Appendices

Appendix A 2
Appendix B 14
Appendix C 15
Appendix D 36
Appendix E 38
Appendix F 46

Appendix A

Project Definition Document

Basic Information

Degree Title: Software Engineering BSc. (Hons)

Dissertation Project Title: Using Statistical Analysis to Predict Sports Results

First Name: Daniel

Surname: Grewal

Phone Number: 07557412137

Email Address: d.grewal187@gmail.com

Supervisor Name: Dr. Peter W. H. Smith

Supervisor Email Address: peters@soi.city.ac.uk

Project Proposed By: Dr. Peter W. H. Smith (Project Supervisor)

Project Description: The concept of my project will be to predict football results for an English Premier League football team using a prediction theorem. The project will involve *designing and building** a software application which the user can interpret using a Graphical User Interface (GUI). The application will allow the user to perform various operations relating to the predictions including but not limited to: viewing all the variables which are used in the predictions as well as how they affect the final prediction of a result and the user will also be able to view predicted results against actual results and measure the accuracy of the theorem.

*Design & Build with Research project

Proprietary Agreements/Interests: No agreements or interests in place.

Signature: …….

Problem to be Solved

At present, it is quite difficult for people and systems to accurately predict the score line of a football match. I want to design and build an Android application which will automatically predict football results using statistical analysis tools. The Bayesian theorem approach is under consideration as it's already been used for prediction purposes in other sports events*. However, I will research available theorems before drawing a conclusion on which theorem I will use based on advantages and disadvantages of each. My findings will be documented in detail.

The football team I have chosen to concentrate my predictions on are Arsenal Football Club of the English Premier League. By building an application which will predict score lines for a football club based on statistical analysis, a problem for customers of the betting trade could be solved by being able to predict more accurate outcomes of football matches if the theory is proved to be successful. Having researched the market, I believe there is an opportunity for an application to be introduced to customers of this industry to help them place more accurate bets based on a statistical method.. This could also form the basis and interest for further research from academics.

*See References section

Project Beneficiaries

Although primarily a Design and Build project, there is a large degree of research involved in order to prove the theorem and ensure my results are predicted as accurately as possible. I have defined below who I believe the project will potentially benefit once completed.

- Betting trade customer (end user) – any persons who have an active interest in predicting or placing bets on the end result of football matches.
- Academic research (academic or research staff) – any academia that has an interest in further researching the ability to predict the end result of a professional sports game using a Bayesian theorem.
- Daniel Grewal (stakeholder/owner) – As the developer of the Android application, I will own the application and make future developments as and when necessary.

Project Objectives

1.0 Design and Build Objective: This project shall result in the creation of an application to automatically predict the outcome of a football match.

Sub-Objective	Test
1.1 Design and build an Android application using the Java programing language and Android SDK (Software Developers Kit).	Start the application and test whether its functions work correctly.
1.2 The application shall be suited for mobility.	Use the application on an Android tablet and ensure all functions work correctly.
1.3 The application shall be user friendly and intuitive.	Select 5 people at random to use the application and record their navigation and accessibility of the GUI through a short survey.
1.4 The application shall make automatic predictions for the user.	Use the application prediction functionality to ensure predictions are being made based on the chosen theorem.
1.5 The application shall perform reliably.	Use the application for 25 hours and calculate the MTBF (Mean Time Between Failure) and decide whether or not it is an acceptable time.

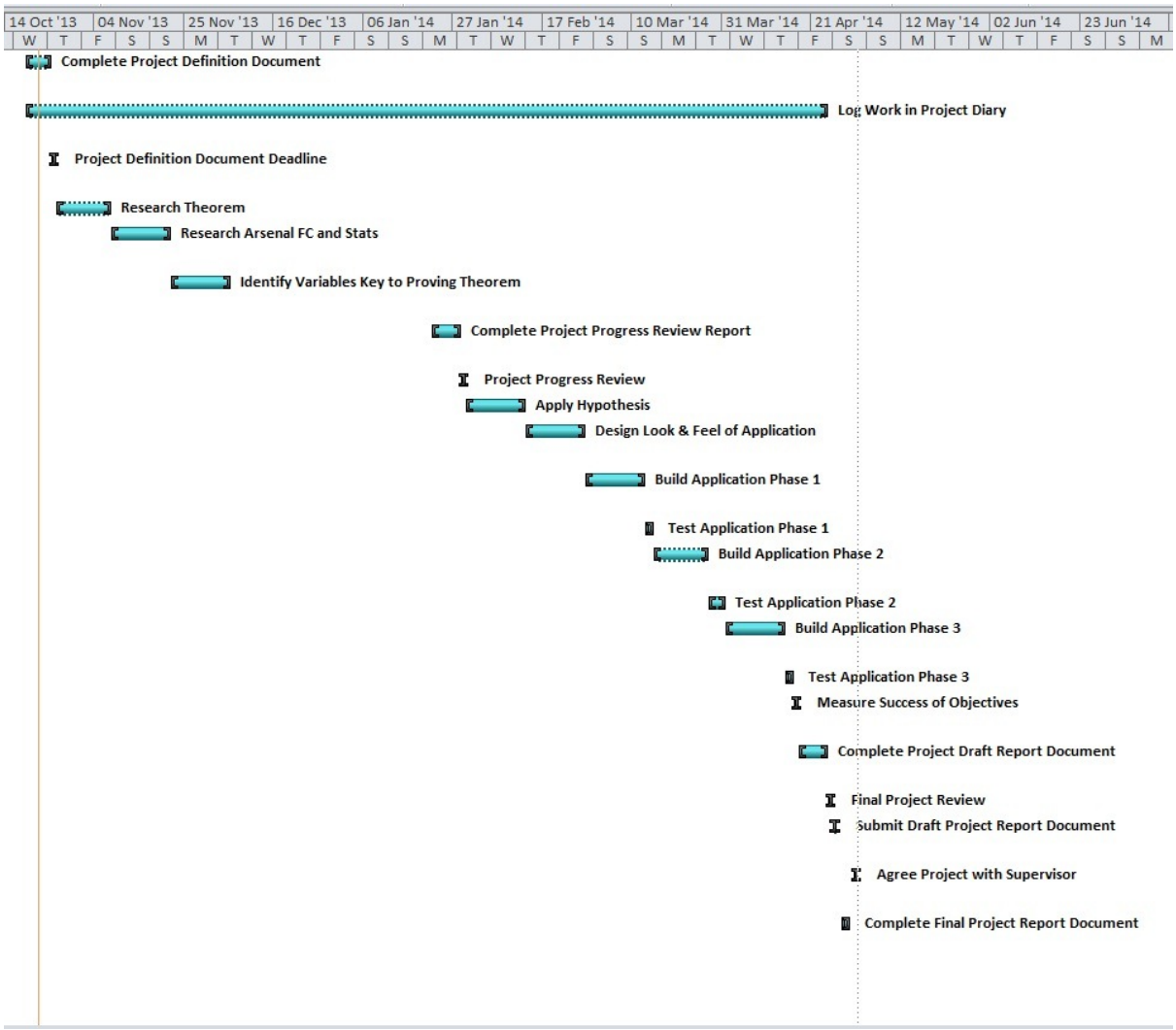
2.0 Research Objective: How can we effectively predict results for a football team?

