



Blockchain Car Marketplace

Team 2:

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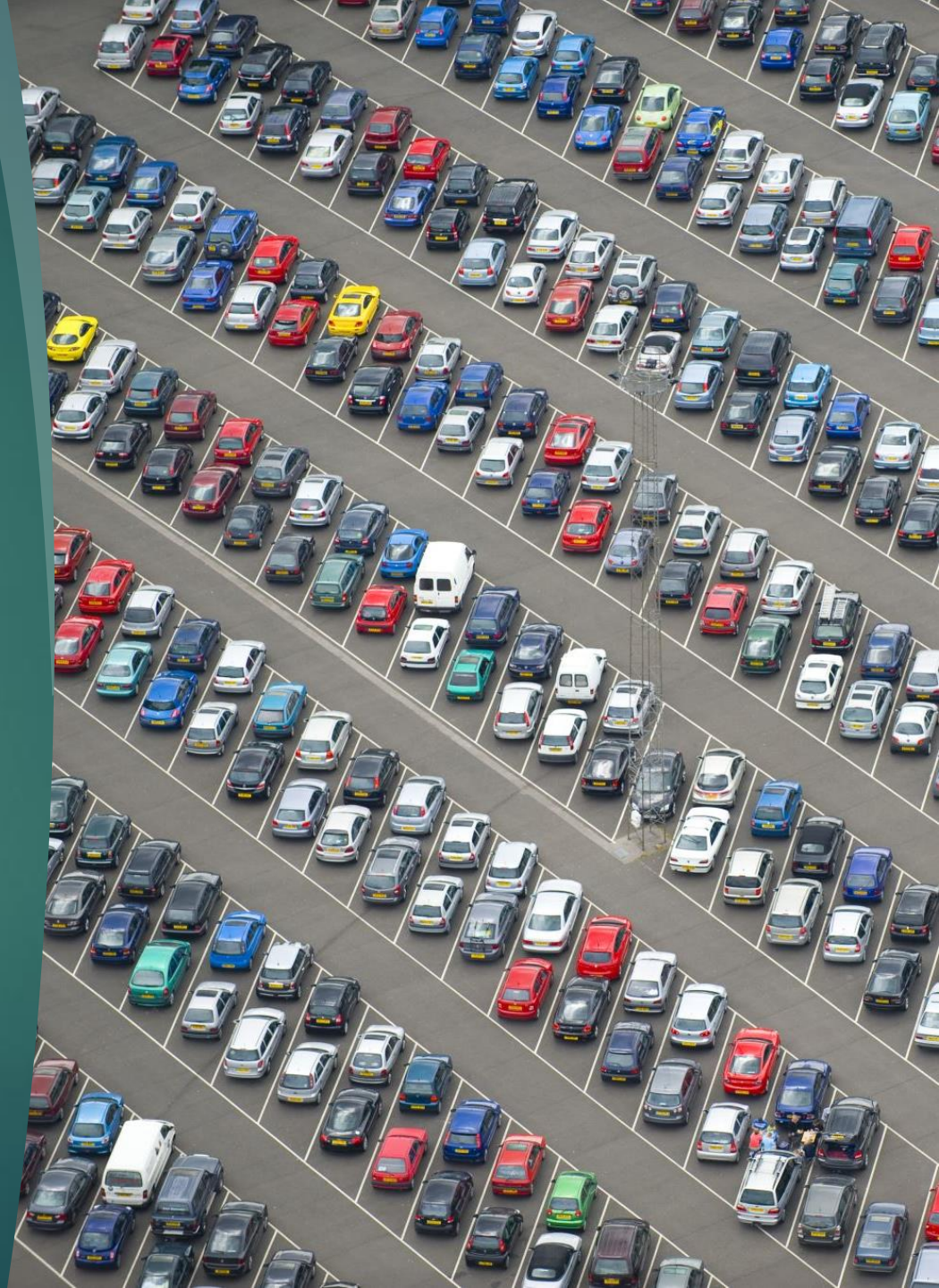
Project Overview

For the capstone Fintech project, we decided to create a car marketplace hosted on the Ethereum blockchain which also incorporates machine learning.

The marketplace allows for a user to:

- register a car to be sold (with a photo upload)
- view a list of currently available cars for purchase
- purchase a car

When registering a car for sale, the user will have the ability to call on a pre-trained machine learning model to provide a recommendation for what the sale price should be.

