

Initial Plan

Performance Analysis Portal

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Project Description

The project aim is to implement a web application for athletes to analyse individual and team, training and competitive performances as a method of self-development and leading to improved performance. The process of analysis can be undertaken through the use of coded video footage taken during training sessions and competitive matches/events. Video analysts record video footage of training sessions and competitive events, via high-definition camera's and then use video processing software to add XML metadata to specific time zones in the video. This metadata provides a method of gathering statistics such as the number of times an event occurs during a section of footage. Through culminating this metadata and combining it with other collections of the same metadata, patterns can be identified and the performance analysts can generate knowledge.

The project aim is orientated around, but not limited to, the video analysis activities undertaken at the Cardiff Blues Rugby Union team by players, coaches and performance analysts. The present desktop system prevents performance analysis from taking place away from the Cardiff Blues Headquarters Video Analysis Hub, as there is no secure method of accessing the coded video footage, statistic reports or other material related to the process.

The project aims to facilitate the process of performance analysis by creating a web application accessible from any location, allowing stakeholders to access the same resources available via the HQ Video Analysis Hub. Through allowing this process to take place via a web application there is no requirement for multiple licenses of the video processing software, such as SportsCode (Sportstec, 2014), in order to view such footage and statistics. This will not only allow a vast number of stakeholders to have access to these valuable resources, but will also prove to be economically efficient in regards to the cost of software licenses and the requirement for multiple devices to be provided to specific stakeholders. In order for stakeholders such as coaches to carry out their performance analysis tasks they are provided with laptops and other devices in order to use such software away from HQ. Through creating a secure web application providing the same basic facilities, coaches and players will be able to access these resources from their own devices, with the added security of no digital material ever leaving the data storage facility, reducing the risk of unauthorised distribution.

The greatest problem the current system has is that it has not been designed in order to accommodate the vast volume of video footage and statistics residing on the organisations server. As a result of the current online system being design to be lightweight and to only manage small quantities of data, analysts are restrained in the volume of footage they are able to place on the server. In order to overcome this problem the problem of multiple matches and training sessions being place on the server each week, I aim to implement a system that is able to use each match package produced by the video analysts, and distribute each player's specific clips from the match from this package. This process will be achieved through the use of the XML data associated with the video footage the player appears in. These specific clips will then be extracted from the match

video package in order to produce an abstract collection of the player's own specific clips. This will as a result only require one copy of each match played during each week, leading to the volume of video footage on the server being drastically reduced.

Although the project is orientated around the Cardiff Blues Rugby Union team, it is aimed at addressing an array of individual and team, sports performance analysis scenarios. Therefore due to the varying needs of different sports organisations, I aim to use a portal framework in order to facilitate the delivery of common services each organisation may require. This will aid the creation of a 'tailored' made system for each organisation the system is used by.

Project Aims and Objectives

The project aim also encapsulates the player's formal match review process along with the daily analysis tasks outlined previously. This process is currently conducted using an independent online system, consisting of a generic question list relating to performance and limited access to training and match footage. The aims in relation to this review process are to create a specific question list depending on the player's position, and to enable the player to choose specific sections of video footage to include in relation to the questions they are asked to further aid communication between the players and the coaches. This will enable the coaches to view the footage associated with the questions answered in the players review process, and identify any strengths or weaknesses in order to work on these areas during future training sessions.

In order for the project to resolve the issues identified and combine both facilities into one remotely accessible system, it also aims to include several other features. These features will aid communication between the stakeholders identified, therefore aiding the process of performance analysis, with the aim to improve individual and team performance. These features will include but are not limited to:

- Team calendar facility to display all activities players and staff are involved in (the activity, time, venue and additional notes).
- Strength and Conditioning test monitoring feature to record and compare test scores (personal scores, team averages, target scores and progress graphs).
- Strength and Conditioning physical monitoring test to monitor and assess player's physical conditions (hydration, nutrition, sleep, injuries, aches and additional notes).
- Generic video analysis facility to allow players, coaches and performance analysts, to add tags to video footage at specific times, in order to aid communication of key points, with particular emphasis on strength testing videos.

The projects underlying aim is to ensure this performance analysis facility is secure by meeting the key objectives of ensuring confidentiality, integrity, availability and authentication (Toal, 2011).