Sub-Objective	Test
2.1 What variables are important when predicting the outcome of a football match?	Identify if any common patterns appear during the research and analysis phase of researching Arsenal FC results.
2.2 Research and choose the best prediction theorem and compare advantages and disadvantages of theorems considered.	Compare advantages and disadvantages of various theorems in a detailed document and outline in conclusion why chosen theorem was chosen with supporting evidence.
2.3 Will the prediction theory predict the correct score line at a 50% accuracy rate or better?	Compare the predicted score line against the actual score line for 60 random matches.
2.4 Will the prediction theory predict a win, draw or loss at a 75% accuracy rate or better, even if the score line isn't correct?	Compare the final outcome of matches against the actual outcome of the matches. Do this for 60 random matches.
2.5 Will the prediction theory correctly predict Arsenal FC final league position at a 60% accuracy rate or better, based on the predicted results?	Compare the predicted final league standings of Arsenal FC for previous seasons using the prediction theory against the actual final league standings of Arsenal FC. Compare the previous English Premier League (EPL) seasons dating back to 30/09/96 (current manager start date).

Work Plan

I have included my Work Plan for the project scope. I have not included *Supervisor meetings* and *meeting minute's documents* as these have no fixed date and will vary month by month.

	Task Name	Duration	Start	Finish	Resource Names
1	Complete Project Definition Document	5 days	Sat 19/10/13	Thu 24/10/13	Complete Project Definition
2	Log Work in Project Diary	135 days	Sat 19/10/13	Thu 24/04/14	Log Work in Project Diary
3	Project Definition Document Deadline	1 day	Fri 25/10/13	Fri 25/10/13	Project Definition Document
4	Research Theorem	2 wks	Sat 26/10/13	Thu 07/11/13	Research Theorem
5	Research Arsenal FC Results	2 wks	Fri 08/11/13	Thu 21/11/13	Research Arsenal FC and Stats
6	Identify Variables Key to Proving Theorem	2 wks	Fri 22/11/13	Thu 05/12/13	Identify Variables Key to Proving
7	Complete Project Progress Review Report	5 days	Wed 22/01/14	Tue 28/01/14	Complete Project Progress Review
8	Project Progress Review	1 day	Wed 29/01/14	Wed 29/01/14	Project Progress Re
9	Apply Hypothesis	2 wks	Thu 30/01/14	Wed 12/02/14	Apply Hypothesis
10	Design Look & Feel of Application	2 wks	Thu 13/02/14	Wed 26/02/14	Design Look & Feel of Application
11	Build Application Phase 1	2 wks	Thu 27/02/14	Wed 12/03/14	Build Application Phase 1
12	Test Application Phase 1	2 days	Thu 13/03/14	Fri 14/03/14	Test Application Ph
13	Build Application Phase 2	2 wks	Sat 15/03/14	Thu 27/03/14	Build Application Phase 2
14	Test Application Phase 2	2 days	Fri 28/03/14	Mon 31/03/14	Test Application Ph
15	Build Application Phase 3	2 wks	Tue 01/04/14	Mon 14/04/14	Build Application Phase 3
16	Test Application Phase 3	2 days	Tue 15/04/14	Wed 16/04/14	Test Application Ph
17	Measure Success of Objectives	1 day	Thu 17/04/14	Thu 17/04/14	Measure Success of Objectives
18	Complete Draft Project Report Document	5 days	Fri 18/04/14	Thu 24/04/14	Complete Project Draft Report
19	Final Project Review	1 day	Fri 25/04/14	Fri 25/04/14	Final Project Revie
20	Submit Draft Project Report Document	1 day	Sat 26/04/14	Sat 26/04/14	Submit Draft Project Report
21	Submit Final Project Report Document	1 day	Thu 01/05/14	Thu 01/05/14	Agree Project with Supervisor
22	Complete Final Report Document	2 days	Mon 28/04/14	Tue 29/04/14	Complete Final Project Report



Incremental Methodology

For this project, I have identified the ***incremental methodology*** as the most appropriate. This way, I can focus on designing and building the application early in the second semester and back-tracking to previous elements of the Build phase during the testing periods. I can also spend the majority of the first semester researching the theorem which will be most suited to my project objectives. This fits in well with my other work commitments (part-time employment and university study) as I have purposely chosen three modules in the first semester and two modules in the second semester.

Project Risks

Risk ID	Risk	Likelihood	Severity	Explanation	Contingency
1	Insufficient time	Low	High	If I can't complete project within the deadline, potential to fail module.	Regular meetings with Supervisor to ensure I'm on track.
2	Insufficient programming knowledge	Low	High	If I don't have the required programming knowledge, I may have to compensate some or all of the functionality during the build of application.	Build up knowledge through reading and practice. Will consider alternative programming language if need be.
3	Insufficient mathematical knowledge	Low	High	If I don't have the mathematical knowledge to identify/ apply the theorem, I will not be able to prove the hypothesis.	Build up knowledge through reading and attending lectures. Will consider using alternative theorem if need be.

References

I. Ben-Gal. Bayesian Networks, in F. Ruggeri, F. Faltin & R. Kenett, Encyclopaedia of Statistics in Quality & Reliability, Wiley & Sons (2007).
http://www.eng.tau.ac.il/~bengal/BN.pdf

J. Buchdal, 2003. Rating Systems For Fixed Odds Football Match Prediction, from Fixed Odds Sports Betting: The Essential Guide.
http://www.football-data.co.uk/ratings.pdf

J. Goddard, 2003. Modelling Football Match Results and The Efficiency of Fixed-Odds Betting, Department of Economics, Swansea University.
http://www.stat.berkeley.edu/~aldous/157/Papers/goddard.pdf

N.E. Fenton, M. Neil, A. Joseph, 2005. Spurs and Bits: Predicting football results using Bayesian Nets and other Machine Learning Techniques.
http://www.dcs.qmw.ac.uk/~norman/papers/Spurs-2.pdf

Pang-Ning Tan, Michael Steinbach, Vipin Kumar, 2004. Introduction to Data Mining

Research Ethics Checklist

School of Informatics BSc MSc/MA Projects

If the answer to any of the following questions (1 – 3) is NO, your project needs to be modified.		*Delete as appropriate*
1.	Does your project pose only minimal and predictable risk to you (the student)?	**Yes**
2.	Does your project pose only minimal and predictable risk to other people affected by or participating in the project?	**No**
3.	Is your project supervised by a member of academic staff of the School of Informatics or another individual approved by the module leaders?	**Yes**
If the answer to either of the following questions (4 – 5) is YES, you MUST apply to the University Research Ethics Committee for approval. (You should seek advice about this from your project supervisor at an early stage.)		*Delete as appropriate*
4.	Does your project involve animals?	**No**
5.	Does your project involve pregnant women or women in labour?	**No**
If the answer to the following question (6) is YES, you MUST complete the remainder of this form (7 – 19). If the answer is NO, you are finished.		*Delete as appropriate*
6.	Does your project involve human participants? For example, as interviewees, respondents to a questionnaire or participants in evaluation or testing?	**Yes**
If the answer to any of the following questions (7 – 13) is YES, you MUST apply to the Informatics Research Ethics Panel for approval and your application may be referred to the University Research Ethics Committee. (You should seek advice about this from your project supervisor at an early stage.)		*Delete as appropriate*
7.	Could your project uncover illegal activities?	**No**
8.	Could your project cause stress or anxiety in the participants?	**No**
9.	Will you be asking questions of a sensitive nature?	**No**
10.	Does your project rely on covert observation of the participants?	**No**
11.	Does your project involve participants who are under the age of 18?	**No**
12.	Does your project involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)?	**No**
13.	Does your project involve participants who have learning difficulties?	**No**
The following questions (14 – 16) must be answered YES, i.e. you MUST COMMIT to satisfy these conditions and have an appropriate plan to ensure they are satisfied.		*Delete as appropriate*

