

后循环大血管闭塞患者机械取栓术后预后预测系统

# 操作手册

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## 1 系统介绍

卒中发病率逐年增加，全球每年约有 3300 万人发生卒中，其中缺血性卒中约占所有卒中类型的 70-80%。急性后循环大血管闭塞是一种罕见但灾难性的疾病，占有卒中类型的 1%，近 80%患者在发病后将面临死亡或遗留有严重残疾。

后循环大血管闭塞患者机械取栓术后预后预测系统基于先进的机器学习集成算法，通过分析患者人口统计学、实验室和影像学指标，自动生成症状发生后 24 小时内接受机械取栓的后循环闭塞患者术后三个月功能预后的个体化预测，以便于指导临床决策，且有助于向患者及其家属提供预后信息。后循环大血管闭塞患者机械取栓术后预后预测系统是网页端小程序，此程序操作简便，高效迅捷，便于用户随时随地处理数据信息，生成预后预测。

## 2 功能介绍

### 2.1 用户登陆

选择左侧选择栏中的“Register”键，输入新的用户名和密码即可注册新账号，如下图所示：

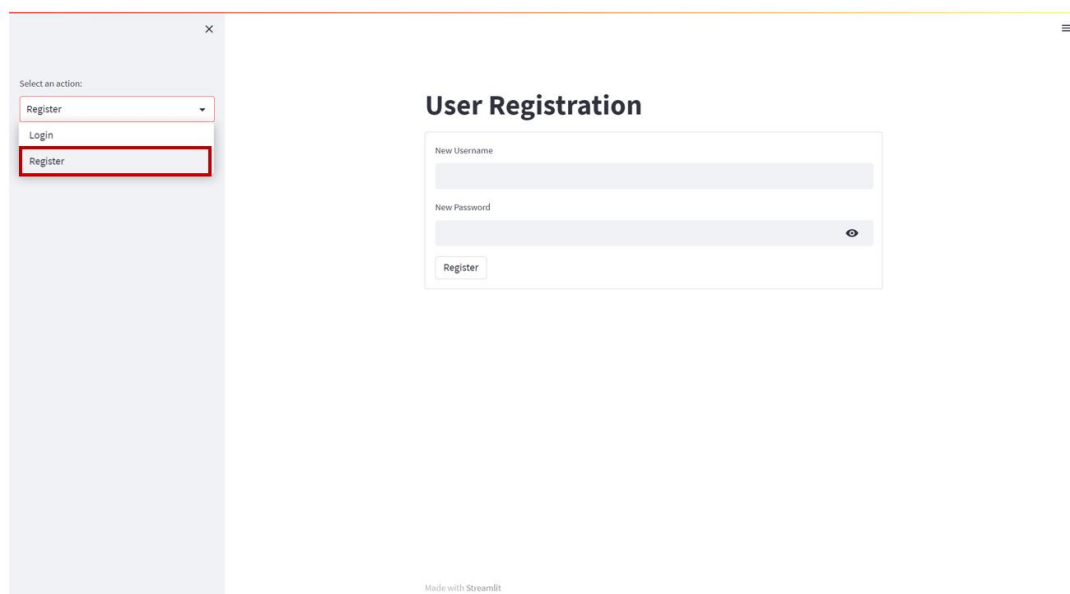


图 1

如果已经注册了账号，请选择“Login”键进入登陆页面，输入用户名和密码即可成功登陆，如下图所示：

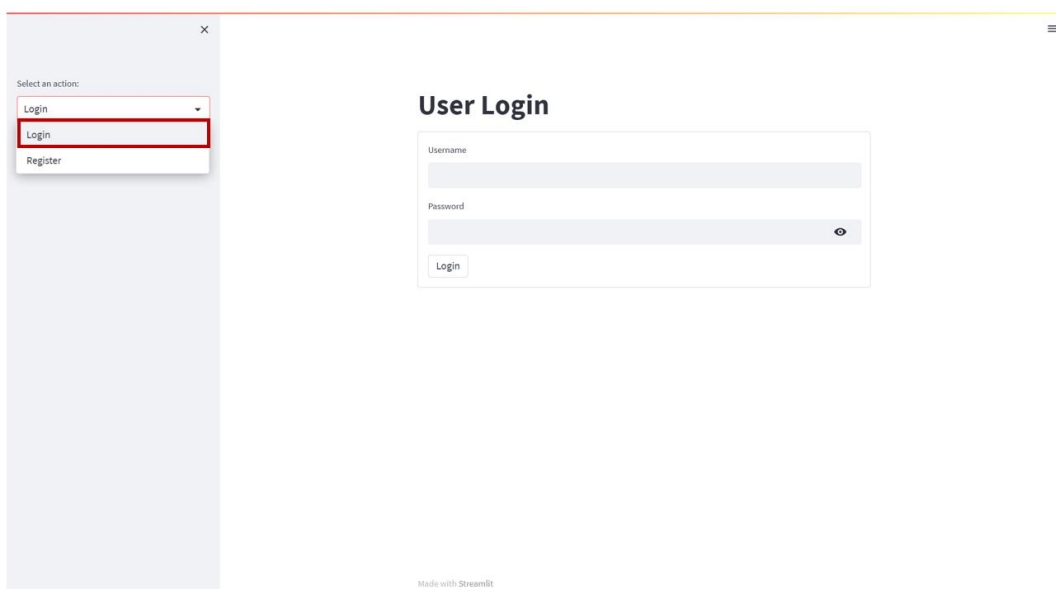


图 2

## 2.2 主页界面

用户登陆后，即可进入主页界面，本界面提供了对系统的简要介绍、系统特征、用法和联系方式。用户可通过点击“User Manual”按钮下载本系统的使用说明书，通过点击“Useful link”下面的链接即可跳转至相关的网页。

×

Select a Page

Home Page

## Welcome to Functional outcome prediction App for patients with posterior circulation large vessel occlusion after mechanical thrombectomy

### Summary

This application aims to predict functional outcome in patients with posterior circulation large vessel occlusion following mechanical thrombectomy, thus facilitates informed clinical judgment, supports personalized treatment and follow-up plans, and establishes realistic treatment expectations.

### Main Features

- ✔ Implementation of preoperative, intraoperative, and postoperative prediction models to dynamically update predictions of functional outcomes.
- ✔ Support for batch predictions of functional outcomes for multiple patients.
- ✔ Ability to predict outcomes for patients with missing variable values.