- Confidentiality – This objective concerns the protection of communications too and from the systems server to the client, and data stored on the server, against interception and viewing by unauthorised personnel. This is particularly important in competitive sport, where unauthorised access by personnel who may be in competition in the same sport to such files and footage, may provide them with a significant advantage. This objective is also important in relation to the submission of personal data such as player information, which is also stored on the team's server as the system must abide by legislations such as the Data Protection Act. Data transmission must therefore ensure confidentiality is maintained; this can be achieved via encryption of such data during transmission such as that offered by SSL (Secure Socket Layer) encryption (digicert, 2014).
- Integrity – This objective concerns the assurance that data stored the server or in transmission between client and server, has not been modified by anyone unauthorised to do so. This is particularly important in regards to messages, calendar appointments or documents, which are held by the system. If important files such as call sheets or team tactics are changed in a malicious manner, it is important for the personnel concerned with this material to know these changed have occur. This can be ensured via the use of hashing algorithms such as the MD5 message-digest algorithm. This hashing function creates a cryptographic hash of the original file, this can then be used by the personnel downloading the file at a later date to verify their obtained hash using the same algorithm to ensure the file is the same as the original version.
- Availability – This objective in concerned with the data and video footage being accessible to stakeholders despite possible disruptive events. Although the data stored on the server is not critical to the organisations operations, it is highly valuable. In order to ensure this data is as complete as possible in the event of possible disruptive events, regular backups should be taken; a suitable method of backup for such data in this scenario would be that of an incremental methodology. This method performs a backup on data that has been changed or recently added to the data storage device, ensuring even recently added data is available if a disruption was to occur, in sport it is often the recent data which is the most valuable.
- Authentication – This objective is vital to achieving the underlying aim of the project and resolving the current issue of a non-distributed performance analysis facility. Access to the systems content and features must only be granted to authorised users such as the stakeholders in this scenario. User registration and authentication make up this authentication process in the majority of web application systems through the use of usernames and passwords entered via a login facility. This process prevents unauthorised personnel accessing the systems data and services, and also allows the system administrator to assign user rights within the system in relation to what data and services each user of the system can access.

Through meeting these objectives the users of the system will be assured that their content such as tactics, calls, training regimes, player information and other information vital to success in sport, is stored securely.

Work Plan

Project Tasks and Sub-Tasks

Review Existing Systems (1/1/2015 – 24/1/2015)

- Review and analyse existing video analysis software
- Review and analyse existing team management software
- Review existing portal frameworks and services

Gather User Requirements (1/1/2015 – 6/2/2015)

- Conduct user questionnaires (Four user groups – players, coaches, analysts and team manager/s)
- Conduct user interviews (Four user groups – players, coaches, analysts and team manager/s)

Produce User Requirements (6/2/2015 – 10/2/2015)

- Functional Requirements
- Non-Functional Requirements
- System Scope and Boundaries
- Risk Assessment
- Identification of Issues (Legal, Ethical, Social and Professional)

Design User Interface Mock-ups/Prototypes (11/2/2015 – 20/2/2015)

- Hand-draw interfaces
- Prototype system (interface without functionality)

Analyse User Feedback (22/2/2015 – 28/2/2015)

- Refine hand-draw and prototype interfaces
- Refine user requirements
- Produce system architecture diagram
- Produce use case diagrams to model actor interaction
- Produce class diagram
- Design Test Cases

Develop Web Portal and Services (1/3/2015)

- Implementation of web portal
- Database schema design and implementation
- Implementation of services and integration of existing services
- User interface design implementation

User Prototype Testing (20/4/2015)

- Conduct user questionnaires (Four user groups – players, coaches, analysts and team manager/s)

- Conduct user feedback sessions (Four user groups – players, coaches, analysts and team manager/s)

Analyse User Prototype Testing Feedback (22/4/2015 – 24/4/2015)

- Adopt user preferences if necessary (Four user groups)
- Identify areas for future development
- Analyse usability of system and refine UI

Conduct Prototype Refinements (24/4/2015 – 27/4/2015)

- Implement identified refinements to system
- Implement additional feasible features identified in user testing

Propose Future Developments (27/4/2015 – 30/4/2014)

- Identify areas identified by users for future development
- Identify areas for future development or expansion of system
- Design new service prototype (User-interface and architecture)

Write Final Report (19/4/2015 – 5/5/2015)

- Support Pages (Abstract, Acknowledgements, Contents, Figures)
- Main Body (Introduction, Background, Specification, Design, Implementation, Results, Evaluation, Future Work, Conclusions, Reflection on Learning)
- Support Pages (Glossary, Table of Abbreviations, Appendices, References)

Supervisor Meetings

Monthly Progress Reviews

- Supervisor Meeting – February (13/2/2015)
- Supervisor Meeting – March (13/3/2015)
- Supervisor Meeting – April (10/4/2015)
- Supervisor Meeting – May (1/5/2015)

Fortnightly Reviews (Every other Thursday)

These reviews will be scheduled on a fortnightly basis in order to provide a point of contact with my supervisor and update to her on the projects progress. Within these meetings I will provide her with an in-depth update of the projects progress, identifying what I have achieved, what I aim to achieve in the near future and identification of any problems I have encountered.

