LineDriveBetting

Team: Indigo
Github Repository: https://github.com/ArmanKhondker/EE-461L-LineDriveBetting
Team Google Drive: https://drive.google.com/drive/u/1/folders/0AF2MKdo4mjX9Uk9PVA

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Vision

The vision for LineDriveBetting is to provide both an **aggregated betting analytics platform that provides bettors nationwide with moneyline and point spreads** from the most popular websites, as well as a **reddit-like blog forum to have intellectual conversations** about betting lines. What makes LineDriveBetting unique and better than any competitors will be its crisp user interface, betting line trend visualizations, and conversational discussion section. The analytics and aggregation of betting website's data allows users to determine the opportune time to place bets. The visualizations will make it clear enough that even an inexperienced bettor can see if it is a favorable bet to place. Additionally, the discussion section is a critical component. Allowing users to have discussions about the specific upcoming games encourages users who have potentially valuable information and opinions to have conversations and arguments about what the smart betting decision is.

Motivation

Currently, bettors are forced to separately view different betting websites to compare their information and determine which is the most favorable for the bet they wish to place. Additionally, these betting websites have unpleasant user interfaces, do not provide trends over time, and do not have a platform for users to have discussions. Reddit, on the other hand, does provide a discussion forum about betting, but they do not provide valuable analytics on betting lines and data from other websites. As a result, LineDriveBetting eliminates these issues and creates an ideal, combinational environment. LineDriveBetting is a convenient, single betting information hub where serious bettors and novices alike can see betting data from major websites and have intellectual conversations about their picks.

Target Audience

LineDriveBetting aims to target all bettors and sports enthusiasts. By providing a single hub for all necessary betting data of their desired team as well as a discussion forum, there are numerous use cases. Bettors who are looking for opportune bets benefit from the display of information of different betting websites, sports fan's interested in aggregated data of win predictions for their favorite teams, and people looking to argue about why they think a certain team will win all benefit from LineDriveBetting's platform.

Approach

LineDriveBetting has a combinational high-level approach. The first aspect of the approach is to provide an aggregated betting analytical platform for bettors. Secondly, LineDriveBetting will incorporate a forum where users can collaborate and provide intellectual insight on their picks and predictions. Users will be able to evaluate the different betting lines and find the line that is the most favorable for the bet they wish to place. Additionally, users will see visualizations of the trends and history of each betting line to see which way the general public is betting. This application would benefit the hundreds of thousands of people involved in sports betting by giving them all of the information they need in one place and allowing them to interact with others doing the same. LineDrive's approach to this problem solves the key issues that are prevalent in current solutions today. Websites such as Reddit have forums to talk about different upcoming sports games. However, all topics and information are user-generated.

On the other hand, websites similar to ESPN provide data and sometimes predictions about upcoming games, but do not provide a seamless forum to chat on, and do not provide enough information on betting lines. Although a user will not be placing bets on this website, LineDrive will serve as a one-stop shop for understanding, discussing, and deciding which bet they feel most comfortable placing. Once the decision is made, a hyperlink to the user's betting website will be available.

Alternatives

Features	LineDrive	ESPN.com	Oddshark	Bovada
View All Necessary Odds (Moneyline, Over/Under, Spreads)	X	X	X	X
Discussion Forum	X			
View Betting Trends	X			
View Line History	X		X	
User-Friendly UI	X	X		
View Head-to-Head Data	X		X	
Create Account	X	X		X
Developer Prediction	X		X	

LineDriveBetting's unique features provide the ultimate experience of an aggregated sports betting platform. Each of these features are **pivotal to providing a comprehensive experience** for our target audience because they directly contribute to providing users the necessary functionalities to view betting predictions and community insights.

Data Sources, Scraping, and Database:

We will scrape data from the following websites:

- ESPN.com, FiveThirtyEight.com ,The-odds-api.com, Oddshark.com

The data we will specifically be pulling are: the scores of previous games, the former head to head results, and all betting lines (money line, point spread, and over/under) for all NBA, NFL, and MLB games. The data will be scraped from the following websites and API endpoints:

http://site.api.espn.com/apis/site/v2/sports/football/nfl/scoreboard (NFL scores)
http://site.api.espn.com/apis/site/v2/sports/basketball/nba/scoreboard (NBA scores)
http://site.api.espn.com/apis/site/v2/sports/baseball/mlb/scoreboard (MLB scores)
https://data.fivethirtyeight.com/ (NFL, NBA, and MLB predictions)
https://the-odds-api.com/ (NFL, NBA, and MLB betting lines)
https://www.oddsshark.com/nfl/odds (NFL odds)
https://www.oddsshark.com/nba/odds (NBA odds)
https://www.oddsshark.com/mlb/odds (MLB odds)

All betting data will be scraped multiple times per day in order to support our database with betting trends over time. All game prediction data will be scraped once daily to update old predictions. This data will be loaded into the MongoDB database.

