**Macintosh HD:Users:rruzzo:Desktop:logo.pngCapstone Analytics**

Software Application Programming Guide

Version 1.0

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# 1 Preface

This document provides an overview and explanation of the functions in the software package for Capstone Analytics’ Sports Analytics Software Package.

# 2 Introduction

# 3 LinearRegression.php

LinearRegression.php holds the definition of the LinearRegression class.

## 3.1 Variables

Variables for this class are set to private and are accessible through setter and getter functions and are declared private.

### 3.1.1 meanX

The variable meanX is used to hold the value of the mean or mathematical average of the set of values of the set X.

### 3.1.2 stddevX

The variable stddevX is used to hold the value of the standard deviation of the values in the set X.

### 3.1.3 sumX

The variable sumX is holds the value of the sum of all the numbers in the set X.

### 3.1.4 sumXsqr

The variable sumXSqr holds the sum of the squared difference between the mean and the value X.

### 3.1.5 meanY

The variable meanY is used to hold the value of the mean or mathematical average of the set of values of the set Y.

### 3.1.6 stddevY

The variable stddevY is used to hold the value of the standard deviation of the values in the set Y.

### 3.1.7 sumY

The variable sumY is holds the value of the sum of all the numbers in the set Y.

### 3.1.8 sumYsqr

The variable sumYSqr holds the sum of the squared difference between the mean and the value Y.

3.1.9 psum

The variable psum holds the sum of the players in the dataset.

3.1.10 n

The variable n holds the count.

3.1.11 r

The variable r holds the correlation coefficient of the function.

3.1.12 slope

The variable slope holds the slope of the linear regression line for the slope intercept equation

3.1.13 intercept

The variable intercept holds the Y intercept of the slope intercept equation for the linear regression function.

## 3.2 Class Functions

### 3.2.1 getMeanX()

#### Summary

A getter function for the variable meanX

#### Definition

public function getMeanX()

#### Parameters

None

#### Return Value

The return value is that of meanX, and is dependent upon it.

### 3.2.2 getStdDevX()

#### Summary

A getter function for the variable stddevX

#### Definition

public function getStdDevX()

#### Parameters

None

#### Return Value

The return value is that of stddevX, and is dependent upon it.

### 3.2.3 getSumX()

#### Summary

A getter function for the variable sumX

#### Definition

public function getSumX()

#### Parameters

*None*

#### Return Value

The return value is that of sumX, and is dependent upon it.

### 3.2.4 getSumXSquared()

#### Summary

A getter function for the variable sumXsq

#### Definition

public function getSumXSquared()

#### Parameters

None

#### Return Value

The return value is that of sumXsq, and is dependent upon it.

### 3.2.5 getSumXSquared()

#### Summary

A getter function for the variable sumXsq

#### Definition

public function getSumXSquared()

#### Parameters

None

#### Return Value

The return value is that of sumXsq, and is dependent upon it.

### 3.2.6 getMeanY()

#### Summary

A getter function for the variable meanY

#### Definition

public function getMeanY()

#### Parameters

None

#### Return Value

The return value is that of meanY, and is dependent upon it.

### 3.2.7 getStdDevY()

#### Summary

A getter function for the variable stddevY

#### Definition

public function getStdDevY()

#### Parameters

None

#### Return Value

The return value is that of stddevY, and is dependent upon it.

### 3.2.8 getSumX()

#### Summary

A getter function for the variable sumY

#### Definition

public function getSumY()

#### Parameters

*None*

#### Return Value

The return value is that of sumY, and is dependent upon it.

### 3.2.9 getSumXSquared()

#### Summary

A getter function for the variable sumYsq

#### Definition

public function getSumYSquared()

#### Parameters

*None*

#### Return Value

The return value is that of sumYsq, and is dependent upon it.

### 3.2.10 getSumYSquared()

#### Summary

A getter function for the variable sumYsq

#### Definition

public function getSumYSquared()

#### Parameters

*None*

#### Return Value

The return value is that of sumYsq, and is dependent upon it.

### 3.2.11 getPsum()

#### Summary

A getter function for the variable psum.

#### Definition

public function getPsum()

#### Parameters

*None*

#### Return Value

The return value is that of psum, and is dependent upon it.

### 3.2.12 getCount()

#### Summary

A getter function for the variable n.

