# Functional Specification

# SportsPA

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## Abstract

This document will outline the specifications of the SportsPA project. It will detail the objectives to be carried out and how these objectives will be measured at the end of the project.

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# 1. Introduction

This project started out as an idea to assist sports teams with the collection of statistics. Once primarily only used by professional sports teams, statistics have become very important in to amateur teams also. Being an avid follower of many sports, I have witnessed many teams recording statistics using pen and paper. This may be due to a number of factors, such as not being aware of existing applications to record such data or the available applications not being suitable. Having researched such applications, as outlined in the Research Document, I believe there is an opportunity to provide an application that can be customised to suit different sports at varying levels of participation.

As part of my research I contacted a lecturer at IT Carlow who was involved in Sports Performance analysis. Johnny Bradley was very enthusiastic about the project I'm undertaking and had numerous ideas on what approach to take. One area he suggested early was to provide a system whereby a team manager/coach could be updated in real time while his assistant was recording live events. This was the approach this project then took and my initial research focussed on this area.

After a few meetings with Johnny Bradley, he suggested an alternative approach to take. He outlined a very real need that would benefit his students with analysing sports performance. He explained that currently his students were using software from "Sportstec" called "Gamebreaker", to record events from video. The details of this Software are outlined in the Research Document. The output from this particular Software is in the format of an XML file. A much more expensive version of this Software, called "SportsCode Elite", outputs statistics on an easy to read Dashboard. Providing an Application which would parse the XML results obtained by the software used by students, into a more readable format would be of great benefit. The application could also be used by other colleges or sports teams who may be financially restricted by the huge cost in purchasing the "SportsCode Elite" software.

Having identified such a great need, it was decided that the goal of my project would change to meet this need. The requirements would be specified by Johnny Bradley as the project progressed. This approach was taken in order to allow me to get more domain knowledge and for Johnny to decide what output would be most beneficial. At the outset, the aim was to have three iterations. This will continue to be the case but each iteration will be broken into smaller iterations in order for Johnny to decide what output is most suitable.

This document will detail both the functional and non-functional requirements to be implemented. As a result of the very agile approach being undertaken, these requirements will, without doubt, change as the project progresses. These changes will also be recorded.

## 2. The Final Product

The end result of this project will be Software that will be used to parse XML statistics into a more readable format by means of a dashboard. The users of the software will have recorded events, either live or from video. These events will output an xml file. This resulting file is not easily read by humans. For this reason, the SportsPA application will be used in order to quickly and easily analyse the statistics recorded. The initial goal,  for the software provided by this project, is to parse XML files which are output from "GameBreaker" software used in IT Carlow. Looking further ahead, the final product may be used in conjunction with other software providing output in XML or JSON format. Therefore, for this project, I will outline only how the resulting final product will interact with "GameBreaker".

Details of how "GameBreaker" works has been outlined in the Research Document. A snippet of the resulting output from "GameBreaker is provided in Fig 2.1. and Fig 2.2.

```xml
1    <file>
2    <ALL_INSTANCES>
3    <instance>
4    <ID>1</ID>
5    <start>537.5550327760</start>
6    <end>560.9146562810</end>
7    <code>IRE Build Up</code>
8    </instance>
9    <instance>
10   <ID>2</ID>
11   <start>538.3944231740</start>
12   <end>540.3944231740</end>
13   <code>Match Start/Stop</code>
14   </instance>
15   <instance>
16   <ID>3</ID>
17   <start>541.5550327760</start>
18   <end>560.9146562810</end>
19   <code>IRE Poss</code>
20   </instance>
21   <instance>
22   <ID>4</ID>
23   <start>552.5566347640</start>
24   <end>568.1148758920</end>
25   <code>NZL CP</code>
26   </instance>
```

Figure 2.1

```
3989   </row>
3990   <row>
3991    <code>NZL Press</code>
3992    <R>0</R>
3993    <G>0</G>
3994    <B>0</B>
3995   </row>
3996   <row>
3997    <code>NZL PS</code>
3998    <R>0</R>
3999    <G>0</G>
4000    <B>0</B>
4001   </row>
4002   <row>
4003    <code>NZL Turnover</code>
4004    <R>0</R>
4005    <G>0</G>
4006    <B>0</B>
4007   </row>
4008   <row>
4009    <code>#ERROR</code>
4010    <R>26214</R>
4011    <G>5397</G>
4012    <B>0</B>
4013   </row>
4014   </ROWS>
4015   </file>
```

