

CannabisAI: A Clinical Decision Support System for Cannabis Prescriptions

By:

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Problem

- Lack of Randomised Controlled Trials
- Lack of Graphical User Interface
- 110 Widely-Prescribed Products
- Too Recent to have Tests for Edge Case Patients

Dr Simon
Erridge
(Curaleaf)



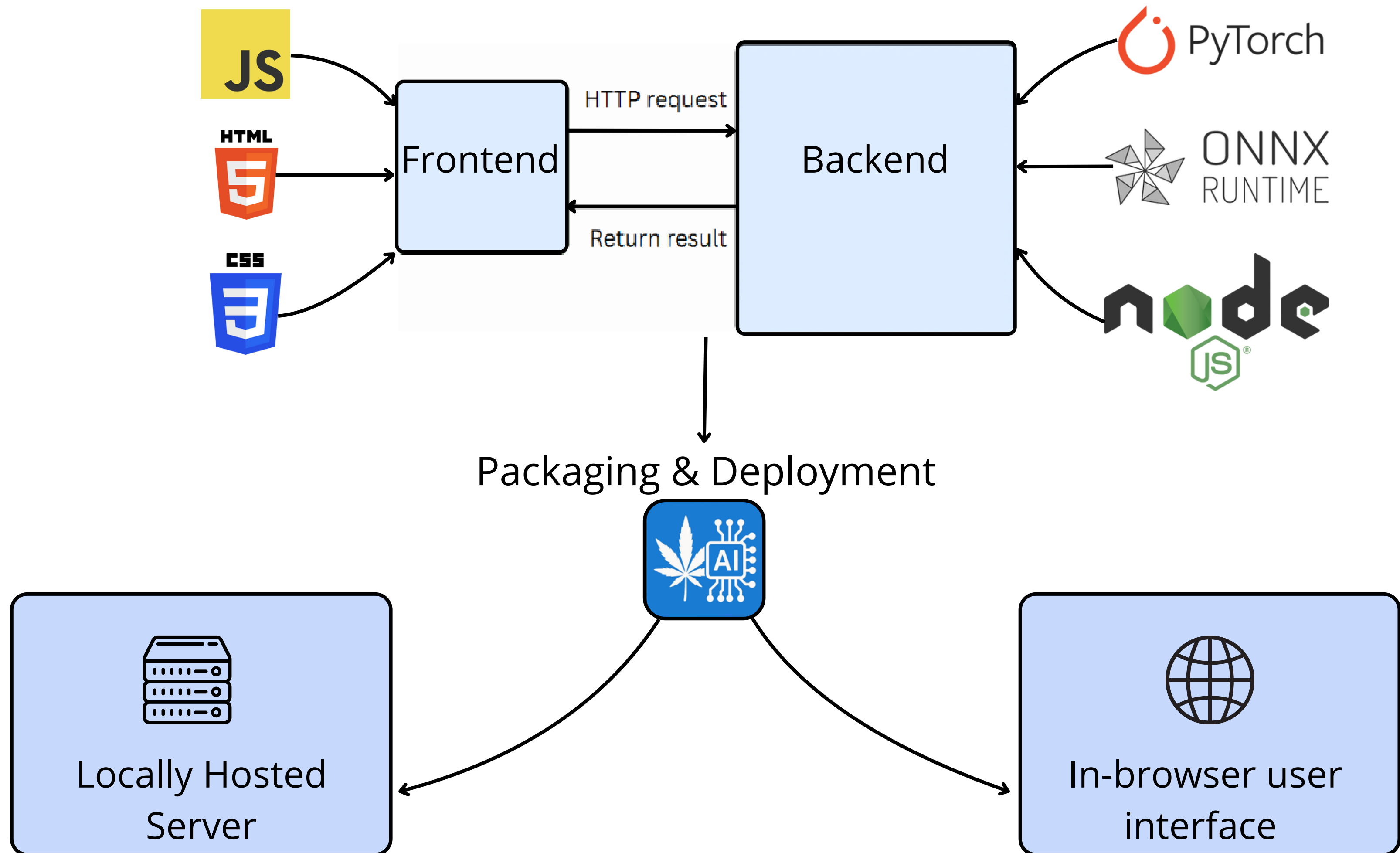
Dr Mikael
Sodergren
(CuraLeaf)



Pedro
Mediano
(Supervisor)

Requirements

- 1 Input Patient Data
- 2 Predict a Patient's Future Health
- 3 Recommend the Most Beneficial Products for a Patient
- 4 Intuitive User Interface
- 5 Lightweight In-Browser Front-End
- 6 Security: Not Sending Patient Data over Web