14.	Will you ensure that participants taking part in your project are fully informed about the purpose of the research?	**Yes**
15.	Will you ensure that participants taking part in your project are fully informed about the procedures affecting them or affecting any information collected about them, including information about how the data will be used, to whom it will be disclosed, and how long it will be kept?	**Yes**
16.	When people agree to participate in your project, will it be made clear to them that they may withdraw (i.e. not participate) at any time without any penalty?	**Yes**
The following questions (17 – 19) must be answered and the requested information provided.		*Delete as appropriate*
17.	Will consent be obtained from the participants in your project? Consent from participants will be necessary if you plan to gather personal, medical or other sensitive data about them. "Personal data" means data relating to an identifiable living person; e.g. data you collect using questionnaires, observations, interviews, computer logs. The person might be identifiable if you record their name, username, student id, DNA, fingerprint, etc. *If **YES**, provide the consent request form that you will use and indicate who will obtain the consent, how are you intending to arrange for a copy of the signed consent form for the participants, when will they receive it and how long the participants will have between receiving information about the study and giving consent, and when the filled consent request forms will be available for inspection (**NOTE**: subsequent failure to provide the filled consent request forms will automatically result in withdrawal of any earlier ethical approval of your project):*	**No**
18.	Have you made arrangements to ensure that material and/or private information obtained from or about the participating individuals will remain confidential? *Provide details:*	**No**
19.	Will the research be conducted in the participant's home or other non-University location?	**No**

*If **YES**, provide details of how your safety will be preserved:*

Templates

The templates available from the links below **must** be adapted according to the needs of your project before they are submitted for consideration. The sample form provided for projects involving children is to be used by the parents/ guardians of the children participating in the research project.

Adult information sheet:

http://www.city.ac.uk/__data/assets/word_doc/0018/153441/TEMPLATE-FOR-PARTICIAPNT-INFORMATION-SHEET.doc

Adult consent form:

http://www.city.ac.uk/__data/assets/word_doc/0004/153418/TEMPLATE-FOR-CONSENT-FORM.doc

Child information sheet:

http://www.city.ac.uk/__data/assets/word_doc/0003/153462/Sample-Child-Information-Sheet.doc

Child consent form:

http://www.city.ac.uk/__data/assets/word_doc/0020/153461/Sample-child-consent-1.doc

Appendix B

Appendix C

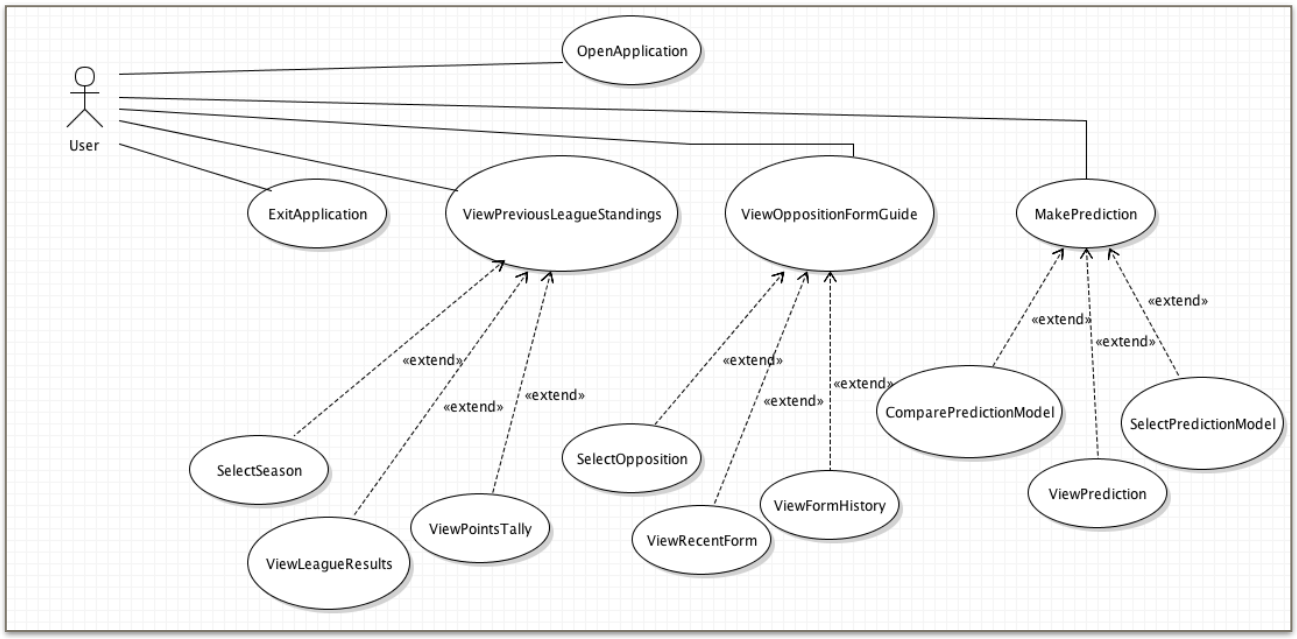
Functional Requirements

Actor Type	The User…	The User…	The User…	The User…
Result Type	…shall be able to predict…	…shall be able to analyse…	…shall be able to analyse…	…shall be able to predict…
Object	…Arsenal F.C. Premier League football matches…	…statistical information about previous Arsenal F.C. league standings…	…statistical information about Arsenal F.C. opponents…	…Arsenal F.C. football matches using different statistical methods…
Qualifier	…easily	…confidently	…confidently	…reliably

Non-Functional Requirements

Actor Type	The Application…	The Application…	The Application…	The User…
Result Type	…shall respond to…	…shall predict…	…shall contain a…	…shall be able to navigate…
Object	…the User interactions…	…Arsenal F.C. Premier League football matches…	…Graphical User Interface which is…	…the application…
Qualifier	…quickly	…accurately	…visually appealing	…easily
Requirement Type	Performance	Accuracy	Look-and-Feel	Usability

Use Case Model of Proposed System



Use Case Descriptions

Use case: OpenApplication
ID: 1
Brief description: Open application to begin using.
Primary actors: User
Secondary actors: None.
Preconditions: 1. The User has installed the application onto their machine.
Main flow: 1. The use case starts when the User has installed the application onto their machine. 2. The User accesses the executable file to start the application. 3. The application loads.
Postconditions: 1. The application is open.
Alternative flows: None.

Use case: MakePrediction
ID: 2
Brief description: Make a prediction of the next Arsenal F.C. football match using the application.
Primary actors: User
Secondary actors: None.
Preconditions: 1. The User has installed the application onto their machine. 2. The User has opened the application. 3. The User is on the main menu of the application.
Main flow: 1. The use case starts when the User is on the main menu screen of the application. 2. The User selects the ‘Prediction Setup’ option on the main menu screen. extension point: ComparePredictionModel extension point: ViewPrediction extension point: SelectPredictionModel 3. The User makes a prediction with the models available.
Postconditions: 1. A prediction has been made.
Alternative flows: None.

Use case: ViewPreviousLeagueStandings
ID: 4
Brief description: View previous league standings for Arsenal F.C..
Primary actors: User
Secondary actors: None.
Preconditions: 1. The User has installed the application onto their machine. 2. The User has opened the application. 3. The User is on the main menu of the application.
Main flow: 1. The use case starts when the User is on the main menu screen of the application. 2. The User selects the ‘Previous League Standings’ option on the main menu screen. extension point: ViewLeagueResults extension point: SelectSeason extension point: ViewPointsTally 3. The User views Arsenal F.C. previous league standings.
Postconditions: 1. A previous league standing has been viewed.
Alternative flows: None.

Use case: ViewOppositionFormGuide
ID: 3
Brief description: View form guides for Arsenal F.C. against league opposition.
Primary actors: User
Secondary actors: None.
Preconditions: 1. The User has installed the application onto their machine. 2. The User has opened the application. 3. The User is on the main menu of the application.
Main flow: 1. The use case starts when the User is on the main menu screen of the application. 2. The User selects the ‘Opposition Form Guide’ option on the main menu screen. extension point: SelectOpposition extension point: ViewRecentForm extension point: ViewFormHistory 3. The User views Arsenal F.C. opposition form guide.
Postconditions: 1. An opposition form guide has been viewed.
Alternative flows: None.