- ✔ Facilitation of the interpretation of how the model provides personalized predictions for specific cases.
- ✔ Consideration of changing environments with automatic deployment of updated prediction models.

### How to Use

To the left, is a dropdown main menu for navigating to each page in the present App:

- Home Page: We are here!
- Prediction: Overview of the prediction section.
- Preoperative\_number: Manage preoperative predictions by inputting the necessary data.
- Preoperative\_batch: Process preoperative batch predictions by uploading a file.
- Perioperative\_number: Manage perioperative predictions by inputting the necessary data.
- Perioperative\_batch: Process perioperative batch predictions by uploading a file.
- Postoperative\_number: Manage postoperative predictions by inputting the necessary data.
- Postoperative\_batch: Process postoperative batch predictions by uploading a file.

Click here to download the manual for more detailed usage instructions:

User Manual.pdf

### Contact Us


If you have any questions, please contact the support team:

- Email: [2894683001@qq.com](mailto:2894683001@qq.com)

### Useful Links

An app designed to predict functional outcomes for patients with anterior circulation large vessel occlusion following mechanical thrombectomy:

- [Visit our partner site](#)



Made with Streamlit

图 3

## 2.3 选择数据输入方式

用户可通过左侧选择框，点击“Prediction”界进入预测界面。此预测系统为用户提供术前、术中、术后三种预测模型以实时预测后循环大血管闭塞患者接受取栓术后的预后，每种预测模型允许两种不同的数据输入方式，用户可依据喜好选择数据输入形式，如“Preoperative\_number”提供单个输入，“Preoperative\_batch”允许批量输入，依次类推。如下图所示：

