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Professional Collaboration Web Application

CsBoard

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Introduction

CsBoard is a professional collaboration platform. It provides a safe platform for team members to share files and interact with each other. It has different roles which have different levels of access to resources since each user has certain responsibility in team. For example, Only system admin can add users. File sharing is another important part of *CsBoard* and different users according to their level of access can interact with files of all types. An in-house interactive tool where members of a team can communicate quickly, elegantly and in different circumstances can definitely boost the overall performance of the team. Engagement of users has been considered throughout the *CsBoard* and different modern approaches and paradigms have been used to improve users' overall experience and engagement. The main objective of *CsBoard* is to provide a safe in-house platform for teams to share information using modern paradigms and approaches, and maximise user engagement.

Discussion

CsBoard has 4 different users (roles), namely system admin, project manager, designer and client. Each of these users has their own defined characteristics.

1. System Admin :
 - User Management
 - File Management
 - WorkSpace Customisation
 - Interacting with other members of CsBoard
2. Project Manager :
 - File Management
 - Interacting with other members of CsBoard
3. Designer :
 - Limited access to Files
 - Interacting with other members of CsBoard
4. Client :
 - WorkSpace Customisation (Themes)
 - Interacting with other members of CsBoard

The following ER diagram will demonstrate the relationship between CsBoard entities.

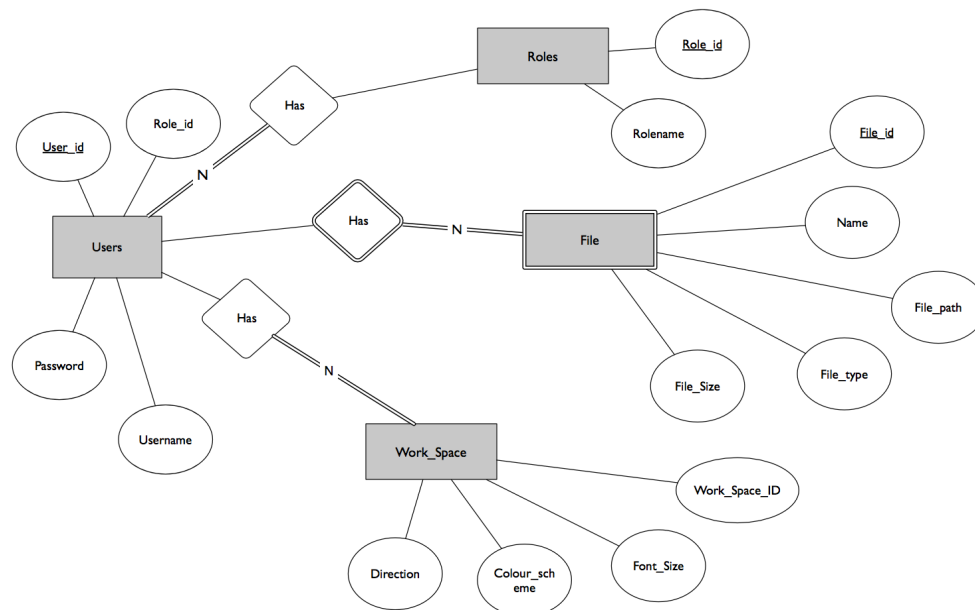


Figure 1 CsBoard Database Schema

In the following sections I will briefly go through my design choices and the philosophical logic behind my design for each section.

User Management

System admin is responsible for registering new users to system. This new user can have one of the 4 defined roles and depending on that role, the user can have certain level of access. System Admin can use a grid view to see all list of current users, Update and Delete them. The most important part of this section is security. *CsBoard* users' password should be protected. *CsBoard* is using encryption function to insert encrypted version of passwords into database.

There are ways of finding users' passwords. For example, attackers are using Rainbow table, or dictionary or Bruteforce approach. Rainbow table consist of common password and their equivalent hashes. In Dictionary attack, common passwords have been guessed and then hashed and then compared to the original password. In Bruteforce attack, every combination of characters is used to find the password. By using salts and peppers, some of these attacks can be eliminated. Salts are a characters that appends to the password before hashing. changing even one single character transforms the whole hashed equivalent of password so with this method, the Rainbow attack become useless. Pepper is a short string that adds to

password before hashing. The important point is, the password itself is not stored in the system and in the login process, all the combinations, for example letters, are tried. This means it takes more time for logging in, but on the other hand, the time complexity of Brute-force algorithm will increase.

In Triple DES¹ algorithm, block cipher algorithm is applied three times to blocks of data. Three keys are used that can be identical or different. Triple DES uses three iterations of common DES cipher. It receives a 168-bit key, which later is divided into 56-bit keys.