Gantt Chart and Task Details

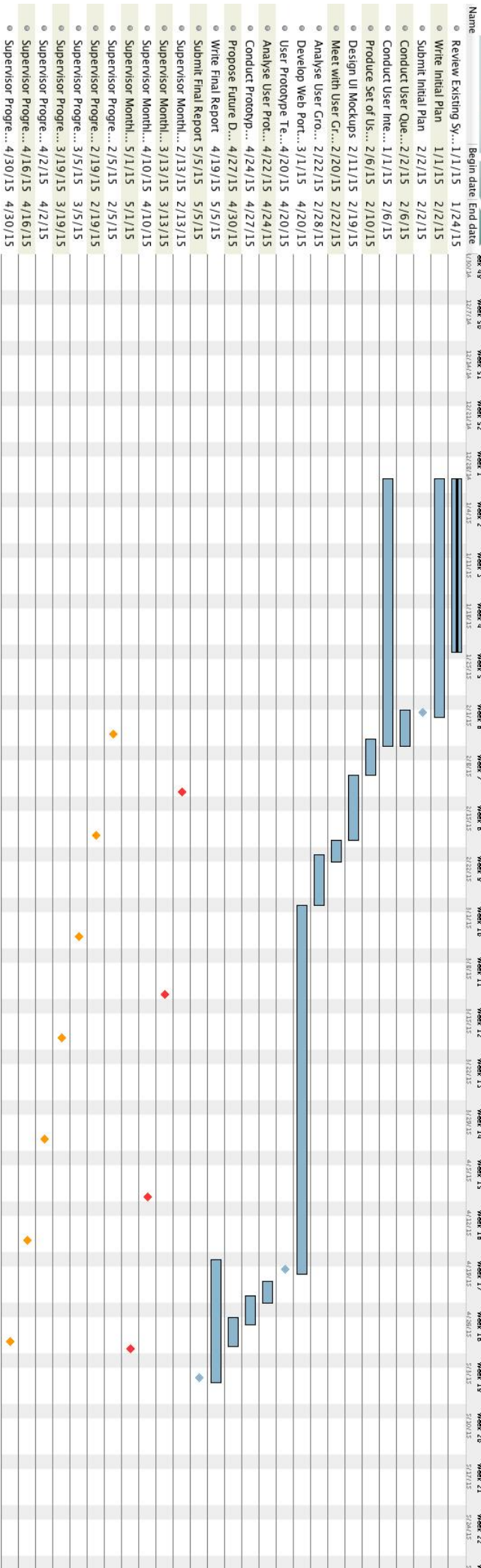
The Gantt Chart below illustrates; each period specific tasks will cover over the duration of the project, key milestones where reports are to be produced and supervisor progress meetings. This method helps to illustrate consecutive tasks which will be running throughout the project and will aid me to organise my time in order to ensure I meet each planned deadline. Additionally there is also a list of tasks contained on the chart with the relative start and end dates to each outlined in the table below.



2014

2015

Sub Supervisor Progress Meeting for P Supervisor Monthly Meeting - March for P Supervisor Monthly Meeting - May



Tasks

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Name	Begin date	End date
Review Existing Systems	1/1/15	1/24/15
Write Initial Plan	1/1/15	2/2/15
Submit Initial Plan	2/2/15	2/2/15
Conduct User Questionnaires	2/2/15	2/6/15
Conduct User Interviews	1/1/15	2/6/15
Produce Set of User Requirements	2/6/15	2/10/15
Design UI Mockups	2/11/15	2/19/15
Meet with User Groups with Requirements and Designs	2/20/15	2/22/15
Analyse User Group Feedback	2/22/15	2/28/15
Develop Web Portal and Services	3/1/15	4/20/15
User Prototype Testing	4/20/15	4/20/15
Analyse User Prototype Feedback	4/22/15	4/24/15
Conduct Prototype Refinements	4/24/15	4/27/15
Propose Future Developments	4/27/15	4/30/15
Write Final Report	4/19/15	5/5/15
Submit Final Report	5/5/15	5/5/15
Supervisor Monthly Meeting - February	2/13/15	2/13/15
Supervisor Monthly Meeting - March	3/13/15	3/13/15
Supervisor Monthly Meeting - April	4/10/15	4/10/15
Supervisor Monthly Meeting - May	5/1/15	5/1/15
Supervisor Progress Meeting	2/5/15	2/5/15
Supervisor Progress Meeting	2/19/15	2/19/15
Supervisor Progress Meeting	3/5/15	3/5/15
Supervisor Progress Meeting	3/19/15	3/19/15
Supervisor Progress Meeting	4/2/15	4/2/15
Supervisor Progress Meeting	4/16/15	4/16/15
Supervisor Progress Meeting	4/30/15	4/30/15

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Toal, P. (2011, 04 01). *Information Security - Architectural Approach*. Retrieved 01 28, 2015 from Oracle: <http://www.oracle.com/technetwork/articles/entarch/arch-approach-inf-sec-360705.pdf>