Year in Industry SFIA skills selector

Initial Report

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Project Overview

As a part of its Year in Industry programme, the School of Computer Science and Informatics requires students to select two IT-related professional skills that they would like to improve upon during their placement. These skills are defined and described by the Skills Framework for the Information Age (SFIA). The framework contains a wide range of skills relating to the IT industry and details the seven levels of responsibility for each skill; with the higher levels representing that individuals are operating with a greater degree of complexity and autonomy in this skill area. The goal of this is to enable students to monitor and assess the progression of their selected professional skills before and after completing their placement.

Currently, students are required to select their chosen skills and generate the necessary forms using an SFIA Selector web application which was created by a student as a previous final year project. The service allows students to select two skills (such as "Knowledge Management" and "IT Infrastructure") and choose an appropriate level range for each, then automatically generate the assessment form for the employer or student to use. Previously the forms were created manually by copy-and-pasting the information from the SFIA reference document into a Word document template. This has become an increasingly time-consuming process for staff, with the growing number of students partaking in the Year in Industry scheme. The service also allows students to browse the available skills and view a description of each along with the behaviours, values, knowledge and characteristics that an individual should have in order to be identified as competent at the level. Finally, the service includes a rudimentary natural language processing tool which allows the student to enter some text and attempts to find skills related to the textual data.

Following the deployment of the service, the School now requires some maintenance to be performed as well as some additional features to be added in order to enhance the utility of the platform. The aim of this project is to further develop the application to meet the requirements outlined by my project supervisor and by members of the Year in Industry team. The key requirements that must be met include fixing some textual errors in the existing platform, allowing for the merging of the resulting SFIA IT professional skills form with the Core Competencies form, implementing a choice between the English and Welsh language within the interface, and adding a staff login area where members of the placement team would be able to upload updated versions of the SFIA framework. The desired result is a durable, well-tested service, which is easy to use and will be suitable to be used by staff and students in years to come. Furthermore, the resulting service should be well-documented and written with strong software engineering practices in mind such that it facilitates future maintenance and possible extension, thus ensuring the longevity of the application.

Project Aims and Objectives

1. Provide a login area for placement staff to upload new versions of the SFIA framework
    - The login must be secure to ensure that only members of staff are able to make changes to the SFIA skills listed by my service.
    - The staff login area should allow new versions of the SFIA skills framework to be uploaded.

- This will probably be in the form of a semi-structured PDF document which must first be scraped to produce a structured data format such as JSON so that the system may easily process the data.
- There should the option to upload an English or Welsh version of the SFIA framework, as well as an option to only use the English version if an up-to-date version is not available in Welsh.
- The login area should also list the currently uploaded version of the SFIA framework so that staff know which version is presently using. This is a feature we may also decide to add to the main user area so that students may also see which version of SFIA the service is using.

2. Fix textual errors in current service
    - This is a small, superficial task.

3. Merge resulting SFIA IT professional skills form with Core Competencies form
    - Merging these documents to produce a unified output will allow the student or employer to assess both sub-sets of skills without referring to multiple documents.

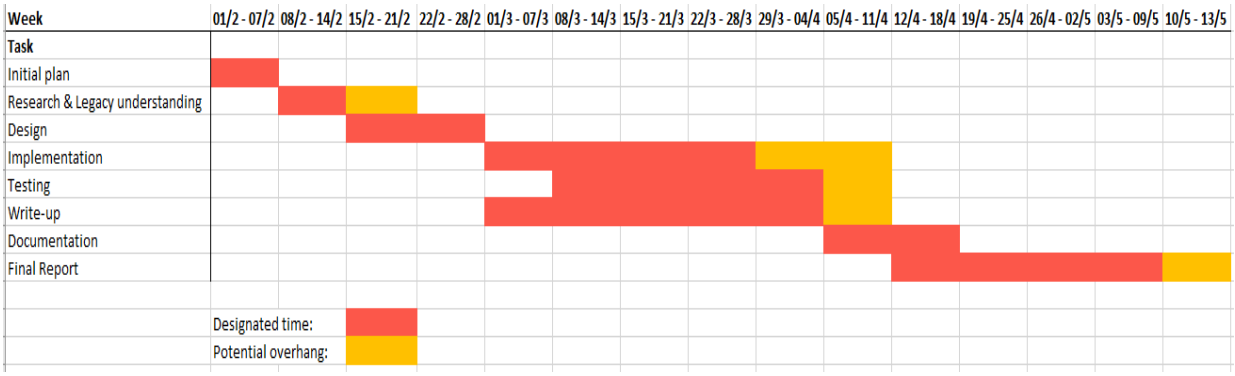
4. Option to translate the service into the Welsh language
    - Adding an interface feature to allow the displayed language of the service to be switched between English and Welsh would make the platform more accessible to Welsh speakers.
    - This would require communication with the university's Welsh translation service in order to procure Welsh translations of the English interface and potentially of the SFIA reference framework itself.
    - As the SFIA framework is not currently available in Welsh, we will attempt to secure funding to have it translated in its entirety. However, due to the scale of the document this may not be possible within the timeframe of this project. In this case we may opt to translate the textual information on the interface and resultant forms and simply warn users that the SFIA skills framework will only be available in English.
    - As a non-Welsh speaker, it will be important for me to have my work thoroughly checked by a proficient Welsh speaker to ensure that it is grammatically and semantically accurate.