Demo



Taise Sosina
The Russian Doctor

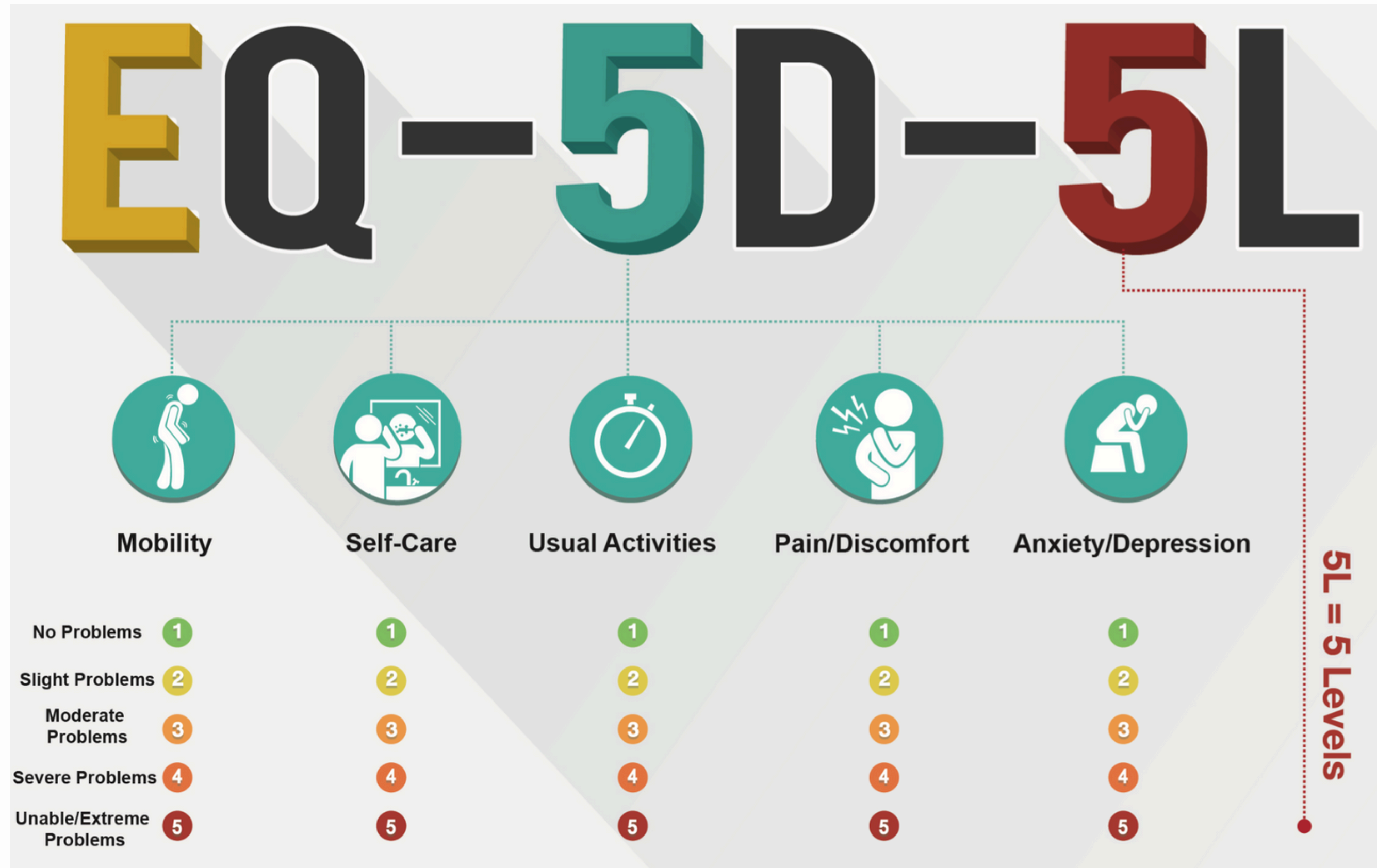


Amit Dhavle
New Patient

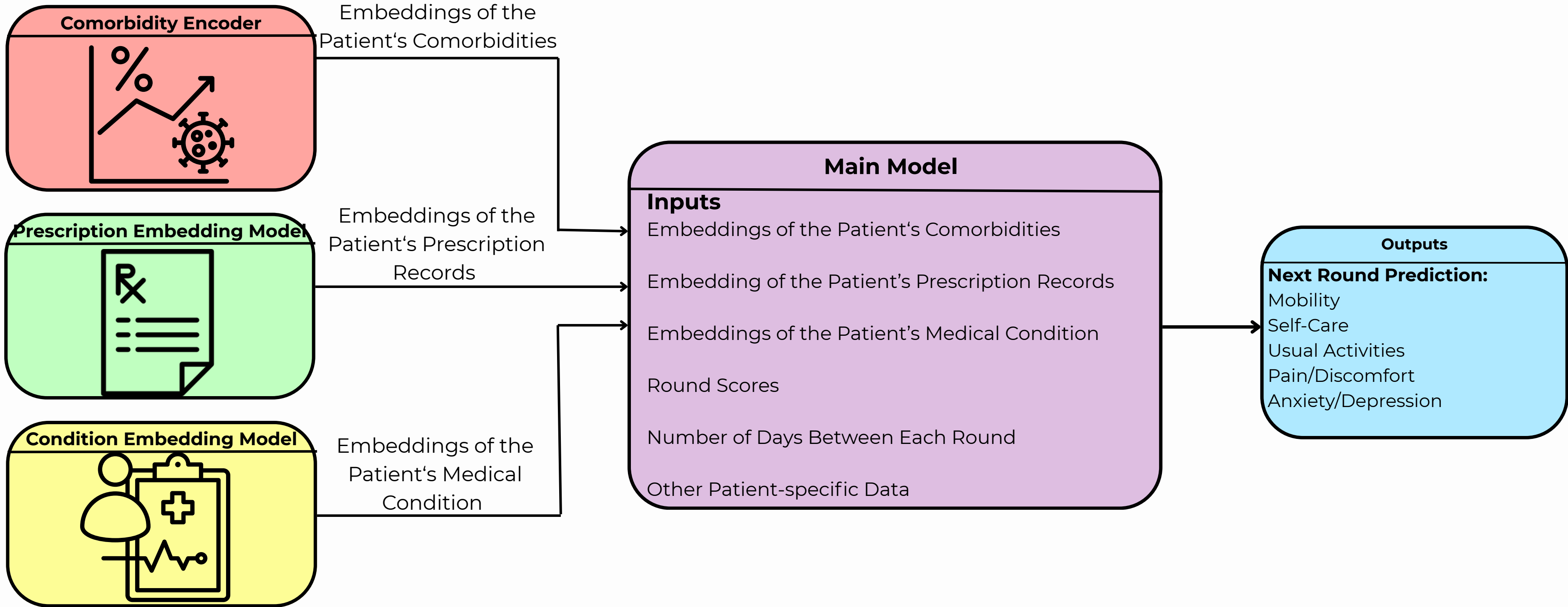


Giacomo Rossetti
Current User

ML Model