Use case: ExitApplication
ID: 5
Brief description: Close application.
Primary actors: User
Secondary actors: None.
Preconditions: 1. The User has installed the application onto their machine. 2. The User has opened the application. 3. The User is on the main menu of the application.
Main flow: 1. The use case starts when the User is on the main menu screen of the application. 2. The user selects the ‘Exit Application’ option. 3. A dialog box asks the User to confirm the close of the application. 4. The User selects the ‘Yes’ option and the application closes.
Postconditions: 1. The application is closed.
Alternative flows: None.

Extension Use case: SelectPredictionModel
ID: 6
Brief description: User selects a prediction model to use.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Prediction Setup’ option from the main menu. 2. The User wants to make a prediction.
Segment 1 flow: 1. The User selects which prediction model to use when making a prediction. 2. The prediction model is selected and the User is directed the prediction model view.
Segment 1 postconditions: 1. A prediction model has been selected.

Extension Use case: ComparePredictionModel
ID: 7
Brief description: User compares prediction model(s) and actual results.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Prediction Setup’ option from the main menu. 2. The User has made a prediction.
Segment 1 flow: 1. The User selects a prediction model(s) to compare. 2. The User selects the actual results to compare against. 3. The user can view the comparisons of each model selected.
Segment 1 postconditions: 1. Prediction model(s) have been compared against actual results.

Extension Use case: ViewPrediction
ID: 8
Brief description: User views prediction(s) that have been made.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Prediction Setup’ option from the main menu. 2. The User has made a prediction.
Segment 1 flow: 1. The User views the predictions made via the selected model. 2. The User selects how they want to view the predictions. 3. The User views the predictions graphically and in table format.
Segment 1 postconditions: 1. A prediction(s) has been viewed.

Extension Use case: SelectOpposition
ID: 9
Brief description: User selects which opposition to view.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Opposition Form Guide’ option from the main menu. 2. The User wants to choose which opposition to view.
Segment 1 flow: 1. The User views each opposition from which they can select. 2. The User selects the opposition to view.
Segment 1 postconditions: 1. An opposition has been selected.

Extension Use case: ViewRecentForm
ID: 10
Brief description: User views recent form against opposition selected.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Opposition Form Guide’ option from the main menu. 2. The User has selected the opposition to view..
Segment 1 flow: 1. The User is on the interface of the opposition selected. 2. The user views the recent form against the opposition.
Segment 1 postconditions: 1. Recent opposition form has been viewed.

Extension Use case: ViewFormHistory
ID: 11
Brief description: User views form history against opposition selected.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Opposition Form Guide’ option from the main menu. 2. The User has selected the opposition to view..
Segment 1 flow: 1. The User is on the interface of the opposition selected. 2. The user views the form history against the opposition.
Segment 1 postconditions: 1. Form history of opposition has been viewed.

Extension Use case: ViewLeagueResults
ID: 12
Brief description: User views league results of season selected.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Previous League History’ option from the main menu. 2. The User has selected the season to view.
Segment 1 flow: 1. The User is on the interface of the season selected. 2. The user views the league results and information.
Segment 1 postconditions: 1. League results of selected season have been viewed.

Extension Use case: ViewPointsTally
ID: 13
Brief description: User views points tally of season selected.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Previous League History’ option from the main menu. 2. The User has selected the season to view.
Segment 1 flow: 1. The User is on the interface of the season selected. 2. The user views the points tally.
Segment 1 postconditions: 1. Points tally of selected season have been viewed.

Extension Use case: SelectSeason
ID: 14
Brief description: User selects which season to view information for.
Primary actors: User
Secondary actors: None.
Segment 1 Preconditions: 1. The User has selected the ‘Previous League History’ option from the main menu.
Segment 1 flow: 1. The User is presented with a sub-menu to select which season to view. 2. The user chooses a season to view.
Segment 1 postconditions: 1. User selects a season.

Test Cases

Scenario #	1		
Name	Open Application		
Objective	The application opens at the first time without any errors.		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User installs the application. 2. User locates application on machine and then executes the application.	The application will load at the first attempt and the home menu screen will be presented to the User.	Yes	None.

Scenario #	2		
Name	Season Execute		
Objective	The User can choose any past season to view statistical analysis information.		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. user clicks the 'Premier League History' menu option. 3. A sub-menu appears showing all previous season options as radio-buttons. 4. The User chooses at random a season to view the statistical analysis information.	The radio-button which is chosen by the User will take the User to the screen relative to the season chosen.	Yes	None.

Scenario #	3		
Name	Opposition Execute		
Objective	The User can choose any opposition to view statistical analysis information.		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. User clicks the 'Opposition Form Guide' menu option. 3. A sub-menu appears listing all opposition as radio-buttons. 4. User clicks any opposition at random.	The radio-button which is clicked will take the User to the respective opposition form guide screen where statistical analysis is presented.	Yes	None.

Scenario #	4		
Name	Prediction Setup		
Objective	All prediction models can be accessed.		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. User clicks the 'Prediction Setup' menu option. 3. A sub-menu appears presenting further options as radio-buttons. 4. User views each prediction model screen and ensures that each model can be predicted.	The User can select the model to predict as well as view as the actual results.	Yes	None.

Scenario #	5		
Name	Back Button Functionality		
Objective	All the ‘Back To Main Menu’ buttons work without any error.		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. User goes through each application screen and uses the back button to go back to the home screen.	Once clicked, the ‘Back To Main Menu’ push button will take the User back to the main menu screen and at the same time, exit the the screen that was active.	Yes	None.