Work Plan

During the course of the project, it will be exceedingly important to have frequent communication with both my project supervisor and the Year in Industry team. Regularly delivering segments of work will ensure that the work is in line with the desires and expectations of the clients. As this is an individual project, regularly self-reflecting upon my progress and making necessary adjustments to my workflow will also be extremely important to ensure that I am making continuous progress, so for these reasons I feel it is appropriate to employ an Agile development methodology. I have

chosen to use a variant of the Scrum development methodology, a subset of Agile development, which I will adapt to be suitable for an individual rather than a team.

Figure 1: Project timeline



Initial plan

The initial plan refers to the preparation of this project proposal, outlining the scope and objectives of the project, and describing how the final product and report will be produced within the timeframe.

Research & Legacy Understanding

This time will be used to do research surrounding the project. It will allow me to get to grips with the technologies used in the legacy code as well as researching technologies I may decide to use when implementing the required functionalities. Some areas I will likely need to look at include:

- The legacy code for the current service
- SFIA format and structure
- Document scraping
- Default browser language recognition using HTTP headers
- Document creation, combination and formatting using python
- Security and ethics surrounding a secure login
- Development using the Django framework
- General web-application development best practices
- Scrum methodology practices and tools

Design

Once I have completed the required research, I can now begin designing my solution. The design phase will include:

- Formally establishing the functional and non-functional requirements of the project

- Using Scrum principles to break requirements down into user stories, estimating the time each will take to implement, and then grouping these stories into several development sprints.
    - User stories capture requirements from an end-user perspective by describing the type of user, what they want and why.
    - A sprint is a period of development by the end of which all features outlined in the 'sprint backlog' will be 100% complete.
- Risk assessment
- System and component architecture: how will new components interface with the existing components and how will data flow within the updated application
- User experience consideration: how should the new features look and feel, what should the user journeys look like.

Implementation

In line with Scrum principles, my implementation process will be broken down into several sprints. At the end of each sprint the result should be presentable pieces of work that can be delivered to my clients for feedback. This style of implementation should result in a tight feedback loop between developer and client which allows for agile adjustments to be made to the work as well as adjustments to the clients' specifications if necessary.

By breaking down development tasks and product requirements into prioritised user stories I will be able to select the highest priority tasks to work on each day. I will then re-estimate the time needed to complete each requirement which will give me a continuous view of how many hours must be completed to stay on schedule. Furthering this, a burnout chart could then be used to visualise the number of hours of work remaining to be completed in the sprint, allowing me to see the projected completion time of the sprint based on the burnout velocity and adjusting if necessary.

By the end of the implementation process the resulting product should meet all the aims and expectations of this proposal as well as any further adaptations to the requirements outlined by the clients. The final milestone in the development of this service will be its deployment on the School servers. This will only occur after the product is thoroughly tested and the final service has been approved by the project supervisor and Year in Industry team.

Testing

When using Scrum development principles, testing is viewed as part of the development process, not something that happens after coding is completed. Before each sprint, user stories will be refined and I will establish the acceptance criteria for each to define when the activity can be considered 'done'. For functional requirements, these acceptance criteria will allow me to write quantitative test cases which can be tested against.

Testing must be done for each requirement and user-story to ensure that they have been fulfilled before a sprint can be completed. Performing testing on a sprint-by-sprint basis should result in functioning code which can be

Write-up

Write-up will consist of keeping informal notes and will take place in parallel with testing and implementation to keep track of my development process and to assist in documentation and producing the final report.

Documentation

To promote strong maintainability and extendibility of the system I plan to thoroughly document the internal architecture of the system and the additional features I am adding. This should build upon existing documentation for the current system and follow a similar format.

The documentation should describe each component in terms of its responsibility and an explanation of how it should be used and tested. The documentation should also give details of any technologies and standards that were employed during implementation to assist any future developers that may need to maintain or extend the service.

Final Report

The final report will summarize my processes during the completion of the project and evaluate the final product against the aims and objective set out in the project proposal. The report will address both my successes during the development of the service as well as any issues I faced and how they were navigated.

Before the production of my final report, I will produce a draft copy for review by my supervisor approximately two weeks prior to the submission date. This will give me time to make any necessary adjustments or improvements to the report before the final hand in date.

Supervisor Meetings

I will be meeting regularly with my project supervisor throughout the project to evaluate my progress and address any potential issues that have arisen. I will also be periodically meeting with members of the Year in Industry team to ensure their close involvement in development decisions and nurture regular feedback between client and developer.

References

1. SFIA: The global skills and competency framework for a digital world <https://sfia-online.org/en> [Accessed: 01/02/2021]
2. Scrum for one: A tutorial on adapting Agile Scrum methodology for individual <https://www.lucidchart.com/blog/scrum-for-one> [Accessed: 02/02/2021]