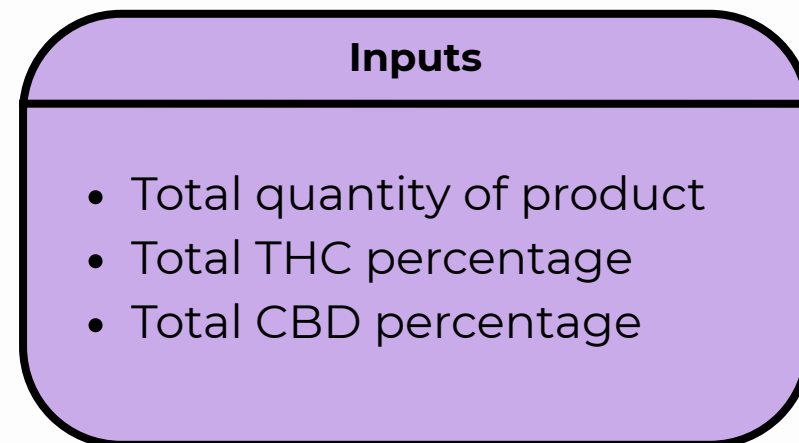
ML Model



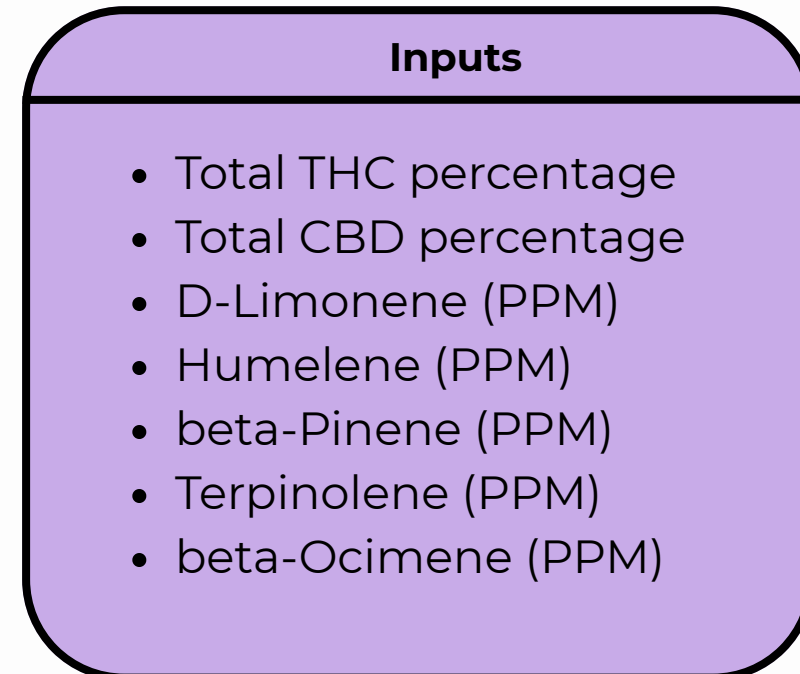
Model Improvements

New Prescription Embedder

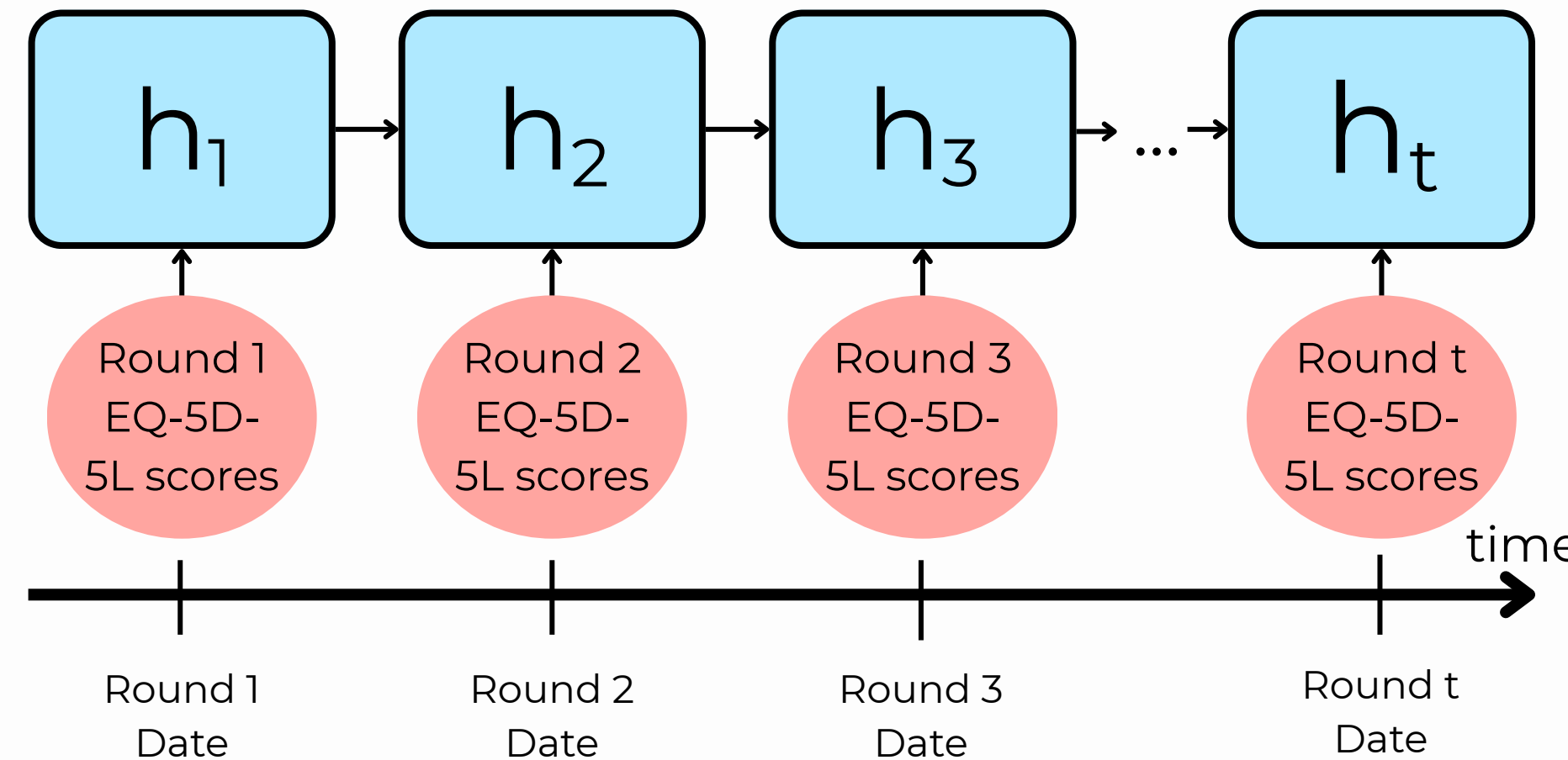
Original Model