Figure 2.2

This XML file will be input into SportsPA to produce an easy to read and analyse dashboard. The proposed dashboard will initially be similar to that in Figure 2.3, which is the output provided in the "SportsCode Elite" Software. However, this may change throughout the project, as requirements are specified by Johnny Bradley.
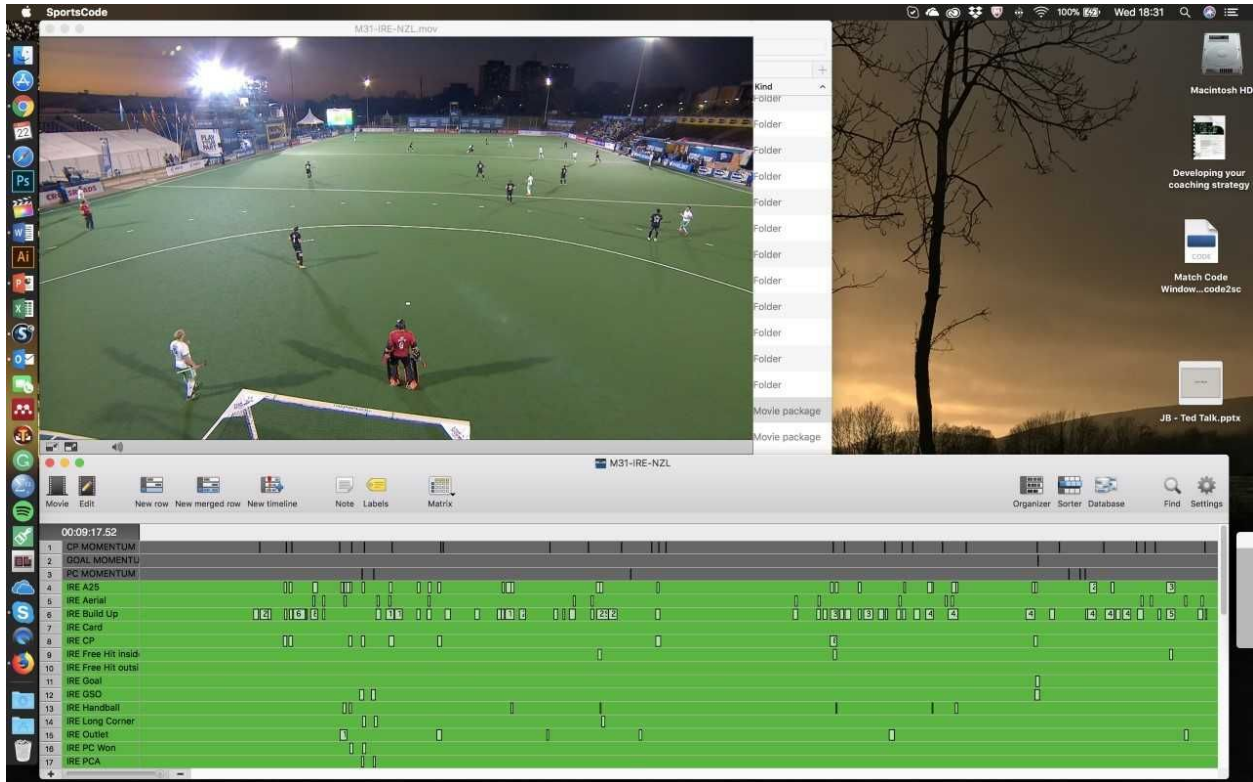
Figure 2.3

The images used in Figure 2.1, Figure 2.2 and Figure 2.3 have been provided by Johnny Bradley and are taken from an Ireland vs. New Zealand hockey match. They have been produced from the more expensive "SportsCode Elite" Software. However, the XML file in Figure 2.1 and Figure 2.2, is the same as the output from the "GameBreaker" Software used by IT Carlow.