Challenges and Risks

Since LineDriveBetting will be presenting data from various websites, data scraping efficiently will be the biggest challenge. There will be a significant amount of time spent on designing and testing the data being scraped. In addition, it will be difficult to maintain all user accounts and allow a user-friendly forum for all to seamlessly discuss their opinions on.

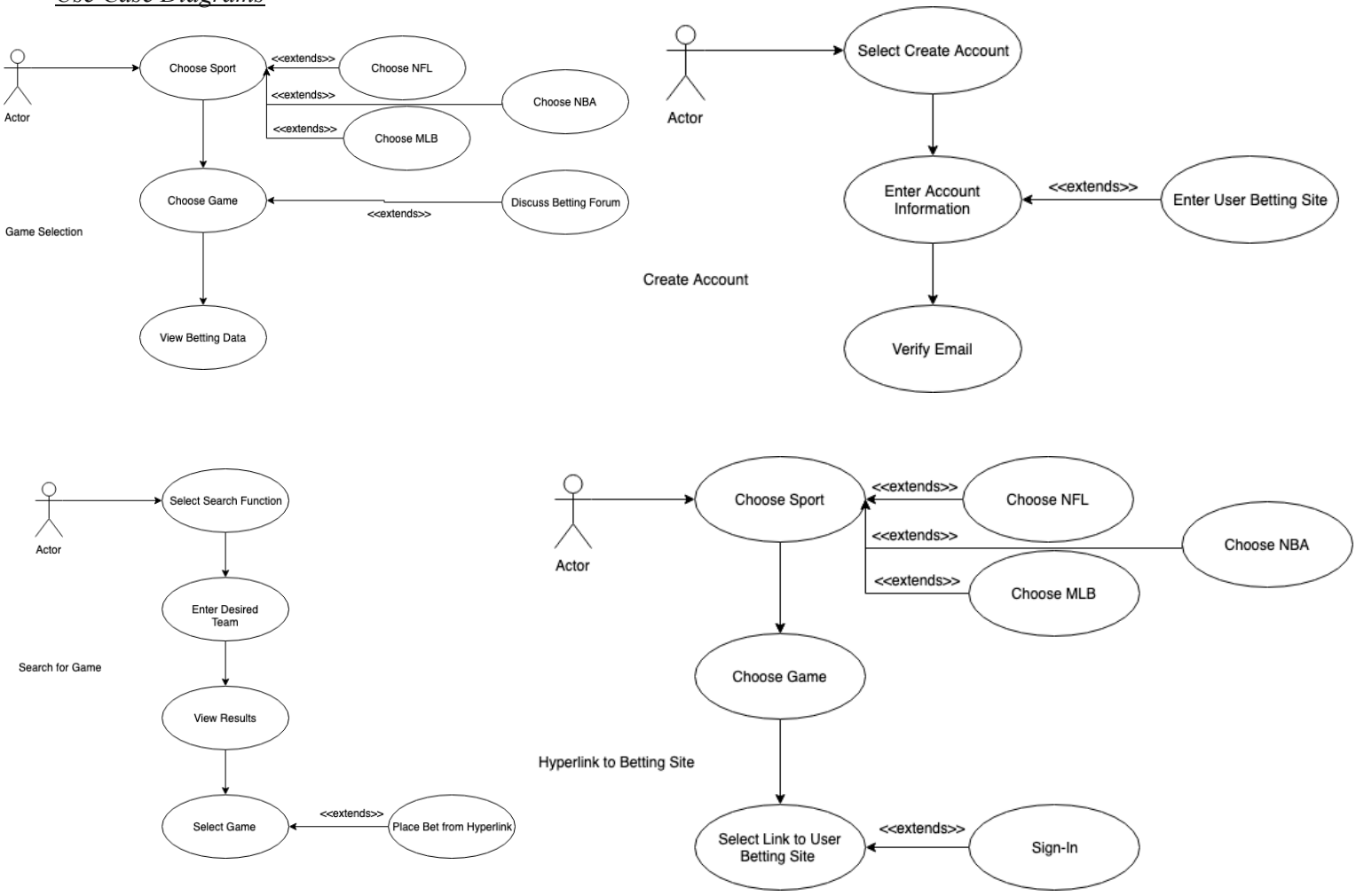
We will **minimize the risk** of working with these websites by thoroughly **reviewing the terms for each site and seeing if we can scrape their data and achieve all our core product functionalities** without any issues. If this is not the case, we will consider redefining our functionalities or omitting certain websites and functions.