New Model



RNN Model for Multiple Round Scores

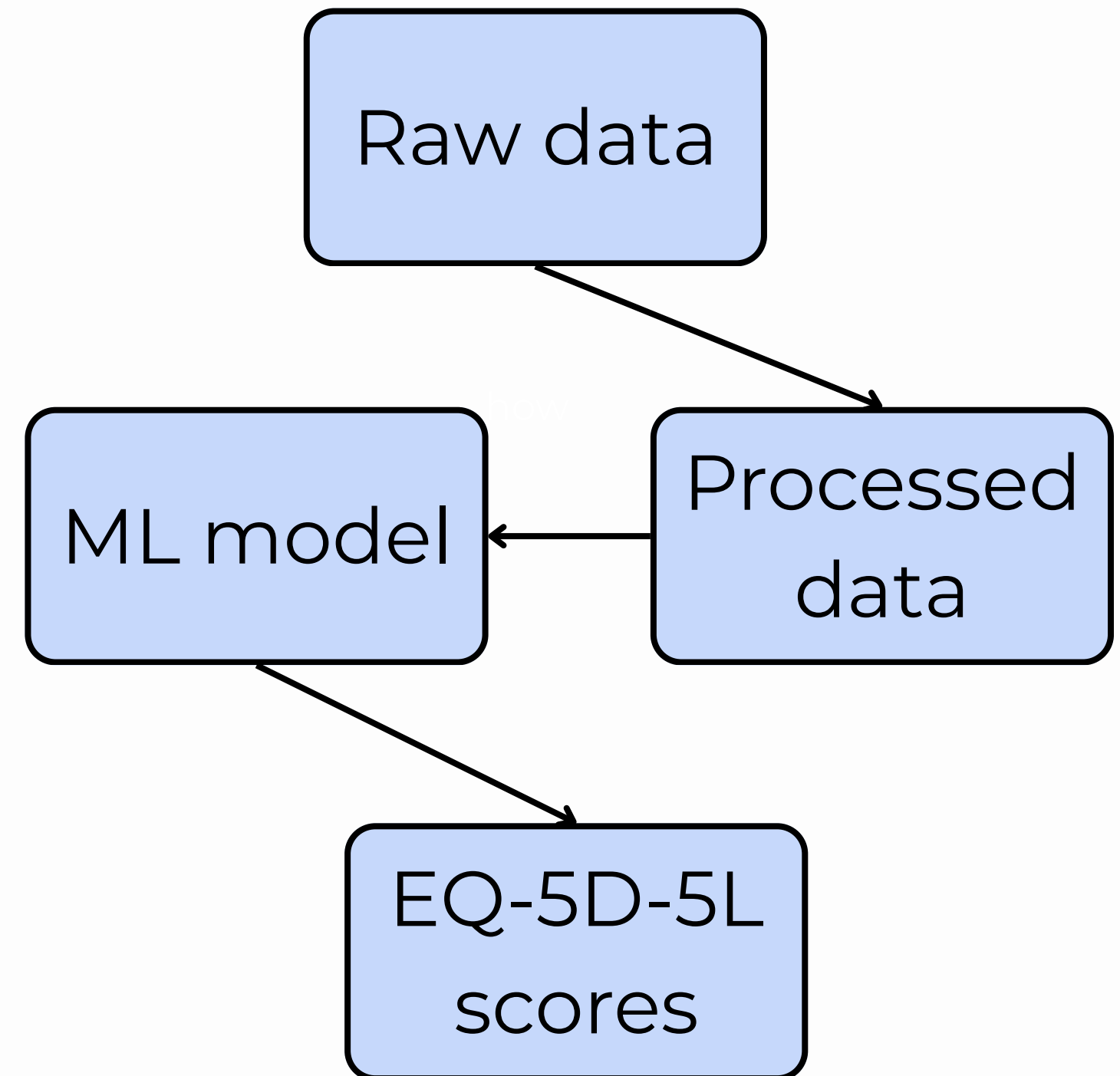


Final Performance

EQ-5D-5L Score	Original Mean Absolute Error (Test)	Improved Mean Absolute Error (Test)	Avg Train MAE
Anxiety/depression	0.64	0.44	Original 0.506
Mobility	0.42	0.40	
Pain/discomfort	0.56	0.54	Improved 0.466
Self-care	0.42	0.50	
Usual Activites	0.61	0.55	
Avg Test MAE	0.530	0.485	