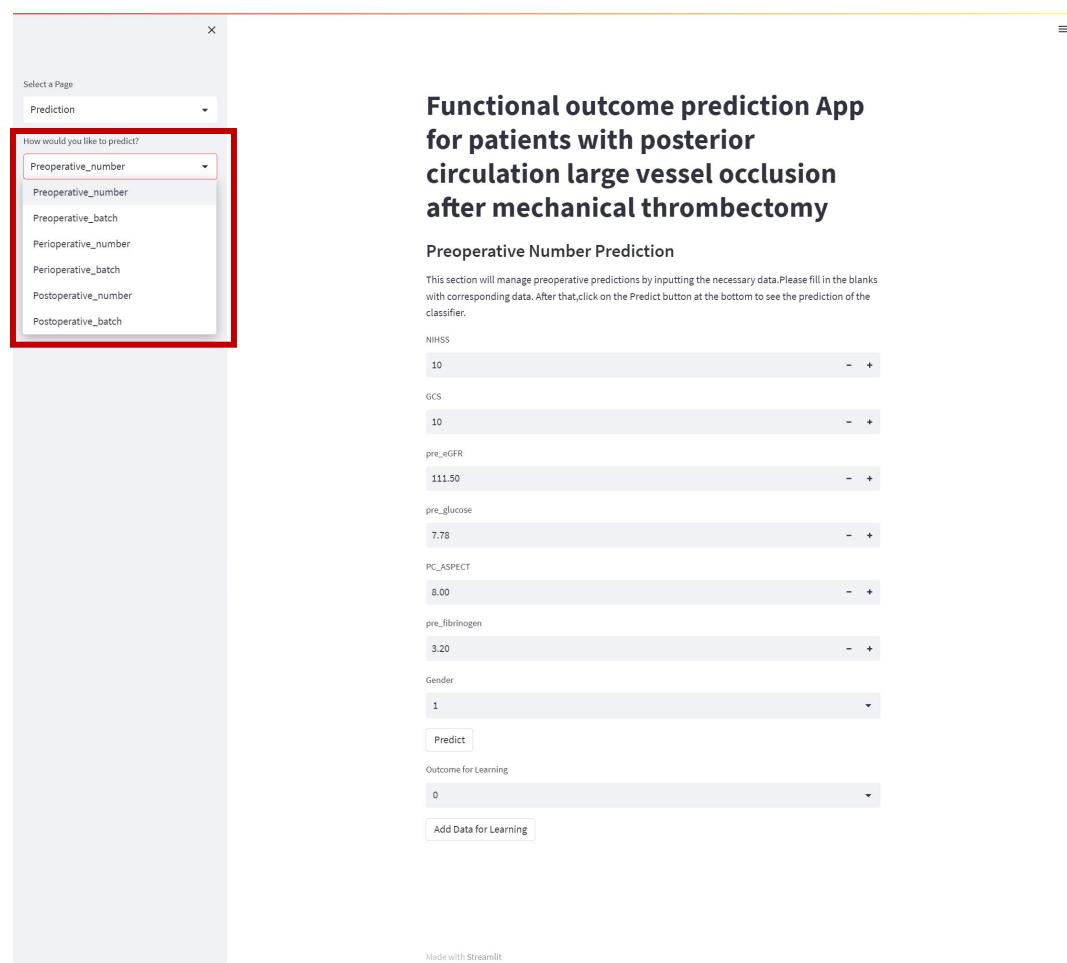


图 4

## 2.4 手动填入数据预测

### 2.4.1 输入数值

点击左侧选择栏中的“Number”键，即进入手动填入单个数据的预测界面。

用户可在变量栏内输入相应的数据，然后按下“Predict”键，即可显示患者术后预后良好的预测概率、相应的 SHAP 力图和各变量对应的 SHAP 值。其中 SHAP 值为正代表该特征对模型的预测结果产生了积极的影响，倾向于使预测输出增加；当某个特征的 SHAP 值为负时，代表该特征对模型的预测结果产生了消极的影响，倾向于使预测输出减少，以术前预测模型为例，如下图所示：