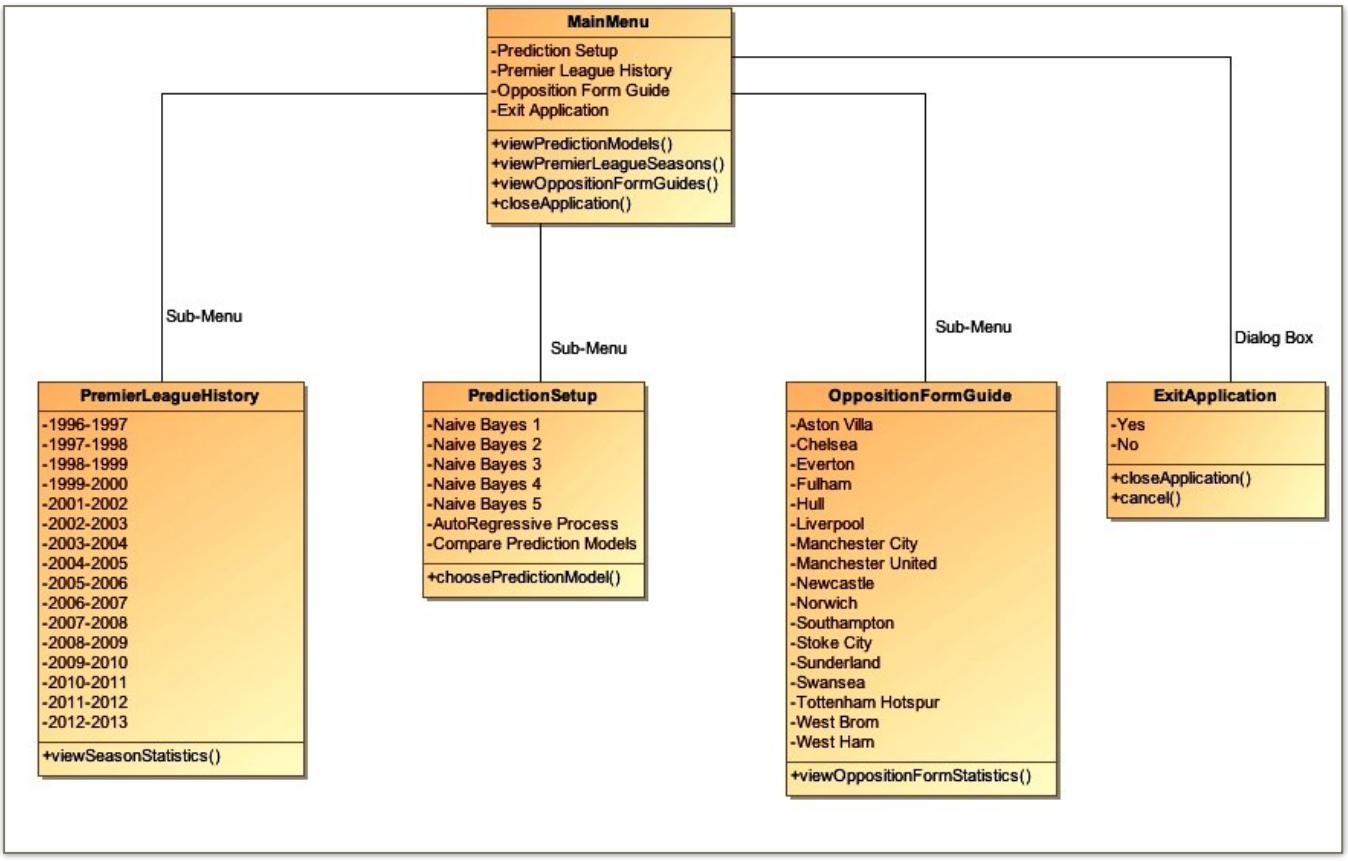
Scenario #	6		
Name	Exit Application		
Objective	The application will exit on User request.		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. User selects the ‘Exit Application’ menu option. 3. A dialog box appears asking User to confirm exit of application. 4. The User selects the ‘Yes’ option.	The application will shutdown and exit immediately once the ‘Yes’ push button is selected by the User.	Yes	The dialog box and application takes more than 3 seconds to close. This is most likely due to the coding of the ‘Exit Application’ menu option.

Scenario #	7		
Name	Predict Button		
Objective	All ‘Predict’ push buttons work without any errors		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. User clicks the ‘Prediction Setup’ menu option. 3. A sub-menu appears presenting further options as radio-buttons. 4. User views each prediction model screen and ensures that each model can be predicted.	The User clicks the ‘Predict’ push button on each Prediction model screen and the predictions appear in table format.	Yes	None.

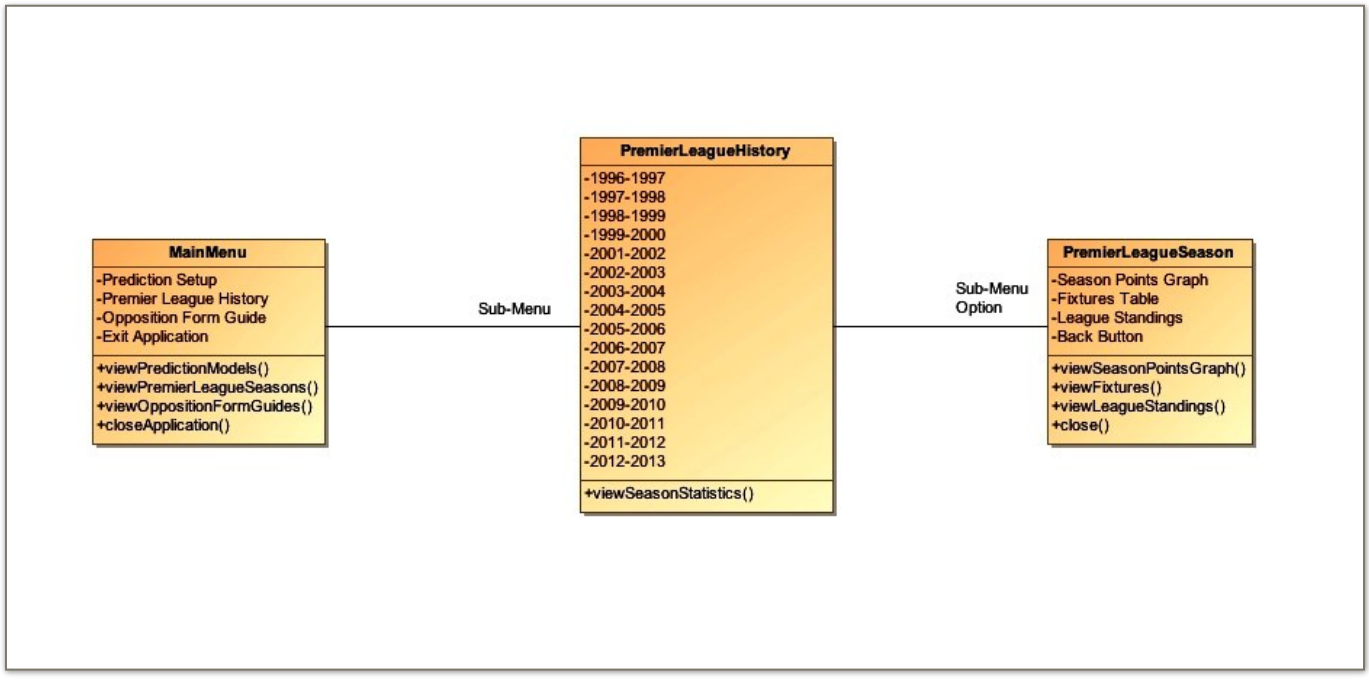
Scenario #	8		
Name	Checklist Butotn		
Objective	All ‘checklist buttons work without any errors		
User Role	Application User		
Steps	Expected Results	Met Expectations (Yes/No)	Explain Deviations if did not meet Expectations
1. User is at the home menu screen. 2. User goes through each screen where checklist buttons are present.	The User clicks checklist button and objects are selected and de-selected dependent on whether checklist button is checked or not.	Yes	None.