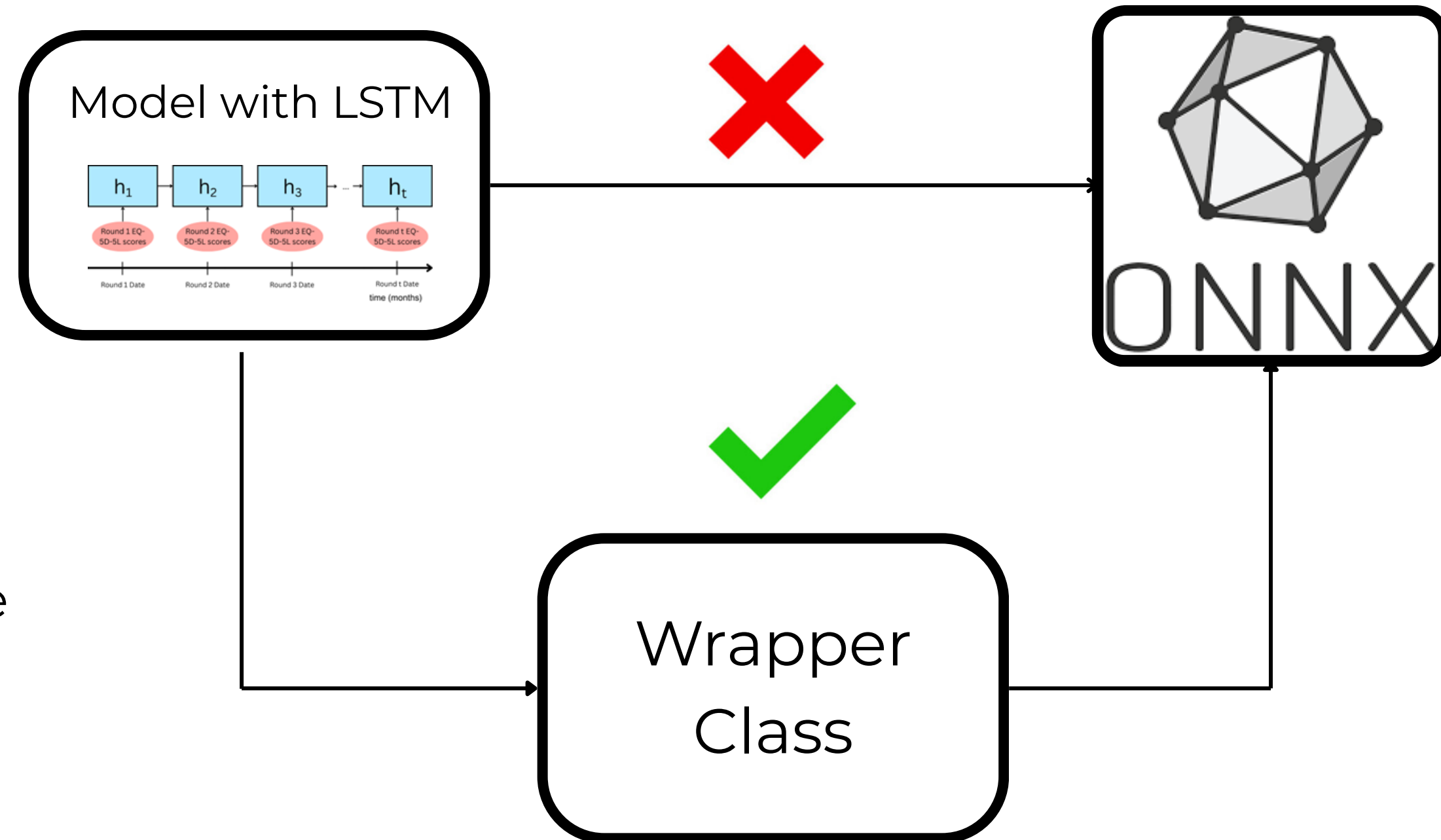
Model Export to JS

- Goal: deploy the model in a JavaScript (web) environment using ONNX
- Built a custom JavaScript class to replicate Python preprocessing logic
- Preprocessed data is sent to ONNX model for real-time inference



ONNX

- Our model required a variable-length LSTM with packed sequences, which ONNX cannot directly export.
- Created a wrapper class to replace dynamic ops with ONNX-compatible logic.
- Preserved model functionality while ensuring ONNX export worked.
- Cross-checked ONNX vs PyTorch outputs to ensure model predictions stayed consistent using sample inputs.