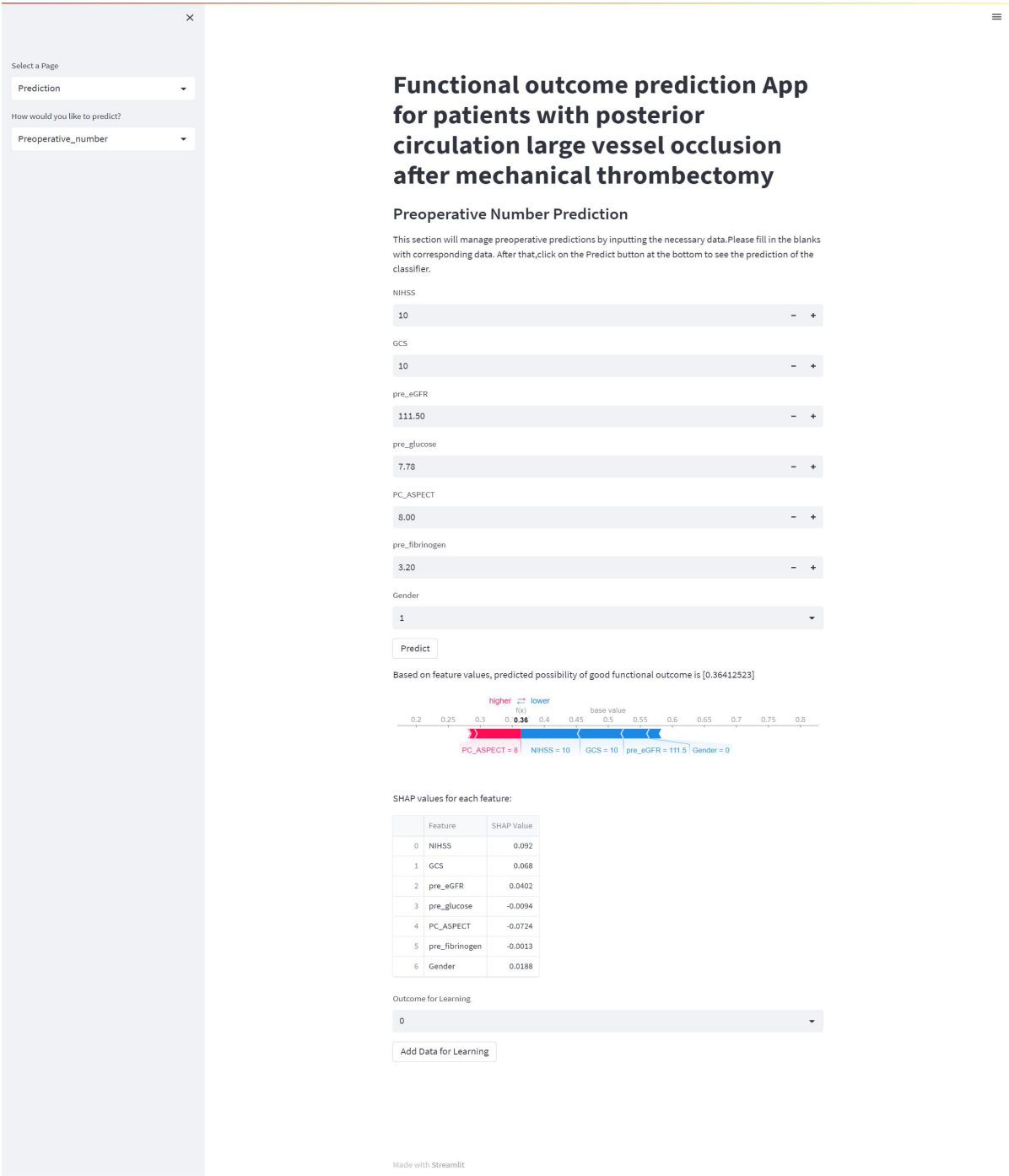
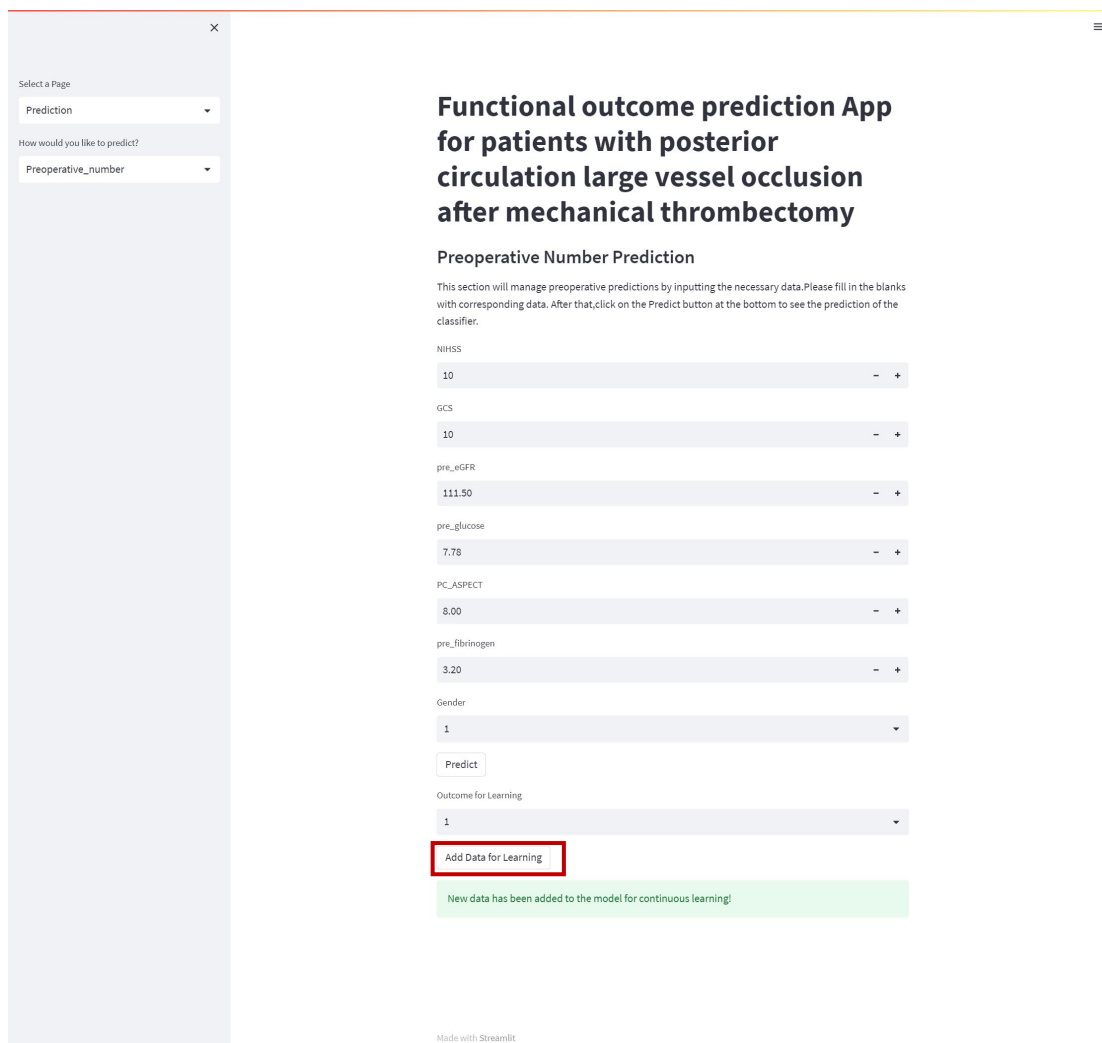