#### Definition

public function getCount()

#### Parameters

*None*

#### Return Value

The return value is that of n, and is dependent upon it.

### 3.2.13 getMeanX()

#### Summary

A getter function for the variable meanX

#### Definition

public function getMeanX()

#### Parameters

*None*

#### Return Value

The return value is that of meanX, and is dependent upon it.

### 3.2.14 getStdDevX()

#### Summary

A getter function for the variable stddevX

#### Definition

public function getStdDevX()

#### Parameters

*None*

#### Return Value

The return value is that of stddevX, and is dependent upon it.

### 3.2.15 getSumX()

#### Summary

A getter function for the variable sumX

#### Definition

public function getSumX()

#### Parameters

*None*

#### Return Value

The return value is that of sumX, and is dependent upon it.

### 3.2.16 getSumXSquared()

#### Summary

A getter function for the variable sumXsq

#### Definition

public function getSumXSquared()

#### Parameters

*None*

#### Return Value

The return value is that of sumXsq, and is dependent upon it.

### 3.2.16 getMeanY()

#### Summary

A getter function for the variable meanY

#### Definition

public function getMeanY()

#### Parameters

*None*

#### Return Value

The return value is that of meanY, and is dependent upon it.

### 3.2.17 getStdDevY()

#### Summary

A getter function for the variable stddevY

#### Definition

public function getStdDevY()

#### Parameters

*None*

#### Return Value

The return value is that of stddevY, and is dependent upon it.

### 3.2.18 getSumY()

#### Summary

A getter function for the variable sumY

#### Definition

public function getSumY()

#### Parameters

*None*

#### Return Value

The return value is that of sumY, and is dependent upon it.

### 3.2.19 getSumYSquared()

#### Summary

A getter function for the variable sumYsq

#### Definition

public function getSumYSquared()

#### Parameters

*None*

#### Return Value

The return value is that of sumYsq, and is dependent upon it.

### 3.2.20 getPsum()

#### Summary

A getter function for the variable psum.

#### Definition

public function getPsum()

#### Parameters

*None*

#### Return Value

The return value is that of psum, and is dependent upon it.

### 3.2.21 getCount()

#### Summary

A getter function for the variable n.

#### Definition

public function getCount()

#### Parameters

*None*

#### Return Value

The return value is that of n, and is dependent upon it.

### 3.2.22 setMeanX()

#### Summary

A setter function for the variable meanX

#### Definition

public function setMeanX()

#### Parameters

None

#### Return Value

None

### 3.2.23 setStdDevX()

#### Summary

A setter function for the variable stddevX

#### Definition

public function setStdDevX()

#### Parameters

*None*

#### Return Value

None

### 3.2.24 setSumX()

#### Summary

A getter function for the variable sumX

#### Definition

public function setSumX()

#### Parameters

None

#### Return Value

None

### 3.2.25 setSumXSquared()

#### Summary

A setter function for the variable sumXsq

#### Definition

public function setSumXSquared()

#### Parameters

None

#### Return Value

None

### 3.2.26 setMeanY()

#### Summary

A setter function for the variable meanY

#### Definition

public function setMeanY()

#### Parameters

None

#### Return Value

None

### 3.2.27 setStdDevY()

#### Summary

A setter function for the variable stddevY

#### Definition

public function setStdDevY()

#### Parameters

None

#### Return Value

None

### 3.2.29 setSumY()

#### Summary

A setter function for the variable sumY

#### Definition

public function setSumY()

#### Parameters

None

#### Return Value

None

### 3.2.30 setSumYSquared()

#### Summary

A setter function for the variable sumYsq

#### Definition

public function setSumYSquared()

#### Parameters

None

#### Return Value

None

### 3.2.31 setPsum()

#### Summary

A setter function for the variable psum.

#### Definition

public function setPsum()

#### Parameters

None

#### Return Value

None

### 3.2.32 setCount()

#### Summary

A setter function for the variable n.

#### Definition

public function setCount()

#### Parameters

None

#### Return Value

None

### 3.2.33 getCorrelationCoefficient()

#### Summary

A getter function for the variable r. The correlation coefficient is calculated within this function.

#### Definition

public function getCorrelationCoefficient()

#### Parameters

*None*

#### Return Value

Returns the value of the correlation coefficient.

### 3.2.34 getSlope()

#### Summary

A getter function for the variable slope. The value is calculated within this function and represents the slope of the linear regression line.