Requirements

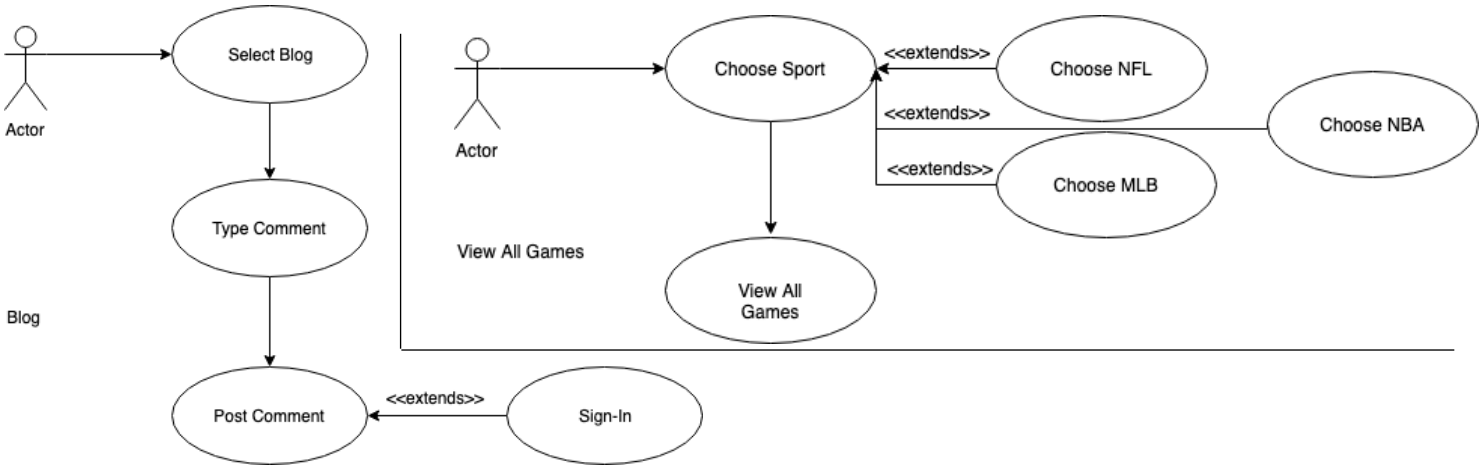
User Stories

1. As a football fan interested in NFL betting lines, I want to view betting lines from all upcoming games at once so that I don't have to switch between multiple browser tabs to see different the most betting line for each team.
2. As a New York Giants fan, I want to bet on the website with the most favorable line for them in their upcoming game against the Philadelphia Eagles so that I am getting the best deal.
3. As an MLB fan, I want to share my own thoughts and view other's thoughts about betting lines in a comments section so that I can understand betting lines from different perspectives.
4. As a sports fan, I want to view historical trends of betting lines so that I can judge how accurate the lines were in the past so that I can make my own judgments on the current lines.
5. As a sports fan, I want to view historical trends of betting lines as a line graph so that I can quickly see trends as a visual.
6. As a Los Angeles Lakers fan, I want to view the expert predictions for the upcoming game against the Boston Celtics so that I can see if the Lakers have a good chance of winning.