图 5

## 2.4.2 模型更新

该系统允许用户将患者随访的实际预后反馈到系统以实时评估模型性能并更新。用户可点击下方选择栏中的“Outcome for Learning”键反馈患者的实际预后，当实际预后良好时输入“1”，当实际预后不良时则输入“0”。当用户点击“Add Data for Learning”时，该系统将根据用户提供的数据自动更新模型。



The screenshot displays a web application interface for predicting outcomes for patients with posterior circulation large vessel occlusion after mechanical thrombectomy. The interface is divided into a sidebar on the left and a main content area on the right.

**Sidebar:**

- Top: A close button (X).
- Section: "Select a Page".
- Dropdown: "Prediction".
- Section: "How would you like to predict?".
- Dropdown: "Preoperative\_number".

**Main Content Area:**

- Title:** Functional outcome prediction App for patients with posterior circulation large vessel occlusion after mechanical thrombectomy.
- Section:** Preoperative Number Prediction.
- Description:** This section will manage preoperative predictions by inputting the necessary data. Please fill in the blanks with corresponding data. After that, click on the Predict button at the bottom to see the prediction of the classifier.
- Input Fields:**
  - NIHSS: 10
  - GCS: 10
  - pre\_eGFR: 111.50
  - pre\_glucose: 7.78
  - PC\_ASPECT: 8.00
  - pre\_fibrinogen: 3.20
  - Gender: 1
- Buttons:** A "Predict" button.
- Outcome for Learning:** A dropdown menu showing "1".
- Action:** A red-bordered button labeled "Add Data for Learning".
- Feedback:** A green message box stating "New data has been added to the model for continuous learning!".
- Footer:** Made with Streamlit.