The XML file contains code tags which correspond to events which are recorded by students involved in Sports Performance Analysis at IT Carlow. The codes are set up by the users prior to recording and correspond to events that may occur during match time. The events are generated from previously recorded video, but could also be generated in real time during a match.

Figure 2.3 shows the video which the recordings were taken from, and the dashboard showing the events recorded. In the dashboard the column on the left contains all the code tags from the XML file. The x-axis of the dashboard is the time frame of the match from start to finish. Each tick corresponds to when that event was recorded from start to finish.

As stated, the initial goal of the finished product is to provide a dashboard as displayed in Figure 2.3 above. Due to the Agile approach been taken in this project, the look and feel of the final project may change according to the requirements specified by Johnny Bradley.

## 3. Target Market

The target market that the resulting software produced as a result of this project are initially students of Sports Performance analysis at IT Carlow. The specifications have been supplied by lecturer Johnny Bradley, with his students in mind. SportsPA will be produced as a direct replacement for SportsTec software, which costs an annual subscription of approximately €6,000.

Although the initial target market is as mentioned above, SportsPA could be used by any student of similar courses. It would also be suitable for those engaged in any kind of sports analysis.

The only caveat to allow those outside the original target market to use SportsPA is that they have an XML file similar to that produced by GameBreaker. This means that the tags in the XML must have the same name as those used in GameBreaker.

## 3. Use Case Diagram
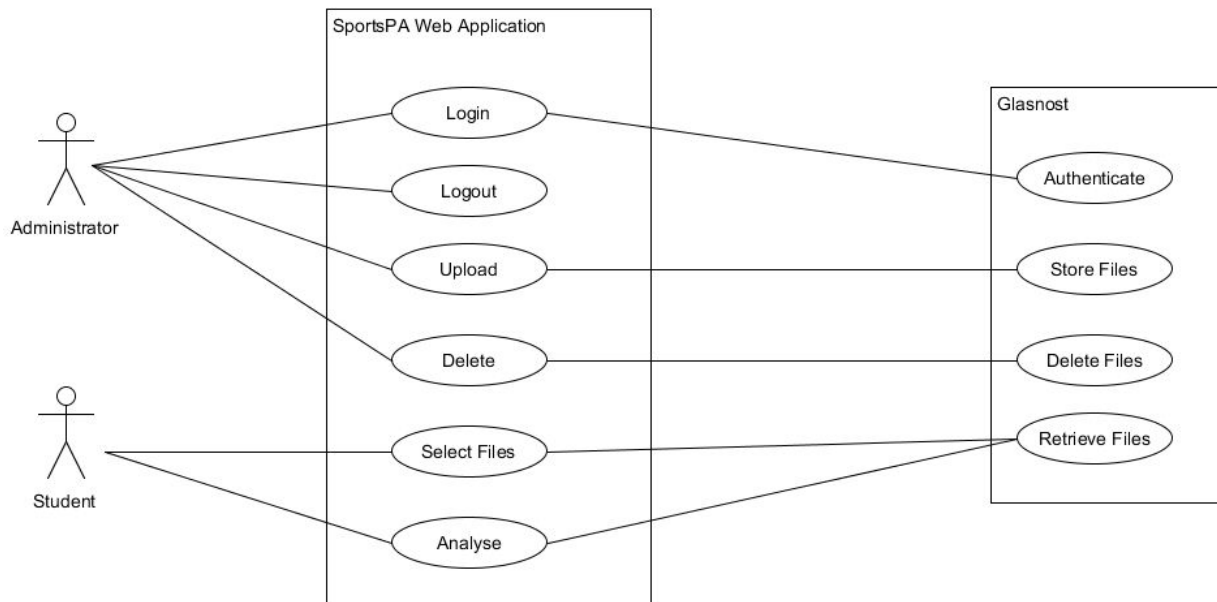
# 5. Use Cases

## 5.1. Home

**Name:**  Home
**Actors:** Student
**Description**: When a Student wishes to perform analysis of a match system they do not need to login to the system.The Student just needs to access the home page. Here they will be presented with 2 dropdown boxes. The first dropdown will present them with all the mp4 video files that have been previously uploaded to the system. The second dropdown will present them with the list of xml files previously uploaded to the system. The student selects an mp4 and an xml file and clicks play. This will then display the page where the analysis will be performed.