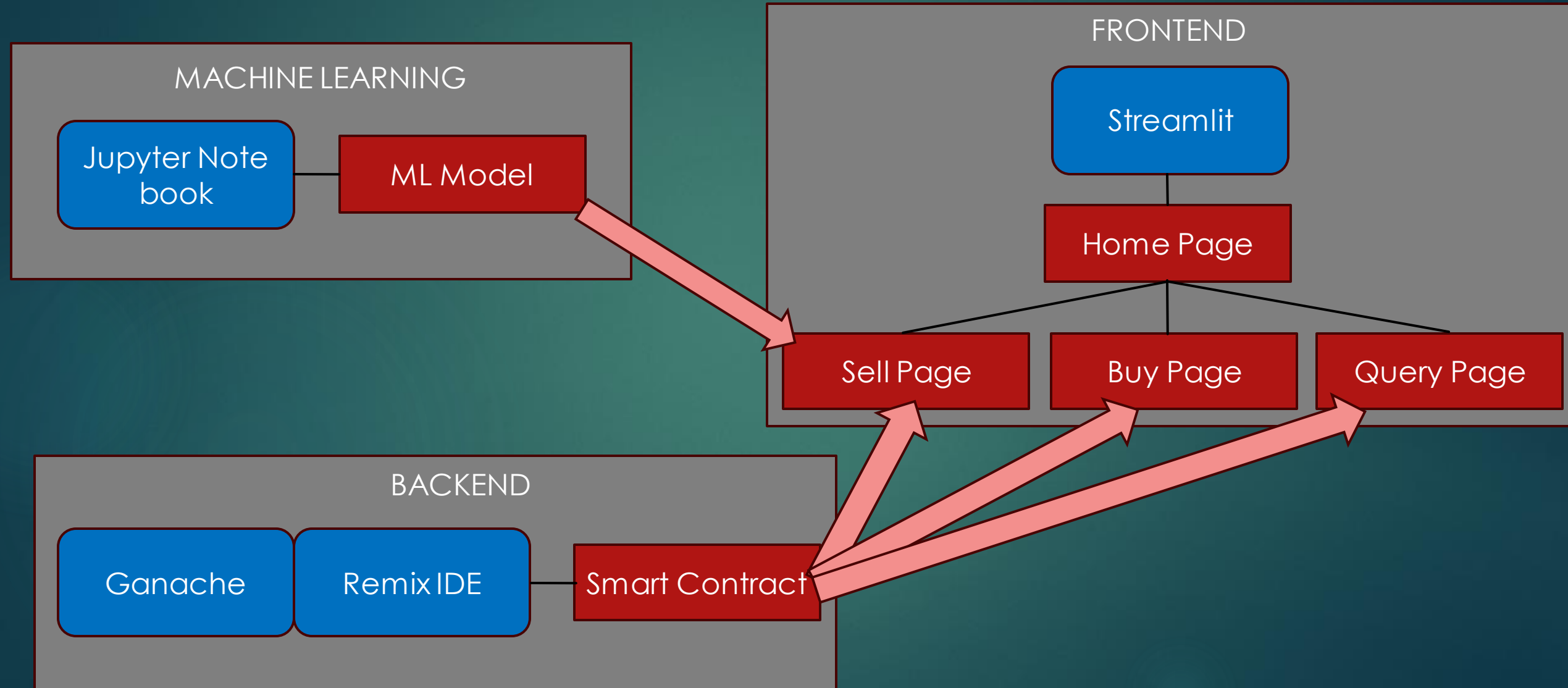


Tools and Software Used

- ▶ The back end of the application uses Ganache as the Ethereum sandbox with the smart contract being deployed using the RemixIDE.
- ▶ The front end of the application was made using python and Streamlit
- ▶ Jupyter Notebook was used for the data analysis and machine learning portion of the project.
- ▶ Pinata IPFS was used to handle the uploads of car photos