Use Case Diagrams



Use Case Diagrams (Continued)



Formal Use Case 1:

Goal: User wishes to view betting lines for the Texans vs Panthers NFL game
Primary actor: User
Precondition: User is already on the home screen of the website
Success end condition: the betting lines are displayed for the game
Failure end condition: the site is not able to display the betting lines for the game
Trigger: User selects the sport he is interested in seeing betting lines for

1. System presents different sports available for the user to choose from
2. User selects professional football
3. System navigates to the professional football page
4. System displays available NFL games for the week
5. User selects the Texans vs Panthers game
6. System finds and pulls all betting line data from database
7. System displays betting lines for the user

Extensions:

4a. System does not display the Texans vs Panthers game
6a. System cannot pull betting line data for the game
6a1. System displays error

Formal Use Case 2:

Goal: User wishes to comment on a betting line for the Texans vs Panthers NFL game
Primary actor: User
Precondition: User is already viewing the betting line page for the game and is not logged in and already has an account
Success end condition: User comment is posted to the page
Fail end condition: User is unable to post a comment to the page
Trigger: Users clicks comment button

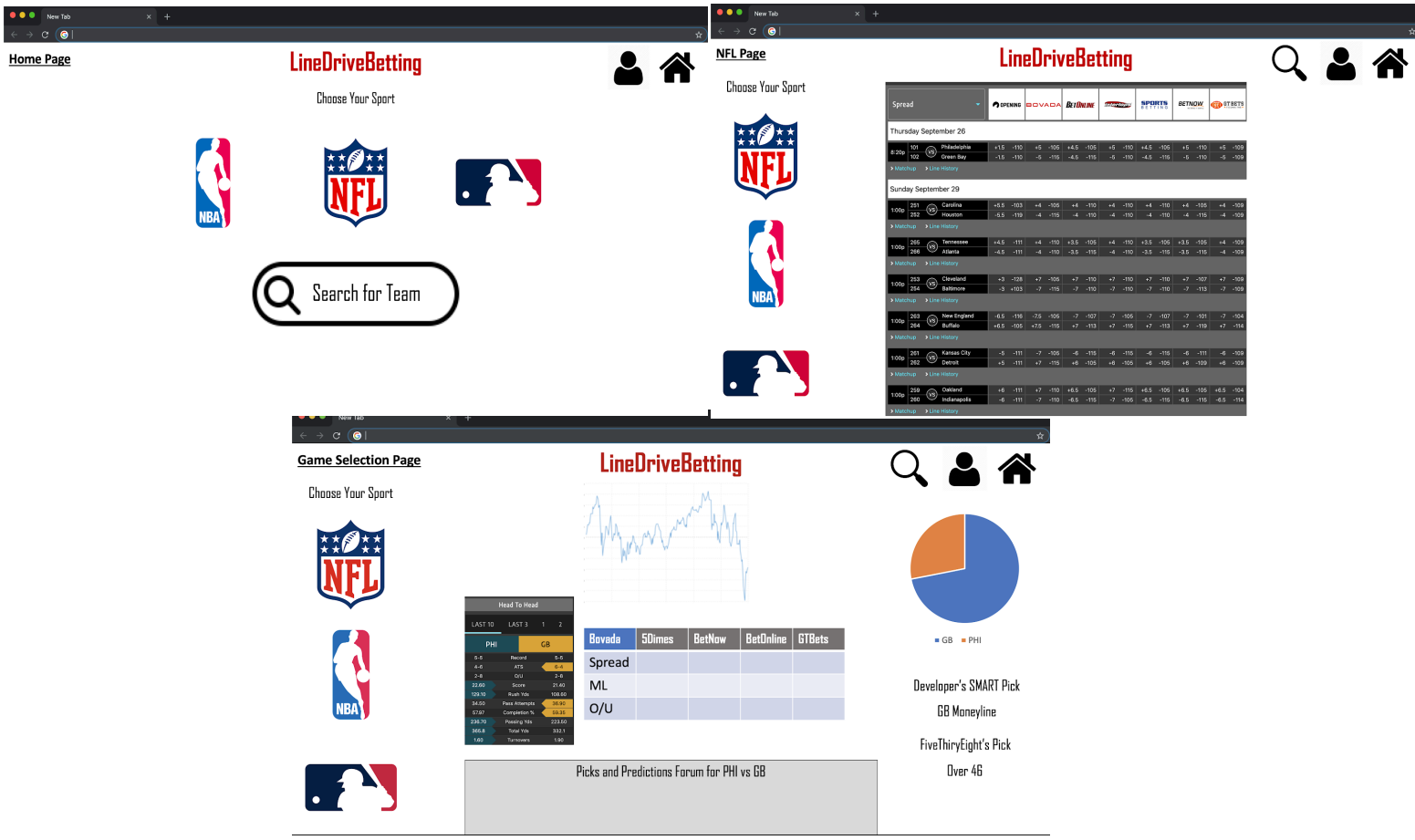
1. System displays login popup window
2. User enters username and password
3. System verifies and logs the user in and closes the login window
4. System displays comment editor
5. User types in his comment in the editor
6. User presses submit button
7. System stores the comment in the database
8. System displays the comment on the site