图 6

## 2.5 表格上传数据预测

### 2.5.1 下载表格



用户点击左侧选择栏中的“Batch” 键，即进入表格上传数据的预测界面。点击图片下方链接，即可下载 csv 格式的表格，以术后模型为例，如下图所示：

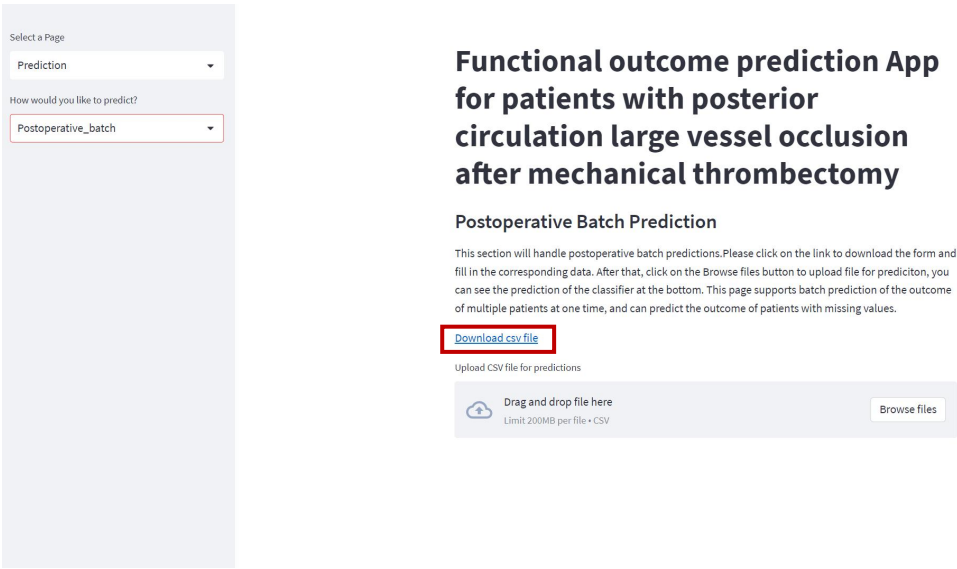


图 7

在下载好的 csv 表格内依次填入所需指标的相应数值。此预测系统可对存在缺失值的患者进行预后预测，如有缺失数据，则该相应项略过不填。且此系统支持批量预测多名患者的功能预后，可在表格内依次输入各个患者相应数据。所有数据输入完毕后，点击保存表格，注意需保存为 csv 格式。如下图所示：

	A	B	C	D	E	F	G
1	pre_glucose	PC_ASPECT	post_eGFR	post_NIHSS	GCS	Duration	
2	6.1	10	90	10	13	60	
3	5.9	7		15	10	78	
4							
5							
6							
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25							

图 8

### 2.5.2 上传表格

返回预测系统界面，点击“Browse files”键，上传表格，或者将 csv 表格拖动至图片下方，即可导入数据。

Select a Page

Prediction

How would you like to predict?

Postoperative\_batch

## Functional outcome prediction App for patients with posterior circulation large vessel occlusion after mechanical thrombectomy

### Postoperative Batch Prediction

This section will handle postoperative batch predictions. Please click on the link to download the form and fill in the corresponding data. After that, click on the Browse files button to upload file for prediction, you can see the prediction of the classifier at the bottom. This page supports batch prediction of the outcome of multiple patients at one time, and can predict the outcome of patients with missing values.