Backend-frontend integration

Why Node.js

Better Performance:

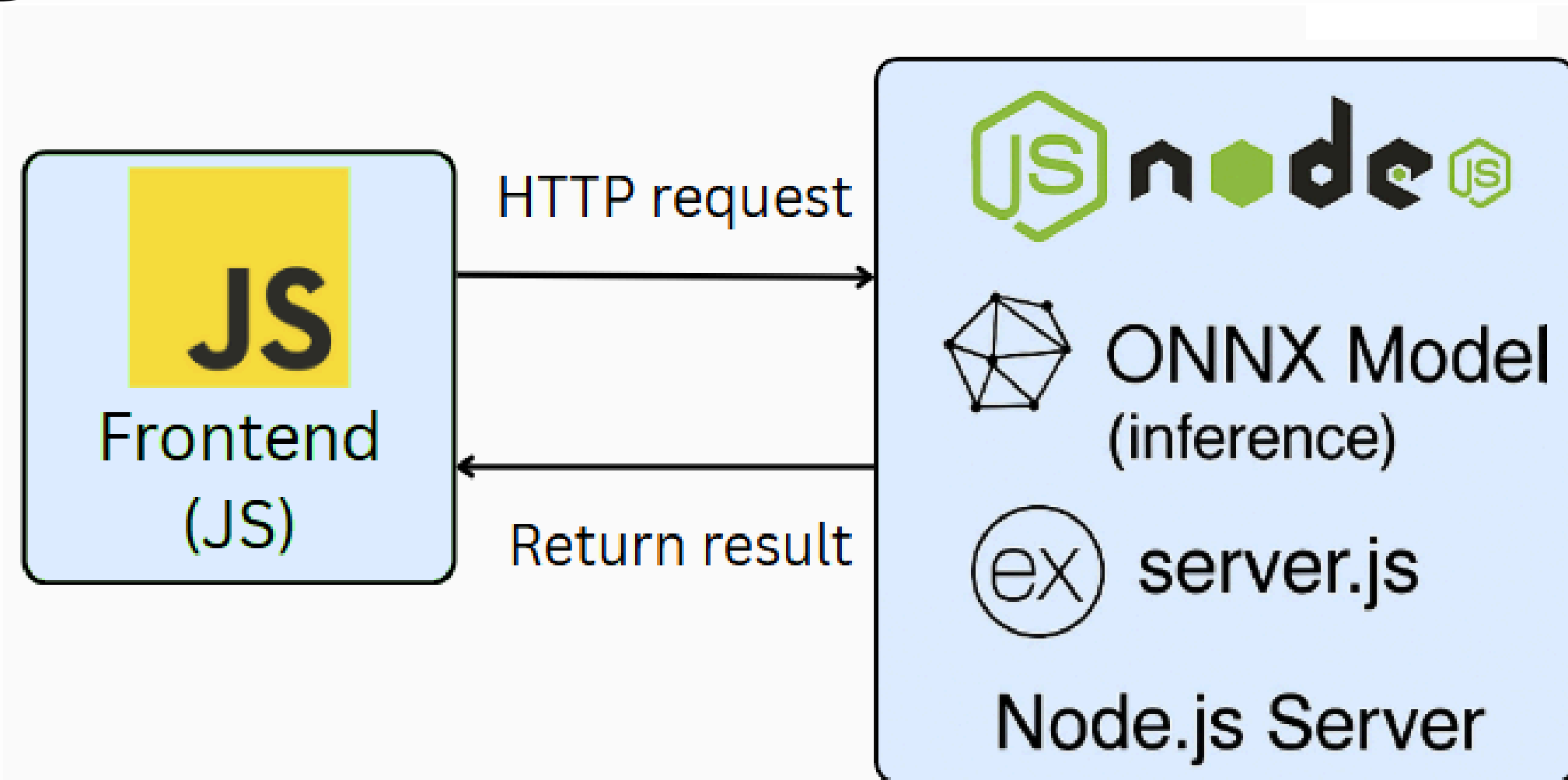
Handles large models more efficiently than the browser.