Analysis and Design Classes

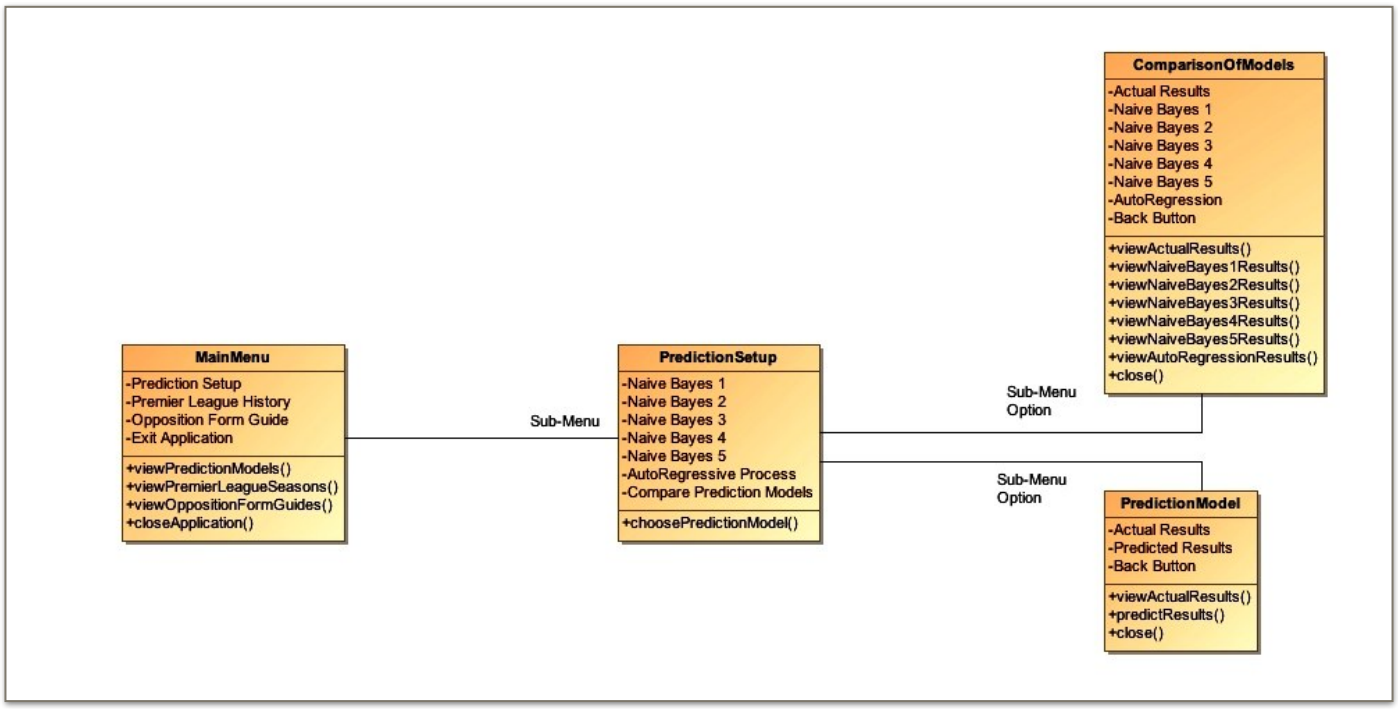
Main menu Analysis Class



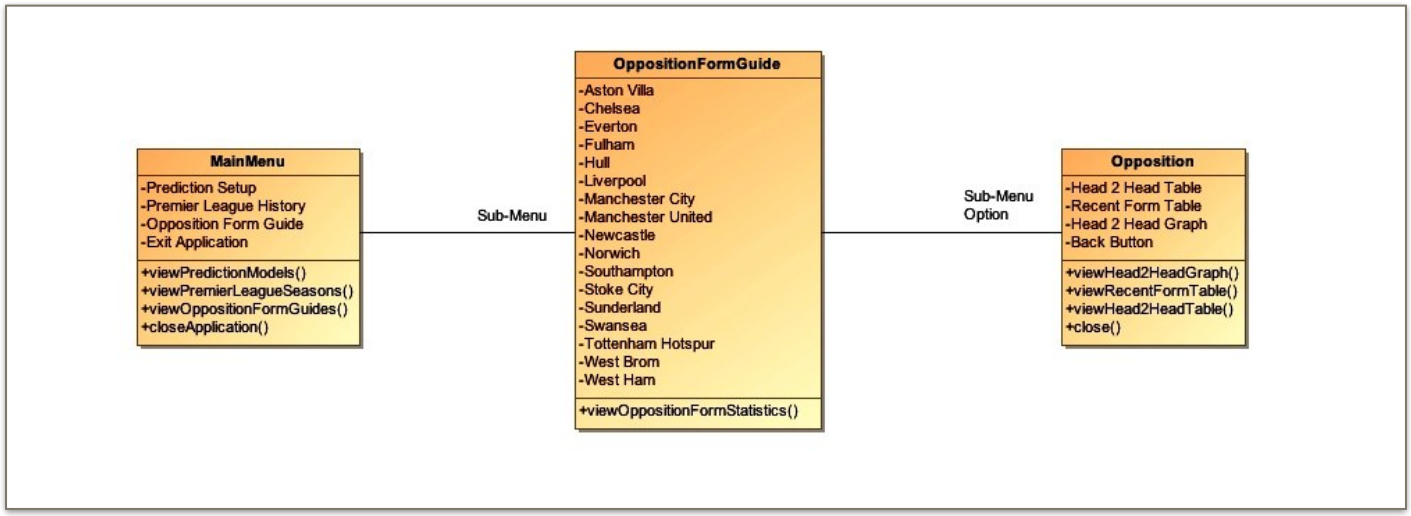
Premier League History Sub-menu Analysis Class



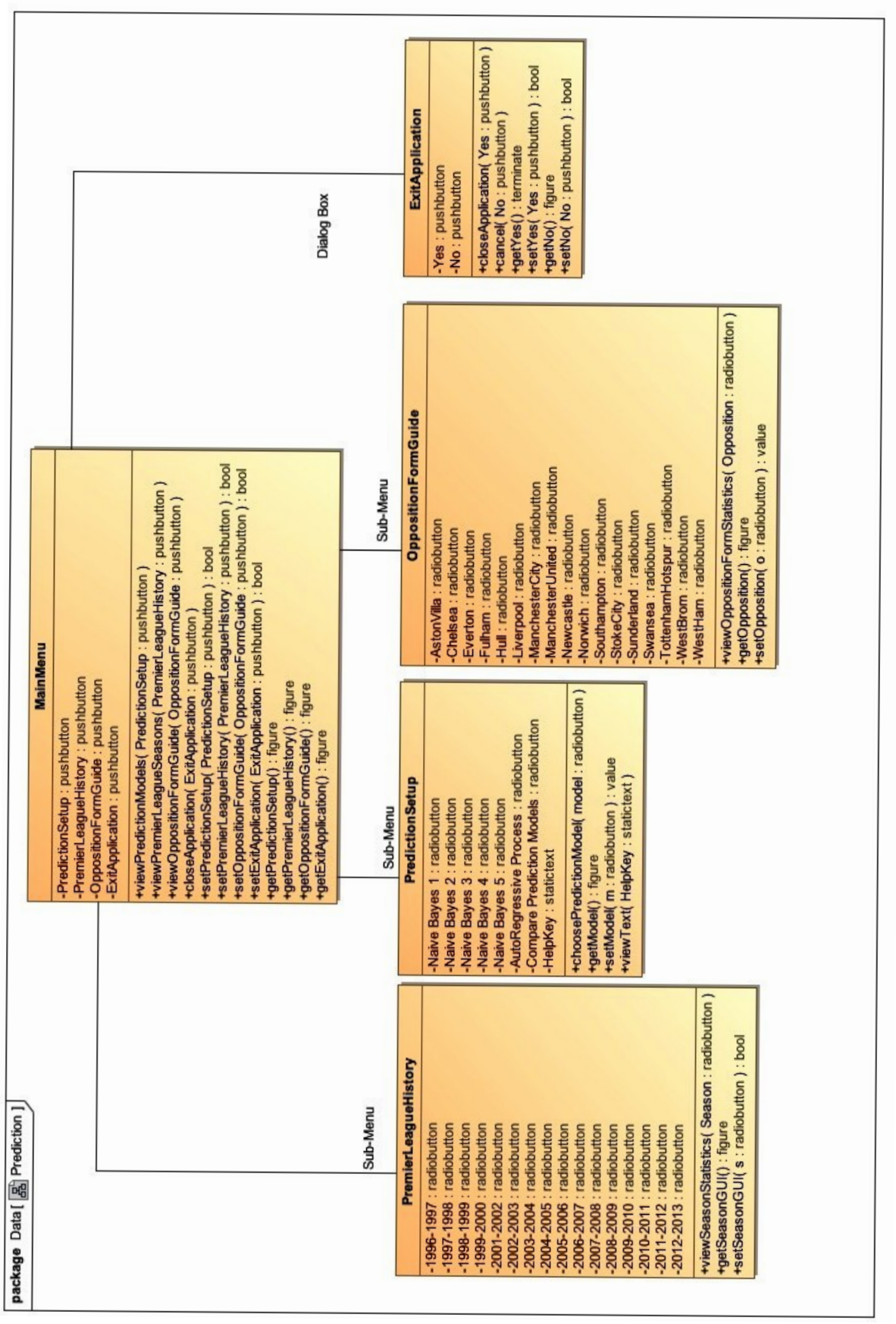
Prediction Setup Sub-Menu Analysis Class



