COMP4801 - Final Year Project

E-poster platform integrated with social networking features

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Abstract

This interim report presents the current status of the final year project “E-poster platform integrated with social networking features”. The main objective of this project is to enhance the promotion effectiveness of the posters in campus. Since there are hundreds of bulletin board in campus, it is impossible that students can check out every posters on campus. Building this e-poster platform eliminates this problem as users can access the platform anywhere, anytime with Internet access.

The platform is built in Rails. Rails is a web application framework running on the Ruby programming language, it is a framework with high productivity as its community is open source. There are many different libraries and source code are free to use.

Currently, the fundamental features of the e-poster platform is implemented already, including the login function, user model and poster model. The coming phases will include add-on features and social networking features to enhance user friendliness.
Acknowledgment

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# Table of Contents

Abstract 2
Acknowledgment 3
Table of Contents 4
1. Project Background 6
2. Objectives 7
3. Current status 8
   3.1 Login function 8
   3.2 Poster model 9
4. Methodology 10
   4.1 Software development Method 10
   4.2 Framework and Technologies 11
5. Difficulties encountered 14
6. Future Plan 15
   6.1 Add-on features 15
   6.2 Social networking features 18
7. Conclusion 20
8. Reference 21
List of Figure

Fig 3.1 8
Fig 3.2 9
Fig 4.1 10
Fig 4.2 11
Fig 4.3 12
Fig 4.4 12
Fig 4.5 13
Fig 5.1 14
Fig 6.1 15
Fig 6.2 16
Fig 6.3 17
Fig 6.4 18
Fig 6.5 19
1. Project Background

Bulletin board is intended to post public messages, for example to advertise items, provide information or announce events. In HKU, it is tedious to put up a poster on the bulletin board, there are regulations and policies, also you will have to go to campus and stick it, and remove it after a certain period. Our university organizes hundreds of events everyday, which fills up the bulletin boards on campus. If a students is having lesson in centennial campus, he or she may miss out the posters in other buildings. However, if no one notices the bulletin board, it becomes meaningless and produces a lot of paper waste. E-poster platform can solve the above issues, it does not only eliminate the environmental concerns, it also enhance the management process. More importantly, students can view the posters anywhere, anytime once they can access the Internet.

It is not a secret that today is a generation of social media. A website with posters only is not attractive enough as it only promotes various events or activities. To attract users, the e-poster platform would also integrate some social networking features to connect users and facilitate interactions between users. The platform would also adopt different mechanics to analyze and keep track on the interests and behaviours of users and provide suggestions on activities, events, job opportunities for users accordingly, and even able to suggest potential friends or communities that shared common interests or background with users.

The project is a web-based platform that handles e-poster submissions, schedules them for display according to certain rules and policies, provides and maintains an interface for user interaction.
2. Objectives

- Increase the **promotion effectiveness** of the posters
- Provide a **user-friendly** web-based platform for users to check out posters
- Provide **social networking services** to connect users
- Provide **personalized suggestions** based on users’ interests and behaviours
- Provide a **comprehensive promotion service** for everyone, as the platform is scalable, the user target is not limited in the students of HKU only, all of the university students or even **general public** can also use the platform

The main objectives of the project is to increase the promotion effectiveness of the posters in campus as it is impossible that students will check out every bulletin board in campus. However, to attract students to use it, it has to be user-friendly and attractive. Decent design of layout, social networking features and personalized content would be attractive to students, and there will be different functions and features provided to enhance user-friendliness.

The ultimate goal is to provide a platform for university students to check out posters including different school events, faculty events, society events, entertainment events or even intern and exchange opportunities. It helps students to acquire different event’s information easily. The platform will also integrate social networking features to allow students expand their social circle based on the events, activities, or organization that they participate in.
3. Current status

3.1 Login function

Basic login function has been implemented. User have to register their account with their email to verify. It is useful when user forgot their password of this platform. When user logged in, he or she can apply to the event associated with the poster.

![Login form](image)

Fig 3.1

The above figure is the login form of the platform. When user click the “Forgot your password” button, a hyperlink will be sent to user’s email. User can reset the password by click the hyperlink.

The login function is created using a rails software package called “devise”. It provides flexible authentication solution. It interacts with the user model to authenticate user on the database, and
it also supports different extension software package like “OmniAuth”, which allows rails application to authenticate with multiple provider like facebook, twitter, github...etc. At this stage, the login function is not integrated with “OmniAuth” yet, it will be implemented in the coming phases.

3.2 Poster model

Poster model have been created. Poster can be view, upload, edit and delete. Poster and its information will be stored in the database when user upload the poster. Also, the owner of the poster is able to edit and delete it. Every user can view the posters on the home page.

It supports 3 kinds of extension, jpg, png and pdf. At this phase, the homepage of the platform only display the posters by the time created, because the poster model does not have field to store the views and the category yet.