Extensions:

3a. System does not recognize the login credentials
3a1. System notifies user that the login credentials are invalid
7a. System cannot connect to database
7a1. System displays “Unable to submit comments at this time.

User Interface

A mock user interface is provided below. Top Left (Home Page), Top Right (Selected Sport Page), Bottom (Game Selection Page)



Tools, Software, Frameworks:

Frontend and User Interface Design: Balsamiq, Draw.io
Frontend and User Interface: React.js
DataBase: MongoDb hosted on AWS
Backend: Python App Engine hosted on Google Cloud Platform
Testing: Selenium, PostMan, Chrome Developer Tools, PyTest

Phase Descriptions, Planning, Scheduling

Phase	Overview	Details
1 **Due:** **(10/11 at 10 PM)** **Time Estimate:** **25 Hours**	Develop backend REST API. Collect data by developing scraping and using 3rd party APIs. **Learning Challenges:** MongoDB/AWS - (1 hr)) Testing Methodologies- (1hr) Python on App Engine - (2hr)	• Obtain a domain name and set up web hosting (45 min) • Plan what data needs to be collected and from where. Come up with possible endpoints for own REST API (2 hr) • Examine the data to be scraped and design scraping methods (2 hr) • Setup MongoDB hosting on AWS (1 hr) • Create Python backend REST API. Integrate third party API's and develop scraping method. (10 hr) • Begin collecting test data and verifying it. Adjust scraping method as necessary (2 hrs) • Write a report rough draft (3hrs)

2 **Due:** **(10/25 at 10 PM)** **Time Estimate:** **34 Hours**	Develop frontend web application. Create login functionality and discussion section **Learning Challenges:** Selenium Testing - 2 hrs Live Updates to Discussion - 2 hrs	• Create a very limited frontend using React.js to display betting lines and connect it to the backend (6 hr) • Collect and display data for upcoming games in the next week (2 hrs) • Develop user account functionality (3 hr) • Scale application to collect data for even more games (6 hr) • Develop discussion section (3 hrs) • Complete comprehensive testing on the web application using Selenium, REST API unit tests with Postman, Javascript unit tests with Mocha, Python unit tests with PyTest (8 hrs) • Refine the report (2 hrs)
3 **Due:** **(11/15 at 10 PM)** **Time Estimate:** **17 Hours**	Finalize Account Management, Add Filtering and Searching **Learning Challenges:** Filter/Search - 2 hrs	• Beautify frontend and user interface (8 hr) • Develop filtering and searching to find specific pages (3 hrs) • Refine all tests and retest (4 hr) • Application is fully functional after this phase
4 **Due:** **(11/25 at 10 PM)** **Time Estimate: 9 Hours**	Refactoring & Applying Design Pattern **Learning Challenges:** Design Patterns - 3 hrs	• Apply at least 3 refactorings and at least 3 design patterns (4 hrs) • Complete additional testing on new design patterns (2 hrs)

Feasibility:
Things that may lead you to fail. This should not be generic. Does your application require excessive amount of data to be useful? Are you concerned about response time of application? (These are just examples - be specific about your team's application.)

LineDriveBetting (LDB) requires a lot of data in order to be useful to the consumer, including betting lines and win predictions for a multitude of professional games. All of this data is coming from about half a dozen different websites, and a few of these do not have an available API and will need to be regularly scraped. If one of these websites decides to change their layout in any way, our methods for extracting information are likely to fail and cause substantial downtime for our users.

One other problem that arises with our particular situation is the problem of live updates. In an area such as sports betting, users need to have the most up to date information in order to place smart bets. Our problem comes with being able to scrape and call our APIs fast enough in order to fill this need. This needs to happen across potentially hundreds of games, and if we are not able to consistently update this information fast enough it could become drastically less useful to the user.

Feedback

We have addressed all feedback.