Triple DES encrypts input data three times. [2]

- Encryption using the first key
- Decryption using the second key
- Encryption using the third key

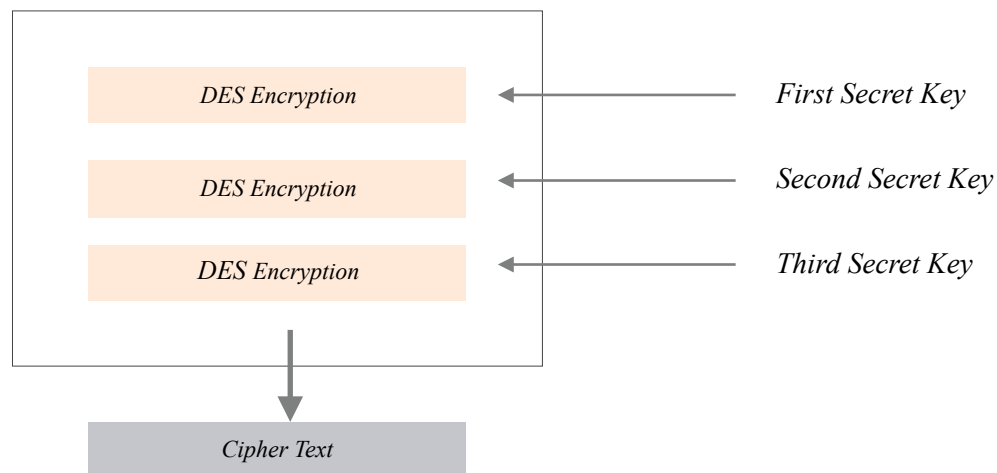


Figure 2 Triple DES Encryption

There are reasons that I have chosen this algorithm. It has been around so many years and it is an ISO and ANSI standard. Due to the number of keys and their length, it is considered as one of the safest algorithms available.

I have used Triple DES algorithm to store the encrypted version of users' passwords. Even the system admin cannot see the real passwords of users.

In the event of logging in, I use the same key to encrypt the inputted value and authenticate the user.

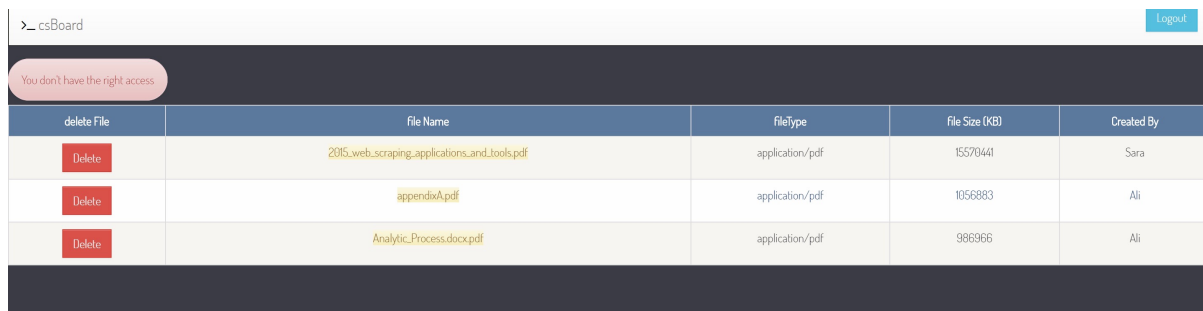
File Management

Files can be shared between teammates who work on the project (maximum of 1 GB)

¹ Data Encryption Standard

Different Users have different access to this section.

System admin and Project manager are in charge of defining requirements so they are the only ones who can upload files. Designer cannot open and delete the file. He/She can only see the overall structure of all files because his/her job is only knowing how many files are shared and who have uploaded them and more importantly it is the way that system admin and project manager can share file with the whole team. Client cannot view the any files because these files are being stored for developing projects and Client should not to know about it.



delete File	file Name	fileType	file Size (KB)	Created By
Delete	2015_web_scraping_applications_and_tools.pdf	application/pdf	15570441	Sara
Delete	appendixA.pdf	application/pdf	1056883	Ali
Delete	Analytic_Process.docx.pdf	application/pdf	986966	Ali

Figure 3 File management

User Interface, User experience and workspace customisation

According to a case study by The Bearodactyl, even a color change can be drastically affect users engagement. There UX² is of utmost importance. The user engagement in conversation for changing the button from green to yellow was a staggering 175%. [5]

- **Flat Design**

In *CsBoard* I used flat design which is a modern design paradigm. It provides a clean look that looks visually flat by using spaces, bright colours, simple lines as layout element. Although Skeuomorphic design look more realistic, it hinders user experience and flat design by providing a cleaner look gained a lot of popularity. The important note is the face that flat design was introduced and accepted at the time that Skeuomorphic design was famous and it was widely used by big companies such as Apple and Google. In 2007, Forbes magazine announced the death of skeuomorphism design.

- **Responsive Design**

I believe we are all using our phone for browsing the internet during the day and I believe every online platform should provide quality functionality in the event of emergency using phone.

² User Experience

Responsive design means designing for optimal viewing experiences on different devices by using technology to make designs flexible and more adaptive to the media that renders them.

Responsive design has been implemented throughout the *CsBoard* web application. For example, project manager can still interact with the team elegantly on his/her phone.