[Download csv file](#)

Upload CSV file for predictions

Drag and drop file here  
Limit 200MB per file • CSV

Browse files

图 9

### 2.5.3 输出结果

数据导入后，即可自动显示预后预测结果。输出的表格中左列为患者序号，右列“Predictions”项为预测的患者预后良好的概率，点击“Download predictions with results”即可下载保存有结果的 csv 表格。如下图所示：

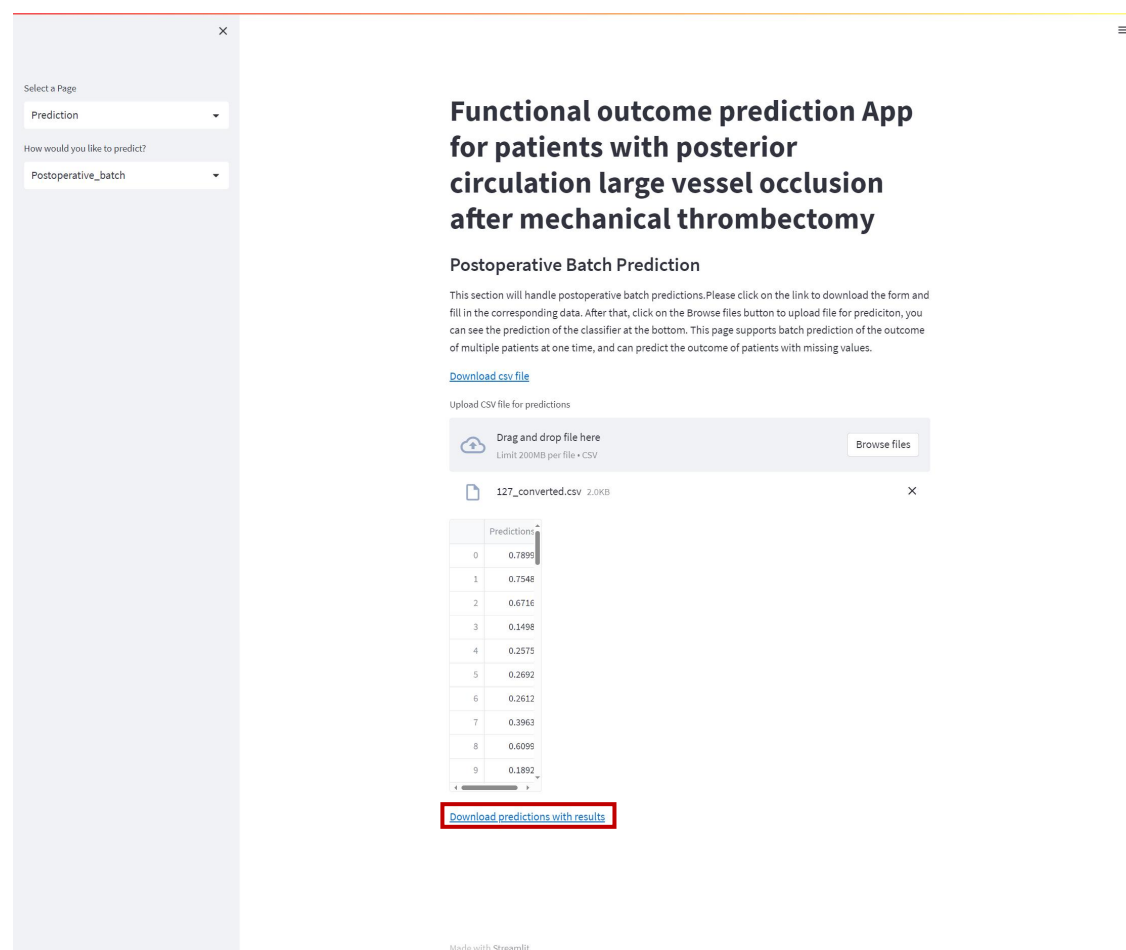


图 10

### 2.5.4 模型更新

此预测系统允许对模型进行评估并自动更新模型，用户可以在上述下载的 csv 表格特征列右侧加入 MRSI 列，并输入患者实际的预后，当实际预后良好时输入“1”，当实际预后不良时则输入“0”，再根据上述方式将 csv 表格导入至系统中。当用户输入超过 10 个样本量时，系统将自动根据此批数据评估模型的准确性、召回率、精确性、F1 值、AUC、Brier 值等性能，并自动绘制相应的 ROC 曲线和校正图，如下图所示：