#### Definition

public function getSlope()

#### Parameters

*None*

#### Return Value

Returns the value of the slope for the linear regression function.

### 3.2.35 getIntercept()

#### Summary

A getter function for the variable r. The correlation coefficient is calculated within this function.

#### Definition

public function getIntercept()

#### Parameters

*None*

#### Return Value

Returns the value of the intercept for the Linear regression function

### 3.2.36 getY()

#### Summary

A function to calculate the Y value in the regression function for any value of X input based on the slope and intercept.

#### Definition

public function getY()

#### Parameters

*x*

#### Return Value

None

### 3.2.37 toString()

#### Summary

This function provides a method to output an element

#### Definition

public function toString()

#### Parameters

None

#### Return Value

A String representing the data in an element

# 4 LinearRegressionConstants.php

LinearRegressionConstants.php holds the definition of the LinearRegressionConstants, and PlayerDataPointConstants classes.

## 4.1 class LinearRegressionConstants

The LinearRegressionConstants.php holds the definition of the LinearRegression class.

#### Summary

This class will hold the calculated regression variables for analysis and selection of players

#### Definition

public class LinearRegressionConstants()

#### Parameters

*None*

#### Return Value

None

## 4.2 class PlayerDataPointConstants

The LinearRegressionConstants.php holds the definition of the PlayerDataPointConstants class.

#### Summary

This class will hold information related to the player

#### Definition

public class LinearRegressionConstants()

#### Parameters

*None*

#### Return Value

None

# 5 LinearRegressionCriteria.php

LinearRegressionCriteria.php is a utility class for building SQL statements for harvesting LinearRegression records/objects.

## 5.1 Variables

Variables for this class are set to private

### 5.1.1 tableX

The variable tableX is used to store the name of the desired table X, used for joining

### 5.1.2 tableY

The variable tableY is used to store the name of the desired table Y

### 5.1.3 rowX

The variable rowX is used to store the rowX value

### 5.1.4 rowY

The variable rowY is used to store the rowY value

### 5.1.5 joinX

The array joinX holds values associated with a database join for the values of X.

### 5.1.6 joinY

The array joinY holds values associated with a database join for the values of Y.

### 5.1.7 sql

The sql variable holds a string with the sql statement built by the class functions

## 5.2 Class Functions

### 5.2.1 \_construct()

#### Summary

The \_construct function is a non-default constructor for the class which has 4parameters and serves to set up the variable definitions.

#### Definition

public function getMeanX($tableX, $rowX, $tableY, $rowY)

#### Parameters

$tableX, $rowX, $tableY, $rowY

#### Return Value

None

### 5.2.1 addInnerJoin()

#### Summary

The addInnerJoin function is used to create an inner join statement to build the sql statement for obtaining the proper data from the database. The statement pushes the joinX and joinY values into the arrays joinX and joinY respectively.

#### Definition

public function getMeanX($joinX, $joinY)

#### Parameters

joinX, joinY

#### Return Value

None

### 5.2.3 getLinearRegressionSql()

#### Summary

The getLinearRegressionSql function is used to create the sql statement

#### Definition

public function getLinearRegressionSql()

#### Parameters

None

#### Return Value

A string representing the SQL statement for the linear regression function

### 5.2.4 getPlayerDataPointSql()

#### Summary

The getPlayerDataPointSql function is a utility function to build an SQL statement to gather records for PlayerDataPoints

#### Definition

public function getPlayerDataPointSql()

#### Parameters

None

#### Return Value

A string representing the SQL statement for player data points.

### 5.2.4 addJoins()

#### Summary

The addJoins function is used to add joins information to the passed in sql parameter.

#### Definition

public function addJoins($sql)

#### Parameters

sql

#### Return Value

A string representing the modified SQL statment

# 6 LinearRegressionUtils.php

LinearRegressionUtils.php has several utility functions related to linear regression.

## 6.1 rowToLinearRegression

#### Summary

This function will take the result row that utilizes the constant names and builds a LinearRegression object from it.

#### Definition

public class LinearRegressionConstants($row)

#### Parameters

*row*

#### Return Value

This function returns a LinearRegression object.

## 6.2 rowsToPlayerDataPoints

#### Summary

This function takes rows that utilize the constant names and build an array of PlayerDataPoint Objects from them.