Lightweight Frontend

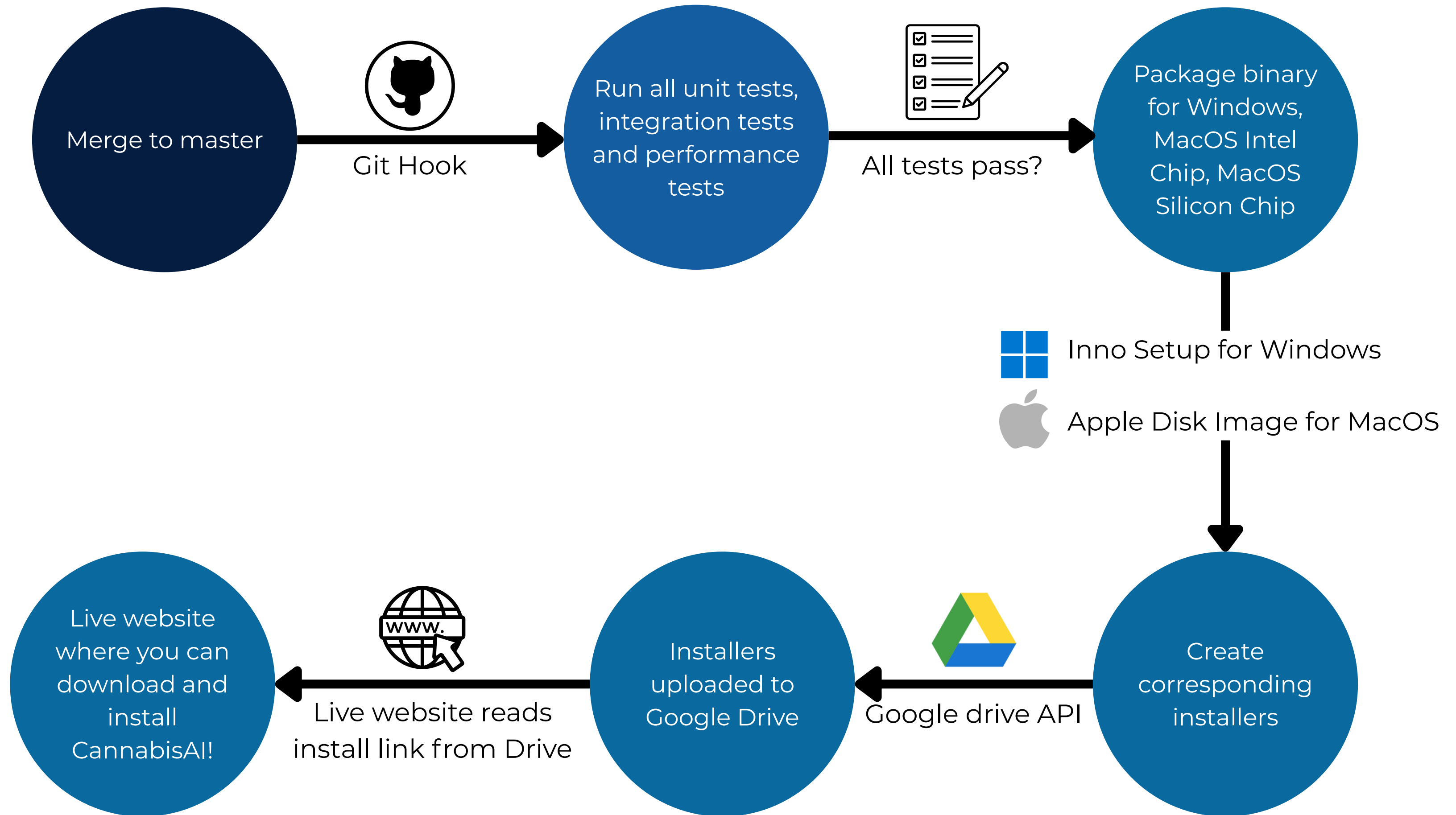
Keeps UI responsive by offloading heavy computation.

Easier Debugging

Centralized logs and errors helps in development.



Deployment



Usability Testing

- To see whether the software is intuitive enough for first-time users
- To get feedback from the target user base

Iteration 1

Questions asked	Scores
How accurate do you think the predicted EQ-5D-5L scores were?	3/10
How satisfied are you with the overall design of the product?	6/10
How easy was it to input and modify patient data?	5/10



“You don’t understand how much I hate manual data entry”

- Richard Hazlett
GP Locum



“I can’t find the relevant comorbidities if I can’t search for them”

- Shaheen Khan
Clinical Director

Usability Testing

- Improved confidence in the model because of chemical decomposition
- Ability to import patient data files
- Usability features such as status bar, search bar



“I’m very grateful for the installer instructions”

- Alia Darweish
Consultant in Anaesthesia and Pain Medicine



“Happy, nice looking webpage, looks so cute!”

- Mindy Bhalla
Advanced Specialist Pharmacist

Iteration 2

Questions asked	Iter. 1	Iter. 2
How accurate do you think the predicted EQ-5D-5L scores were?	3/10	7/10
How satisfied are you with the overall design of the product?	6/10	9/10
How easy was it to input and modify patient data?	5/10	8/10

Our Contributions

First Ever User Interface for Cannabis Prescriptions in the UK

State of the Art Model Using Largest Dataset of Cannabis Prescriptions

Intuitive GUI improved through two iterations of user testing

Open Source Contribution to ONNX

Continuous deployment to a live website (Try it yourself!)



<https://taisy03-uni.github.io/cannabisai/>