Besides implemented the login function and poster model, routes is also implemented. Routes is responsible for navigating to different page to display different content according to the user action. For example, if the password is incorrect, it should redirect to the error page. The following figure is an example of the routes in rails application.

Fig 3.2
4. Methodology

4.1 Software development Method

**Incremental model** is used in this project, it generates working software quickly and early during the software life cycle, it is also easy to test and debug. The project work is split into iterations. The platform is incrementally enhanced with additional functions or features in every iteration. The development cycle is as the figure below.

![Diagram](Fig 4.1)

This project is suitable to use incremental development model as I can get the feedback from my supervisor and users and make changes regarding to the feedbacks immediately to optimize future iterations.
4.2 Framework and Technologies

Ruby on Rails is used to build core features of the e-poster platform. It is a web application framework with MVC architecture. MVC stands for model, view, and controller respectively. The controller responds differently according to user’s action, it decides what is going to happen based on user’s action. It then communicates with the model to get the data needed from the database. When it decides what is going to display on the browser, it will then send the HTML, CSS, JavaScript to the view, the presentation layer. The following figure is the concept of MVC architecture in user’s perspective.

![MVC Architecture](image)

Ruby on Rails is very suitable in this project as it is very productive compared to other frameworks as it has an object-oriented nature and a vast collection of “gem” available online. “Gem” is the software package of Ruby which contains a packaged Ruby application or library. It can be used to extend or modify functionality in Ruby applications. There are around 9000 gems available on the Internet, so it
saves up a lot of time for building function from nothing and thus speed up the development process.

Bootstrap is a front end framework for easier and faster web development. It provides a lot of user interface components like buttons, forms, tables, navigation bars, dropdowns, modals...etc. The figure below is a group of UI components of bootstrap.

![Bootstrap UI Components](image)

**Fig 4.3**

It also helps to create responsive layout with much less efforts with its “grid” design by calling classes. The figure below is one of the example using the “grid” classes. The webpage will display responsively according to different resolution.

**Example: Stacked-to-horizontal**

Using a single set of `.col-md-*` grid classes, you can create a basic grid system that starts out stacked on mobile devices and tablet devices (the extra small to small range) before becoming horizontal on desktop (medium) devices. Place grid columns in any `.row`.

![Stacked-to-horizontal Example](image)

**Fig 4.4**
Google Analytics is a web analytics service offered by Google, it is widely used in different scales of website. Google Analytics' approach is to show high-level, dashboard-type data for the casual user, and more in-depth data further into the report set. Google Analytics analysis can identify poorly performing pages with techniques such as funnel visualization, where visitors came from, how long they stayed on the website and their geographical position.

The figure below is the Google Analytics Dashboard. It helps to gain insights from the users’ behaviour and background and thus website can personalize the best content shown to each individual user.
5. Difficulties encountered

There are two main difficulties I have encountered. The first one is compatibility. Since incremental model is used, new functions will be implemented after each milestone. When I am trying to add new functions, I will have to consider to make the existing platform and new functions compatible. For example, when I try to make posters associated with different category, the poster model should add an attribute to store which category it belongs to.

The second problem I have encountered is about styling. Styling is one of the most important thing to attract users. Since I used Ruby on Rails as the backend of my platform, it uses rails application template like erb and haml, it is quite different from html code. So it takes time to style the webpage using these templates. The following figure shows the difference between Haml and HTML.

Fig 5.1
6. Future Plan

6.1 Add-on features

Providing a platform for user to browse the poster is not user friendly and attractive enough, so I would implement add-on features to and social networking enhance user friendliness and connect users in the coming phases.

First add-on features is to allow users their favourite poster for easy retrieval. For example, if users found poster that they are interested in, they can save it to the wish list by simply clicking one icon. Users can retrieve posters that they are interested in easily as the figure below. To implement the wish list, one more database table should be created to store the information of user and the poster.

![Saved to Wish List](image)

Fig 6.1
Sorting, filtering and searching function are also essential, these functions helps user to filter and find posters that they are interested in easily. These functions can be implemented by setting the constraints in the SQL statement, then database will return the records that match the constraints to the server, and finally the website will display the corresponding result.

To implement these functions, the poster model has to be altered. One more category field should be added to the poster model. Also, the webpage for users to upload the poster has to be edited as well. A dropdown input field should be added to the upload form.

After adding these functions, I will have to consider the change of layout of the homepage as well. Currently, the homepage displays all of the posters. Sidebar, top navigation bar or drop down bar needed to be added to allow users filter, search or sort the posters. I will take a look on the webpage of Klook, Airbnb and tripadvisor as a reference in designing the new layout.
The above figure is the layout of search and the filter function bar of Klook. It shows the categories in a sidebar and search function in an input text field.

