**Development of a map-based web application to be used by visitors and staff at the Dyfi Wildlife Centre**

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| Report Name | Project Outline |
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# Project description

The Dyfi Wildlife Centre is a visitor centre run by the Montgomeryshire Wildlife Trust, situated on the Cors Dyfi Nature Reserve in Powys, Wales. Its purpose is to showcase the reserve's work, and its place as an osprey conservation, engagement, and research project [1]. This project will aim to create a map-based application to assist volunteers at the centre while they aim to provide an interactive and educational experience to visitors. The application should operate from a browser on a touch-screen Windows PC, with information and details about the site presented in a user-friendly manner.

The project will develop a single-page web application to assist volunteers in providing information to visitors. Volunteers have varying levels of computer literacy, and importance must be placed on the application being easy to use and aesthetically pleasing. The interface will involve the use of a map API, such as the OpenStreetMap API [2] or Google Cloud Maps Platform [3]. An interface for adding information about specific points of interest will be developed; be that parts of the centre, public transport links, or local businesses surrounding the nature reserve. The application should also provide access to the Dyfi Osprey Project's existing webcam infrastructure, built to show a live feed of their osprey nests.

The project will also develop an administration portal, where volunteers can enter and manage information about the nature reserve through a graphical interface. Initial information, and the requirements of this administration portal, will have to be sought from the customer at some stage during the project. Information will be stored via persistent data.

The application will be used directly by the Dyfi Wildlife Centre. There is a need for the application to be maintainable and written with a view to long-term use. The project will place focus on sustainable software, along with the development of documentation for both end users and developers on how to use and maintain the application. Future use-cases for the project may involve it being used independently by visitors, or it being used on other devices such as mobile phones, and the project will consider how to allow for future iterations upon it to be as simple as possible.

The project will utilise an adapted form of Agile Development for one-person software development [4], which will be further adapted for an academic software project. The project will place emphasis on Test-Driven Development, with the construction of a CI/CD pipeline to assist in delivering working software.

# Proposed tasks

The following tasks will be carried out as part of this project:

* **Investigation of technology stacks for development –** This task will research into which technology stack to use for the development of the application. A review will take place of the advantages and disadvantages of certain stacks, and the maintainability of such a project with its chosen stack. Prominent stacks to investigate would be a CSS framework such as Bootstrap or Material Design and then a choice between a JavaScript stack like MEAN (MongoDB, Express.js, Angular and Node.js) or other stacks such as Django’s Python stack or Spring’s Java stack. Research into choosing a technology stack will be consulted [5]. An investigation will also take place into the type of hosting that the customer has, be that a server instance or shared hosting
* **Creating the development environment** – This task will gather the necessary requirements for creating a local environment for development of the project. Use of container platforms such as Docker for Windows [6] may be beneficial. The task will also initialise a version control system, with a choice being made as to whether to use the department’s git repository, or an external service, likely GitHub [7]. A choice will be made as to what CI/CD pipeline should be set up, with GitHub having several tools available on their marketplace.
* **Developing the application** – The development stage of this project will be broken down into two subtasks, which further subtasks defined during this stage in the form of issues. The Test-driven development process will be used throughout this task.
  + **User interface** – This subtask focuses on the frontend stack, and specifically the development of an aesthetically pleasing and responsive user interface. It will create the layout for the web application and the administration portal where data entered can be edited. The map API chosen will also be embedded. During this phase, static mock data will be used, and any required backend implementation will remain minimal.
  + **Back-end development** – This subtask focuses on the backend stack; implementing CRUD operations for data and building the database. It will also ensure an authentication protocol is selected to allow access to the administration portal. Any APIs used in the UI will be interfaced with the data.
* **Communicating with stakeholders** – This task will require communication throughout the project with its stakeholders. Weekly supervisor meetings will occur, as well as a project journal, in the form of an HTML5 web page, to ensure the current progress of the project is clear. This project also involves an external customer; a contact at the Dyfi Wildlife Centre. Regular meetings, either in-person or by e-mail, will be required throughout the project to ensure that the customer’s requirements are clear. Two demonstrations; a mid-project demonstration between Thursday 12th March 2020 and Wednesday 18th March 2020, and a final demonstration between Monday 11th May 2020 and Friday 29th May 2020, will be scheduled, and suitable preparations for these will be made.
* **Creating documentation** – Documentation will be a crucial part of this project, to ensure that the code is maintainable and useful to the customer. This document and the final report will be created and disseminated to relevant people in the department. A project maintenance document will be created to ensure that future developers have a better understanding of how to maintain and iterate upon the project. A brief user manual will also be created to assist volunteers in using the system.

# Project deliverables

# Annotated Bibliography

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