#### Definition

public class rowsToPlayerDataPoints($result, $linearRegression)

#### Parameters

*result, linearRegression*

#### Return Value

This function returns an array of PlayerDataPoint objects

# 7 PlayerDataPoint.php

PlayerDataPoint.php contains the definition for the PlayerDataPoint class

## 7.1 Variables

Variables for this class are set to private

### 7.1.1 playerId

The variable playerId holds the playerId that will be obtained from the database.

### 7.1.2 firstName

The variable firstName holds the first name of the player matching the playerId obtained from the database.

### 7.1.3 lastName

The variable lastName holds the last name of the player matching the playerId obtained from the database.

### 7.1.4 x

The variable x holds the x value for the player

### 7.1.5 y

The variable y holds the y value for the player

### 7.1.3 expectedX

The variable expectedX holds the expected X value for the player in the database

### 7.1.4 expectedY

The variable expectedY holds the expected Y value for the player in the database

## 7.2 Class Functions

### 7.2.1 getPlayerId

#### Summary

This is a getter function to return the playerID in the object.

#### Definition

public class getPlayerId()

#### Parameters

*None*

#### Return Value

This function returns the playerId from the object.

### 7.2.2 getFirstName

#### Summary

This is a getter function to return the firstName variable in the object.

#### Definition

public class getFirstName()

#### Parameters

*None*

#### Return Value

This function returns the firstName variable from the object.

### 7.2.3 getLastName

#### Summary

This is a getter function to return the lastName variable in the object.

#### Definition

public class getLastName()

#### Parameters

*None*

#### Return Value

This function returns the lastName variable from the object.

### 7.2.4 getXValue

#### Summary

This is a getter function to return the x variable from the object.

#### Definition

public class getXValue()

#### Parameters

*None*

#### Return Value

This function returns the x variable from the object.

### 7.2.5 getYValue

#### Summary

This is a getter function to return the y variable from the object.

#### Definition

public class getYValue()

#### Parameters

*None*

#### Return Value

This function returns the y variable from the object.

### 7.2.6 getExpectedX

#### Summary

This is a getter function to return the x variable from the object.

#### Definition

public class getXExpectedX()

#### Parameters

*None*

#### Return Value

This function returns the expectedX variable from the object.

### 7.2.7 getExpectedY

#### Summary

This is a getter function to return the y variable from the object.

#### Definition

public class getExpectedY()

#### Parameters

*None*

#### Return Value

This function returns the expectedY variable from the object.

### 7.2.8 getDifferenceX

#### Summary

This is a getter function to return the difference between the x variable and the expected x variable from the object.

#### Definition

public class getDifferenceX()

#### Parameters

*None*

#### Return Value

This function returns the difference between the x variable and the expectedX variable.

### 7.2.9 getDifferenceY

#### Summary

This is a getter function to return the difference between the y variable and the expectedY variable from the object.

#### Definition

public class getDifferenceY()

#### Parameters

*None*

#### Return Value

This function returns the difference between the y variable and the expectedY variable.

### 7.2.10 setPlayerId

#### Summary

This is a setter function for the playerId variable

#### Definition

public class setPlayerId($id)

#### Parameters

*id*

#### Return Value

None

### 7.2.11 setFirstName

#### Summary

This is a setter function for the firstName variable in the object.

#### Definition

public class setFirstName($firstName)

#### Parameters

*firstName*

#### Return Value

None

### 7.2.12 setLastName

#### Summary

This is a setter function for the lastName variable in the object.

#### Definition

public class setLastName($lastName)

#### Parameters

*lastName*

#### Return Value

None

### 7.2.13 setXValue

#### Summary

This is a setter function for the x variable in the object.

#### Definition

public class setXValue($x)

#### Parameters

*x*

#### Return Value

None

### 7.2.14 setYValue

#### Summary

This is a setter function for the y variable in the object.

#### Definition

public class getYValue($y)

#### Parameters

*y*

#### Return Value

None

### 7.2.15 setExpectedX

#### Summary

This is a setter function for the expectedX variable in the object.

#### Definition

public class setXExpectedX($expectedX)

#### Parameters

*expectedX*

#### Return Value

None

### 7.2.16 setExpectedY

#### Summary

This is a setter function for the expectedY variable in the object.

#### Definition

public class getExpectedY($expectedY)

#### Parameters

*None*

#### Return Value

None