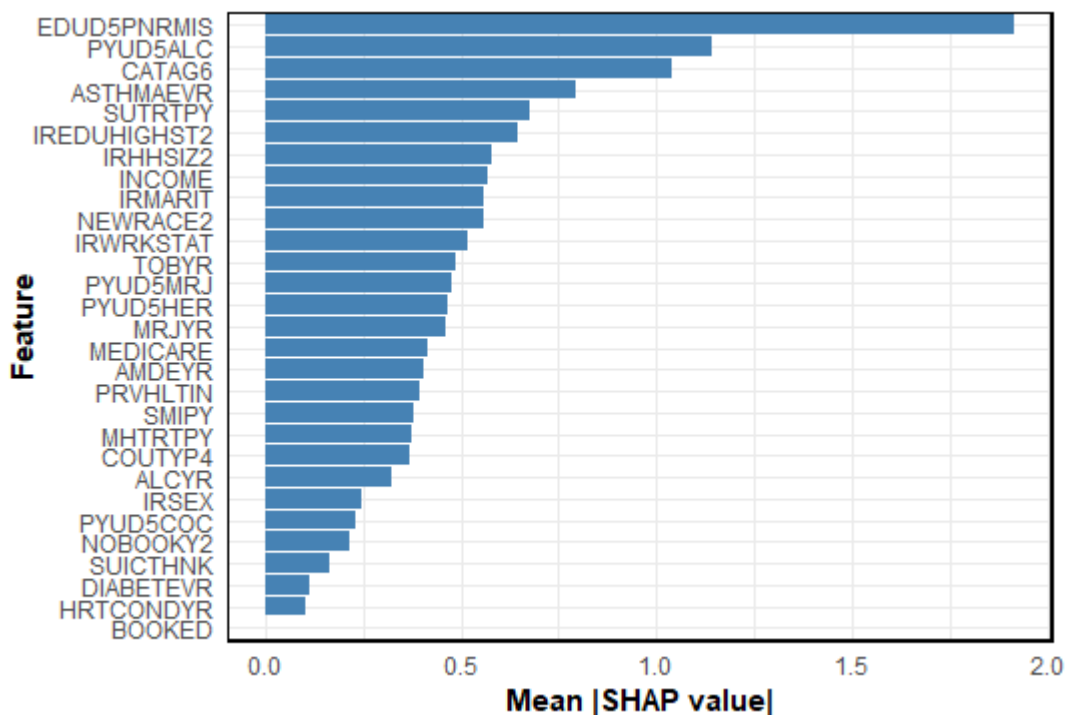


Fig 6: Features importance plot