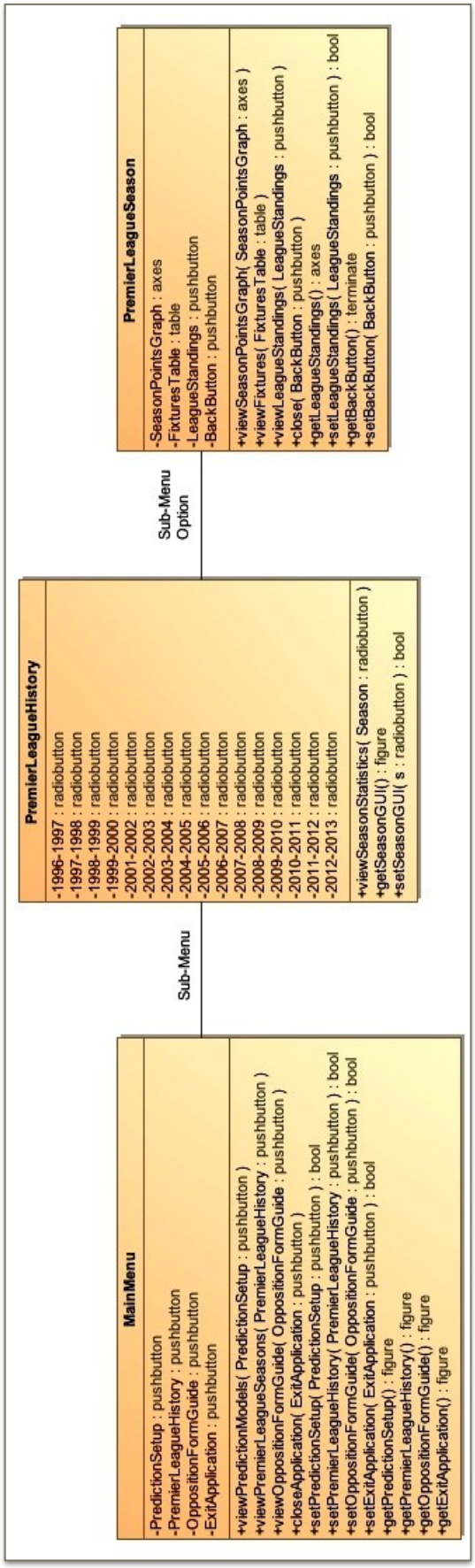
Opposition Form Guide Sub-Menu Analysis Class