The platform will also provide payment gateway for the posters. For example, if the poster is promoting an event that costs money, students do not have to go to campus to pay in person, they can just pay it online. This can be implemented by using service by Braintree. Braintree is a validated Level 1 Payment Card Industry Data Security Standard compliant service provider, it provide online payment gateway services. Global enterprises like Airbnb and Uber also handle payments by using the service of Braintree. It supports various payment methods, including different credit cards, prepaid credit cards, PayPal, Alipay, Apple Pay, Android Pay and even more.

![Transaction Process Flow](image)

The above figure is the flow of the payment process using the service of Braintree. After configuring Braintree in the web application, the server will pass the data to Braintree. It has multiple security measure to ensure the security of the payment data. For example, Cardholder data is managed in the Braintree Vault, using multiple encryption keys with split knowledge and dual control. A data thief would not be able to make use of information stolen from a database without also having the key.

In the coming phases, I will read the guides and official documentations of Braintree to add payment gateway in this platform.
6.2 Social networking features

Fig 6.4

The figure above is the login form of Airbnb, user can login to the platform with just a few clicks. Allowing users to login via facebook or Google enhance users’ engagement as it makes registering and logging in easy. In the coming phases, the e-poster platform will also include this feature for users.

Users will also be able to comments and likes on poster. “Comment” and “like” function can be implemented by create model for each. PosterID would be one of the foreign key to identify which poster do the comments and likes belong to.

Inbox and messenger functions will also be added for user to communicate. These functions will enhance the interactions between users. However, I do not have concrete idea on how to implement them yet, I would do research and implement them in the coming phases.
6.3 Personalization

Personalize the content for each individual user enhance the user experience. The platform will recommend posters to each individual user according to their previous actions, behaviors or their backgrounds. For example, if the user likes the poster related to outdoor activities, then the platform will recommend hiking event poster, surfing event poster...etc. There are various tools that helps to achieve personalization on web applications or mobile app. I will look for the best tool and integrate it in my platform in the coming phases.

The figure below is a survey from Evergage, one of the biggest personalization solution platform. It shows the benefits of implementing personalized content from its customer.

Fig 6.5
<table>
<thead>
<tr>
<th>Date</th>
<th>Accomplishments</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2017</td>
<td>Design Database schema, Implement the core features</td>
</tr>
<tr>
<td></td>
<td>➔ Login function</td>
</tr>
<tr>
<td></td>
<td>➔ Categorizing posters</td>
</tr>
<tr>
<td></td>
<td>➔ Able to upload, edit, view and delete posters</td>
</tr>
<tr>
<td>Late January 2018</td>
<td>Implement add-on features to enhance user friendliness</td>
</tr>
<tr>
<td></td>
<td>➔ Storing poster for easy retrieval</td>
</tr>
<tr>
<td></td>
<td>➔ Sorting poster by different parameters</td>
</tr>
<tr>
<td></td>
<td>➔ Searching poster by different parameters</td>
</tr>
<tr>
<td>March 2018</td>
<td>Implement the social networking features</td>
</tr>
<tr>
<td></td>
<td>➔ Able to login with Facebook / Google</td>
</tr>
<tr>
<td></td>
<td>➔ Comments / Likes on posters</td>
</tr>
<tr>
<td></td>
<td>➔ Embed Google Analytics to record and analyze users’ behaviour</td>
</tr>
<tr>
<td>15 April 2018</td>
<td>Implement the social networking features</td>
</tr>
<tr>
<td></td>
<td>➔ Personalization for users who logged in like suggestions on friends, posters, events</td>
</tr>
<tr>
<td></td>
<td>➔ Exploring new friends</td>
</tr>
<tr>
<td></td>
<td>➔ Inbox / Messenger</td>
</tr>
</tbody>
</table>

The above table is the schedule of my project. Besides implementing these features, there are also different concerns need to be resolved in the coming phases.

I will have to decide whether include admin panel for HKUSU, faculties and societies to manage the poster or not, it depends on the poster management policy of HKU. I will investigate the current policy.

Moreover, when “comment” and “like” function are implemented, the website should display the number of “likes” and “comments” in real time, I will also have to decide what front end framework should be used in the coming phases.
7. Conclusion

At this stage, the basic features like login and core structure of the platform have been implemented. The project progress is going well and on schedule. The difficulties I have encountered is not difficult to deal with, for compatibility, it is inevitable as incremental model is used, those changes will not take a long time; and for the styling problem, there are many tutorials and documents online, so I believe I can overcome the styling problem in the future.

However, providing basic functions are not attractive and user friendly enough. To enhance user friendliness and user experience, there are various works needed to be done in the coming phases, including different add-on features, social networking features and personalized content for each individual user.
8. Reference