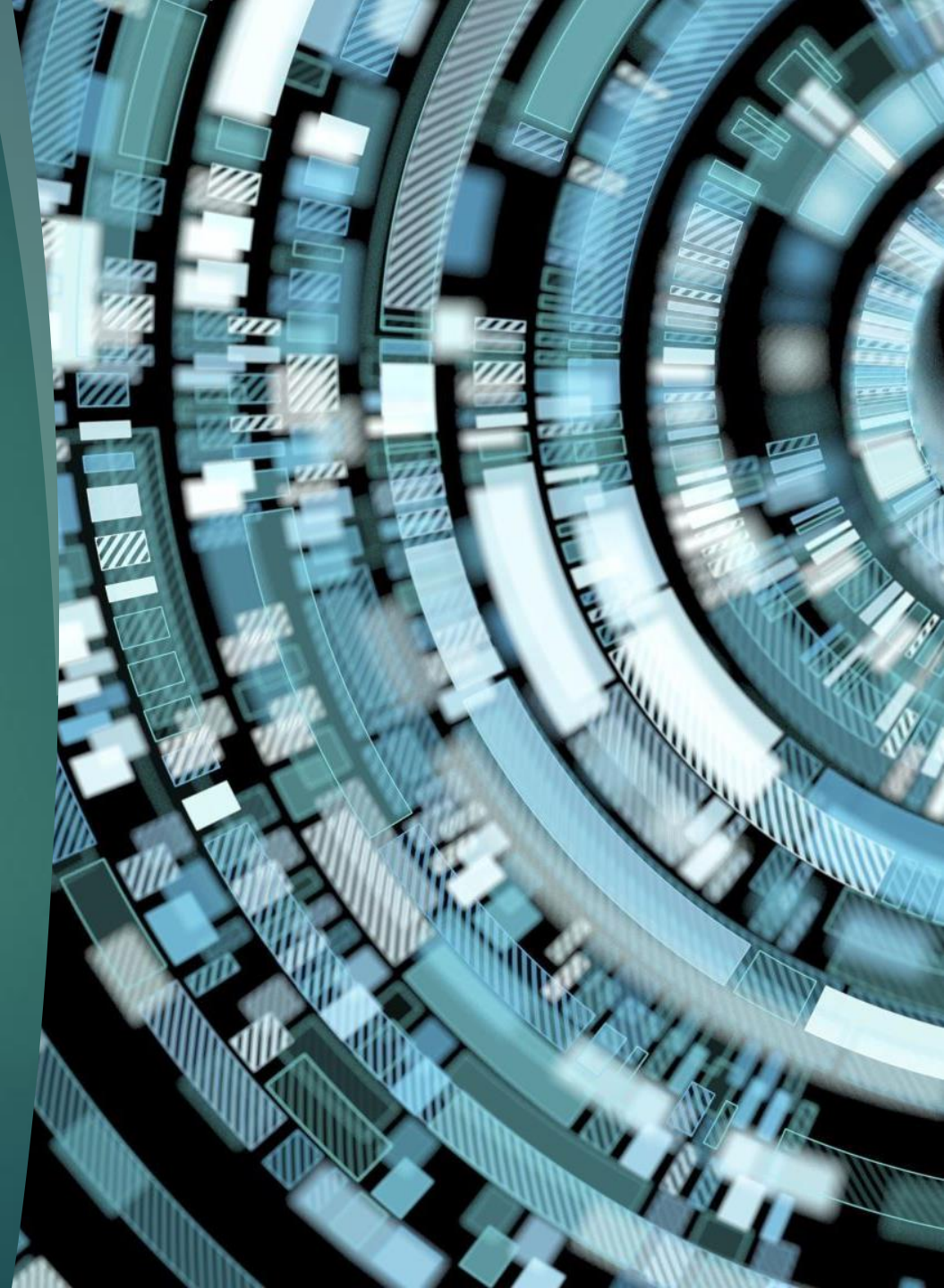


Application Structure



Machine Learning

- ▶ A dataset was obtained from kaggle.com which had used car data for over 4000 vehicles sold on cars.com.
- ▶ The dataset contained information about various car attributes and their sale price
- ▶ The data was cleaned, split, encoded and then applied to various machine learning algorithms.
- ▶ The best performing predictor was the Gradient Boosting Regressor. This model was saved and then used on the "Sell" page to give the user a price recommendation of what price to upload their car at.



Smart Contract

- ▶ The smart contract defines the structure of a 'car' token and initializes various functions and events needed for the blockchain marketplace to function.
- ▶ Two main functions are defined in the contract:
 - ▶ `registerCar` : used to mint a new token attributed to the car the user wants to sell (called on the streamlit 'Sell/List' page)
 - ▶ `purchaseCar` : used to transfer ownership of the token and distribute the ether from the buyer to the seller (called on the streamlit 'Buy' page)



Challenges & Future Improvements

- ▶ The initial plan was to implement an option to rent a car as well. This proved to be too difficult to tackle within our timeframe as we did not know how to incorporate the aspect of a timed transaction in Solidity. Transferring back physical ownership upon expiration of the rental would also be a challenge.
- ▶ There is the challenge of the actual transfer of physical assets upon sale. A physical lot or car delivery/pick-up service would probably need to be incorporated if this was a real-life system.
- ▶ Additionally, the user interface would have to be much improved if this were to ever be an end-product. Viewing available cars is somewhat tedious with the application in its current form.
- ▶ Car information changes over time (ie. mileage, accident reports, condition) so a new token would have to be minted each time the same car is sold.

A photograph of various laboratory glassware, including a round-bottom flask, two Erlenmeyer flasks, a graduated cylinder, and a beaker, all containing liquids. The image is overlaid with a semi-transparent blue filter. A solid red vertical rectangle is positioned in the top right corner.

Demonstration