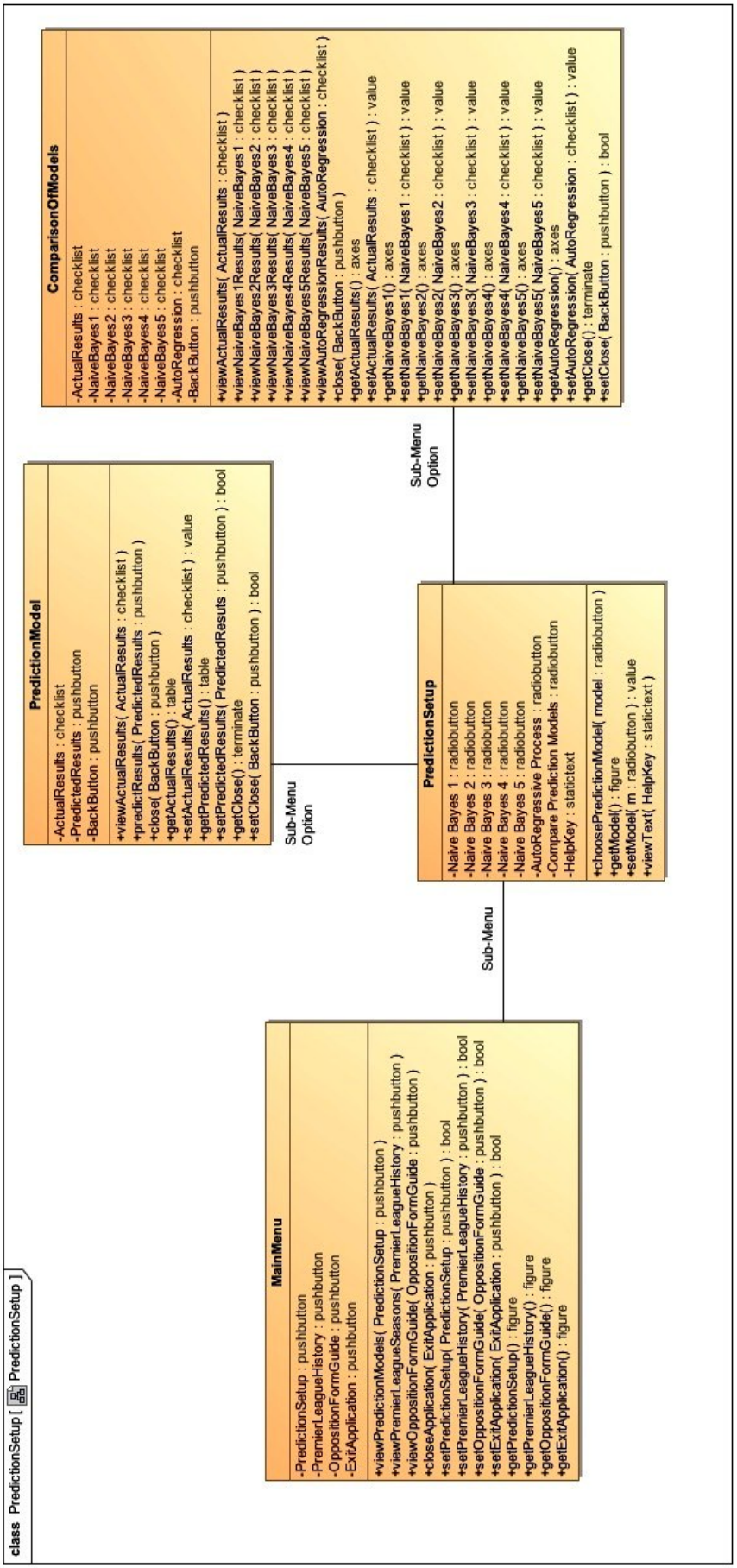
Main Menu Design Class



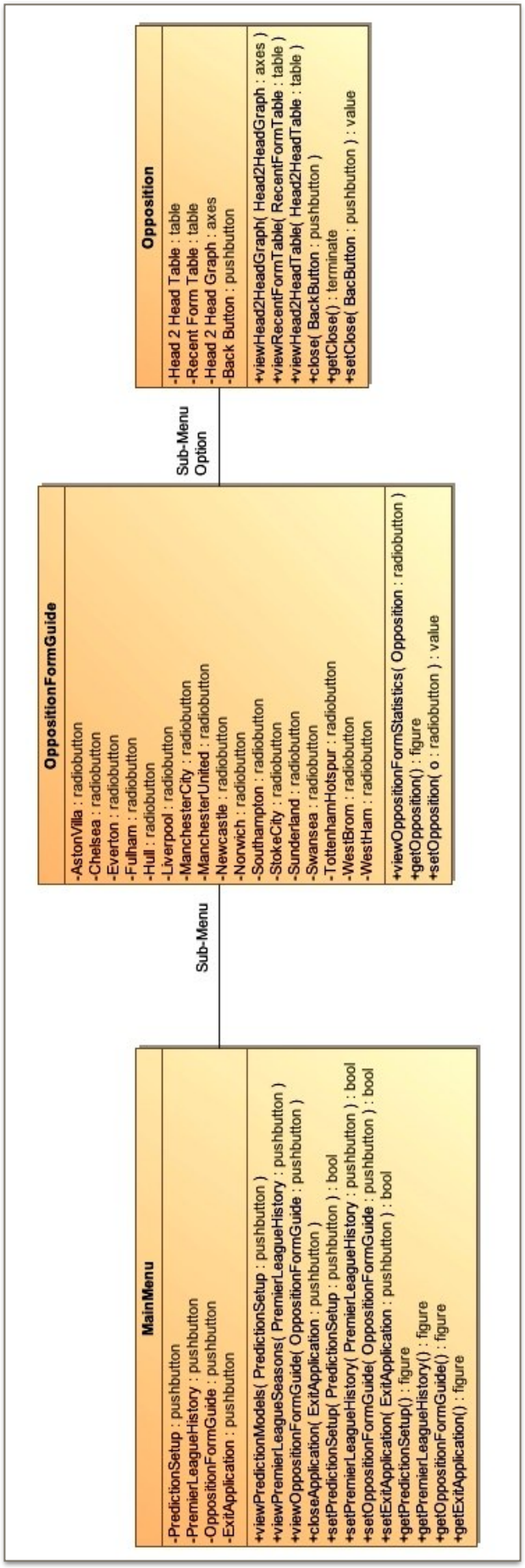
Premier League History Design Class



Prediction Setup Design Class



Opposition Form Guide Design Class



Appendix D

The project was completed using an Apple Macbook Air which does not have access to a CD-ROM drive. All source code has been uploaded as a .zip file to the Matlab File Exchange. You can access the link here: http://www.mathworks.co.uk/matlabcentral/fileexchange/46592-application-source-code-zip

Appendix E

Table of Potential Attributes

Question	Variable	Importance (High/ Medium/ Low)	Reason
Was the match played at the Arsenal F.C. home venue, or the opponent venue?	Home/ Away	High	Playing in front of their own fans and in a more familiar surrounding will have a better psychological effect on players.
Did Arsenal F.C. play a domestic or European Cup game prior to the Premier League match being played	Cup Game Played (Yes/No)	Medium	Playing an important fixture prior to the league match can have a fatigue bearing effect on the players.
Did Arsenal F.C. win, draw or lose the cup game played, prior to the Premier League match?	Cup Game Result (W/D/L)	Medium	A positive result in an important fixture prior to the league game can have a positive psychological effect whereas a negative result could have a negative effect.
Did Arsenal F.C. win their previous Premier League match?	Last Result (W/D/L)	High	A positive result in their last league fixture could have a positive effect on form and player confidence whereas a negative result could have negative effects.

Question	Variable	Importance (High/ Medium/ Low)	Reason
Was the result of Arsenal F.C.'s last Premier League match against lower ranked opposition?	Opposition Rank (Higher/ Lower)	High	A positive result against a team they were expected to win against would have little effect on player confidence. A negative result against a team they were not expected to lose against could have a large negative effect on player confidence. A positive result against a team they were not expected to win against could have a large positive effect on player confidence. A negative result against a team they were not expected to win against would not have a dramatic effect on player confidence.
Had Arsenal F.C. scored more goals than their opposition leading into the match?	Goals Scored (More/ Less)	Medium	The team with the highest amount of goals leading into the match could be the team with the best attack, therefore the most likely to score.
Had Arsenal F.C. conceded less goals than their opposition leading into the match?	Goals Conceded (More/ Less)	Medium	The team with the least amount of goals conceded leading into the match is the team with the best defence, therefore the least likely to concede.

Question	Variable	Importance (High/ Medium/ Low)	Reason
Did Arsenal F.C. possess more technically gifted players than their opposition?	Technical Rank (Higher/ Lower)	Low	The team with the most technical players are the team who are most creative, therefore the most likely to score against tough defences and rigid tactics. They are also the team most likely to dominate possession of the football.
Did Arsenal F.C. possess more physically gifted players than their opponent?	Physicality Rank (Higher/ Lower)	Low	The team with the most physical players are the team are the team who will feel superior in stature compared to the opposition. They are also the team most difficult to break down and the team most likely to win challenges for the ball as well as prove more effective at set pieces.
Did Arsenal F.C. lose their match in a particular weather season?	Time of Season (Autumn/ Winter/ Spring)	Low	Teams who have more foreign players than home-grown players are more likely to suffer during the colder weather. This is because England has a colder climate than other European countries such as Spain, Portugal and Italy. Also players coming from other continents are more likely to suffer in the colder British weather.

Question	Variable	Importance (High/ Medium/ Low)	Reason
Did the opposition win their last match?	Opposition Last Result (W/D/L)	Medium	A positive result for the opponent in their last match could have a better effect on their player confidence rather than a negative result.
Did the opposition win their last match against a team ranked higher than themselves?	Opposition Last Result Team Rank (Higher/ Lower)	Medium	A positive result for the opponent against higher ranked opposition could have a large positive effect on their player confidence. A negative effect against a lower ranked team could have a large negative effect on their player confidence.
How many previous match results have an influence on the next match result?	Form	High	This variable is important when considering parameters for AutoRegressive process. It is important to understand how many previous fixtures effect the next fixture. This is known as team form.
Do Arsenal F.C. have a better form history against their opponent going into the match or vice versa?	Form Against Opponent (Better/ Equal/ Worse)	Medium	If Arsenal F.C. have suffered more negative results than their opponents have against them, it could indicate Arsenal F.C. struggle against the opponents due to other variables indicate elsewhere in this table.

Question	Variable	Importance (High/ Medium/ Low)	Reason
Is the Arsenal F.C. manager ranked better than the opposition manager?	Manager Ranking (Better/ Worse)	Low	A manager who is ranked higher than his opposite number is more likely to be the most experienced of the two. He is also more likely to have a higher number of wins than his opposite number.

Table of Final Attributes

Question	Variable	Importance (High/ Medium/ Low)	Reason
Was the match played at the Arsenal F.C. home venue, or the opponent venue?	Home/ Away	High	Playing in front of their own fans and in a more familiar surrounding will have a better psychological effect on players.
Did Arsenal F.C. play a domestic or European Cup game prior to the Premier League match being played	Cup Game Played (Yes/No)	Medium	Playing an important fixture prior to the league match can have a fatigue bearing effect on the players.
Did Arsenal F.C. win their previous Premier League match?	Last Result (W/D/L)	High	A positive result in their last league fixture could have a positive effect on form and player confidence whereas a negative result could have negative effects.

Question	Variable	Importance (High/ Medium/ Low)	Reason
Was the result of Arsenal F.C.'s last Premier League match against lower ranked opposition?	Opposition Rank (Higher/ Lower)	High	A positive result against a team they were expected to win against would have little effect on player confidence. A negative result against a team they were not expected to lose against could have a large negative effect on player confidence. A positive result against a team they were not expected to win against could have a large positive effect on player confidence. A negative result against a team they were not expected to win against would not have a dramatic effect on player confidence.
Had Arsenal F.C. scored more goals than their opposition leading into the match?	Goals Scored (More/ Less)	Medium	The team with the highest amount of goals leading into the match could be the team with the best attack, therefore the most likely to score.
Had Arsenal F.C. conceded less goals than their opposition leading into the match?	Goals Conceded (More/ Less)	Medium	The team with the least amount of goals conceded leading into the match is the team with the best defence, therefore the least likely to concede.

Question	Variable	Importance (High/ Medium/ Low)	Reason
How many previous match results have an influence on the next match result?	Form	High	This variable is important when considering parameters for AutoRegressive process. It is important to understand how many previous fixtures effect the next fixture. This is known as team form.

Appendix F