## 5.2. Analysis

**Name:**  Play
**Actors:** Student
**Description**: Having selected files for analysis on the Home page, the Student will be presented with the analysis page. The page will contain the selected mp4 video. It will display the selected xml file in the form of a graph/plot. The plot will contain all the events recorded in the xml file. The Student will be able to select an event for analysis. When an event is selected the video will be played from the start time of that event until the end time of that event. The details of the event, including the name, the number of that particular event, the start time, the end time and any labels, will be displayed.

The Student will also be presented with another option to select an event for analysis. This will be 2 dropdown boxes. The first dropdown will allow the Student to select the name of the event they wish to analyse. On selection of an event by the Student,the second dropdown will be updated with all the times associated with the selected event. The Student can then select a time and that event will be played on the video from the start time of the event to the end time of the event.

The webpage will also include a replay button. This will allow the Student to replay the last event that was played.

The Student can then return to the Home page to select different files for analysis if they so wish.

### 5.3. Login

**Name:**  Login
**Actors:** Administrator
**Description**: When an Administrator wishes to upload xml and/or mp4 files to the system they must first log in to the webpage access the upload feature of the system. To achieve this, the administrator must input the correct username and a password. This information is checked against the entries in the User Database and if correct, the administrators session is started and they are redirected to the Upload screen.

### 5.4. Upload

**Name:**  Upload
**Actors:** Administrator
**Description**: When an Administrator accesses the upload page they will be presented with an input box which will allow them select any mp4 or xml files from their own system. They can browse their ps and only files with a .mp4 or .xml extension will be shown. They can then select multiple files for upload. Clicking the upload button will upload the files to their relevant folder. The extension is checked to determine which folder the file goes into as there is a different folder for each extension.

### 5.5 Delete

**Name**:  Delete
**Actors**: Administrator
**Description:** Having logged in  the administrator has the option to delete previously uploaded and stored files. This is done through the Delete page after the administrator selects the Delete Tab. The administrator is presented with a drop down list of all .mp4 and .xml files that are stored on the system. The administrator can then select a file to delete. On clicking the 'Delete' button the file will be deleted. The administrator will remain on the delete page and can delete another file if necessary.

### 5.6 Logout

**Name**:  Logout
**Actors**: Administrator
**Description:** When the administrator wishes to logout after they can do so from the upload page by selecting the logout option which appears in a tab. When the user selects this option their session will be ended and they will be redirected back to the Home page.

# 6. Supplementary Specification

## 61. Functionality

A Student must must be presented with the analysis page within 2 seconds of selecting files.
When the analysis page is loaded the video must finish loading within 20 second of the page finishing loading.
An Administrator must be able to access all aspects of the system from the web application
A Student must be able to access the Home screen from the web application.
An Administrator must only be able to upload mp4 or xml files.

## 6.2. Usability

The GUI must be easy to navigate and comply with design standard
The layout of each web page must be uniform throughout the site in order to allow for easy navigation.

## 6.3. Reliability

The application must be available 24 hours a day 7 days a week so that a Student or Administrator can access it 98% of the time.
When a Student selects files the system must ensure that the correct files are presented for analysis 100% of the time.

## 6.4. Performance

The system must be able to support multiple users.
When a new file is loaded it must be available immediately to allow Students perform their analysis.

## 6.5. Supportability

The web application must be compatible with all major browsers.
Support should be provided so that if the layout of xml files produced by third party software changes, then upgrades will be performed

## 6.6.Security

A secure login facility must be provided to  ensure that any files uploaded by an administrator cannot be altered by any unauthorised users.

# 7. Metrics

The success, or otherwise of this project will be measured from feedback supplied by the client Johnny Bradley. Johnny Bradley supplied the overall specifications at the start of the project. As the project progressed specifications were altered or added. As each requirement was supplied, they were shown to Johnny for approval or disapproval.