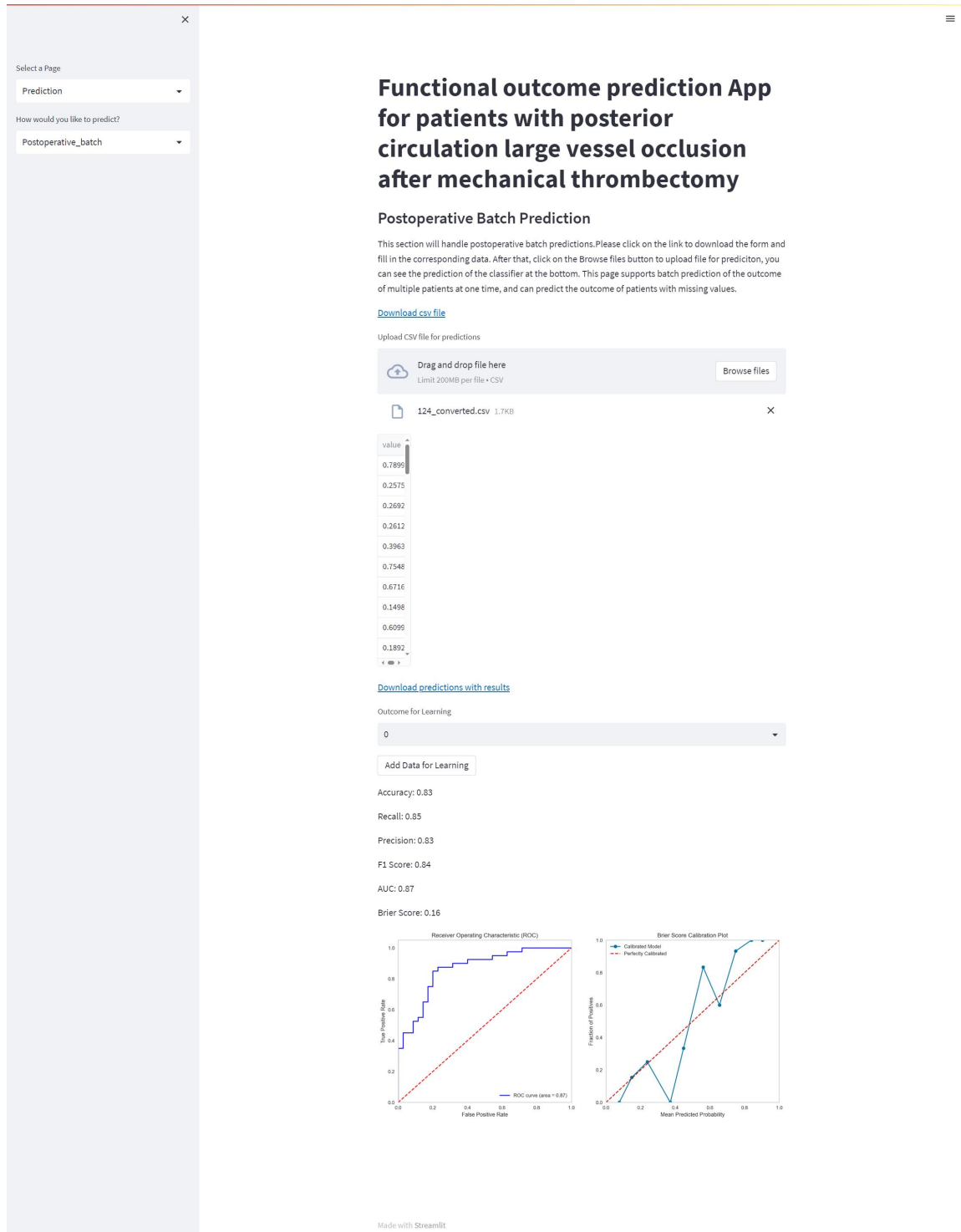


图 11

当用户选择“Outcome for learning”为 1，并点击“Add Data for Learning”时，该系统将根据用户提供的数据自动更新模型。如下图所示：

Prediction

Postoperative\_batch

### Postoperative Batch Prediction

[Download csv file](#)

Browse files

x

[Download predictions with results](#)

Add Data for Learning

Recall: 0.85

Precision: 0.83

F1 Score: 0.84

AUC: 0.87

Brier Score: 0.16

Made with Streamlit

图 12