CSCE 436 Project Proposal

Team Info

Team name: Outrageous Privilege
Team members:

1. Courtney Ericson
2. Hayden Chandler
3. Cory Avra
4. Heming Tian
5. Zachary Daum

Problem Statement

For the National Hockey League (NHL), as the season winds down, every fan who follows a team currently out of playoffs has one question: what are the conditions for making playoffs? Our project will address the problem of an NHL fan who wants to know in absolute terms how likely his team is likely to make playoffs and which future games are most important to making the playoffs.

Our solution is intended to provide a daily, mobile interface for users to track the progress of their team into playoffs. A user will be able to input the team they follow and each day the application will provide a list of games scheduled. The list of games schedules will be ranked by importance with importance being defined as how much impact a specific game will have on the team of the user making a playoff berth. In addition, a user will be able to view his team's current projected chances at playoffs.

The main mechanism for the percentage-based model which we will use for modeling playoff chances is the ELO rating system. The ELO rating system is a model for calculating the relative skill level of players which is used commonly in games like chess. Each team (or player in the case of chess) has a specific rating which corresponds to their skill level. Each win a player is able to accrue adds to his own rating. Beating a team with a higher rating provides more rating than beating a player who is below in rating. While it is possible to ascertain the number of games a team will have to win to make playoffs using simple math, the percentage chance of making playoffs is where ELO becomes useful. ELO provides a reliable way to estimate the chance a team will be able to win the number of games necessary.

For example, if a user follows the New York Islanders, they can open the application and receive a list of games every day. The list will perhaps contain a matchup like the Washington Capitals vs Philadelphia Flyers. This match-up, in our example, has a huge impact on the Islanders playoff chances because they are in the same division as the Islanders. The app will display a number like "+2.55% if the Washington Capitals win in regulation, -1.00% if the Flyers lose in regulation, etc..." which would represent the odds of making the playoffs increasing. Other matchups will be shown in decreasing order of impact.

In order to access the playoff information on NHL, we can tentatively expect to use the mySportsfeed API that offers real-time API access to current or previous team statistics. Otherwise, there is the option of NHL Scraper API that gives specific information about team plays and player stats.
Specific design decisions will ultimately depend on project requirements, which are established initially and reconsidered throughout the duration of the process. These requirements include (but are not limited to) system performance, user interactivity and problem scope. Additionally, a prototype of the application in its current state will be subjected to user evaluations at certain intervals during each design phase in order to gauge the effectiveness of specific features. Following each evaluation, the requirements will be revisited and the design goals shifted accordingly. This cycle continues until it is determined that the project requirements are adequate and evaluation of the project successfully satisfies all conditions set forth.

Citations

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Kangas, E., Kinnunen, T. (2005). Applying user-centered design to mobile application development. Communications of the ACM, 48(7), 55. doi:10.1145/1070838.1070866

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Work Plan

Task List:

1. Scraping NHL site for schedule, scores and organize into database
2. Create and update ELO rating for each team according to wins and losses and store in db. Create interface for viewing.
3. Estimate playoff probability
    a. Calculate number of points needed in future games to qualify (i.e. how many games to win)
    b. Obtain ELO rating of each team who you will play in remaining games
    c. Use ELO rating of each team to calculate probability of win in each remaining game (so if the ELO rating of opponent is higher than your team, you have less probability of winning).
    d. Aggregate percentage chances of winning of all remaining games and compare to points needed to qualify
    e. Output: X team has a 12% chance of qualify for playoffs based on their remaining schedule and the relative strength of their opponents
4. Create graphical interface for viewing daily games which:
    a. Allows user to choose a favorite team
    b. Sorts by relative importance of each game (which games have the biggest effect on the user's team making playoffs)
        i. Shows results of the game if it has already happened
        ii. Shows percentage swing of each game
            1. How much a win, tie, etc. will impact each team's playoff chances
    c. Allows users to view current playoff picture (percent chance of qualifying & projected first-round matchup
    d. Have a working prototype to evaluate halfway through

Division of Tasks/Task Planning

We will use agile development with scrum. We will having weekly scrum meetings along with the regular class to time to report on work as well as sprint plan. Scrum helps eliminate uncertainty and disorganization normally associated with group work and replace it with a more

adaptable plan of execution. The divisions of tasks will be organized at each sprint planning section and will be further detailed below.

The divisions of tasks will be dynamic with individual strength taken into account. The major elements of our project are: statistical evaluation, data retrieval, and user interface. Teams will be organized around these elements and each person will primarily focus on whatever element they've chosen. User interface will be the most fluid team because it is the most relevant portion of the application and it requires interaction will all of the other components.

1. Statistical backbone team
    a. Courtney Ericson
2. Data retrieval team
    a. Zachary Daum
    b. Heming Tian
3. User interface team
    a. Hayden Chandler
    b. Cory Avra

Key for Table	
Task 1	
Task 2	
Task 3	
Task 4	
Redesign/Tweak	

Sun	Mon	Tues	Wed	Thurs	Fri	Sat
				Proposal due		
Sprint planning						
		UI mock-up	Sprint planning			
				UI integration with DB	Sprint planning	
				Progress Checkpoint Sprint planning		
				UI prototype finished	Begin user trials with interface	
					Begin redesigning	More trials w/ interface
		In-class Demo	*In-class Demo*	*In-class Demo*		

Bibliography

ELO Rating System and How to Calculate it:
https://metinmediamath.wordpress.com/2013/11/27/how-to-calculate-the-elo-rating-including-example

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https://www.mysportsfeeds.com/

NHL Scraper API:
http://pythonhosted.org/nhlscrapi/

Tutorial on Elo Rating System.
http://gobase.org/studying/articles/elo/

Using Elo Rating System with NFL
https://fivethirtyeight.com/datalab/nfl-elo-ratings-are-back/