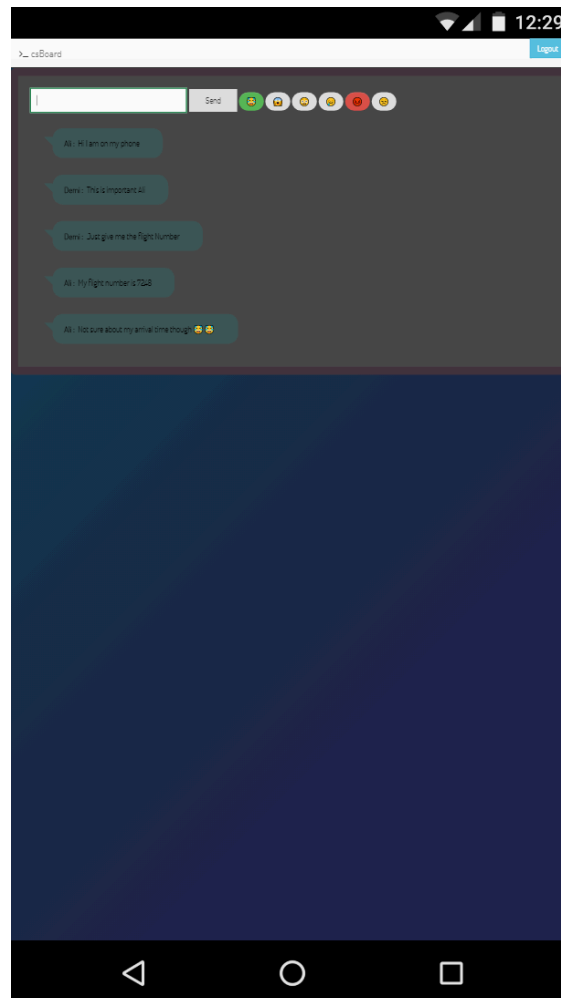


Figure 4 Responsive design view in Nexus 5X

- **Workspace customisation**

Sometimes System admin need to use a bigger font or may want to change the direction of the web if he/she is coming from another country and use to different style. These changes can only be applied for that System admin and it should persist whenever they are logged in. *CsBoard* has workspace customisation functionality which allow the mentioned mentioned features as well as different themes for Client for enhancing their engagement and dark theme for System Admin.

- **Other design features**

The experience of *CsBoard* in Edge, chrome, firefox, is the same. I have used modernizer which is a javascript library. It makes my site more compatible with different versions of browsers It provides css classes that can easily be used for later if a version of a browser does not support a feature.

Direct real-time interaction

CsChat enables users with different roles to interact with each other in an engaging and fast way. This is an important part of the *CsBoard*. Simulated avatars that convey users emotion can have huge effect on users engagement. There are 6 main facial expressions that convey human 6 main emotions. Joy, Surprise, Fear, Sadness, Anger, Disgust. Emotions can contribute to engagement in social interaction and convey different patterns than using characters.[10][11] In a research by Kazunori and Chikara Takeuchi in 2017, they explained how simple line drawings of an smile can impact on user engagement and respond. They research revealed even a change in the corner of a line that indicate a smile or sad face is effective in including people to cooperate. For example anger facial expression can elicit concessions from others, while happiness can elicit altruism. Their finding suggested that both positive and negative expression shown in their experiment on an ultimatum game might have contributed to the proposer raising the offer. Due to these findings I decided to implement six main facial expressions in *CsChat* section for enhancing user engagement.

Conclusion

Until now I have explained different designed choices and technologies that I have used. At this point I have achieved the requirement and the main objective of *CsBoard* which is providing a safe in-house platform for sharing information using modern paradigms and approaches, and maximise user engagement.

References

- Infosecinstitute. 2017. *10 Most Popular Password Cracking Tools*. [ONLINE] Available at: <http://resources.infosecinstitute.com/10-popular-password-cracking-tools/#gref>. [Accessed 15 December 2017].
- John A. Chester. 2015. *Analysis of Password Cracking Methods & Applications*. [ONLINE] Available at: http://ideaexchange.uakron.edu/cgi/viewcontent.cgi?article=1009&context=honors_research_projects. [Accessed 15 December 2017].
- Karthik .S, Muruganandam .A. 2014. *Data Encryption and Decryption by Using Triple DES and Performance Analysis of Crypto System*. [ONLINE] Available at: <http://www.ijser.in/archives/v2i11/SjIwMTM0MDM=.pdf>. [Accessed 13 December 2017].
- Noura Aleisa. 2015. *A Comparison of the 3DES and AES Encryption Standards*. [ONLINE] Available at: <https://pdfs.semanticscholar.org/a49b/b5e25a2e5372d44ae32d0e621bb68b0a85f5.pdf>. [Accessed 14 December 2017].
- The Bearodactyl. 2015. *Case Study: How Using Color Psychology Improved Our Website*. [ONLINE] Available at: <https://moz.com/ugc/case-study-how-using-color-psychology-improved-our-website>. [Accessed 15 December 2017].
- Interaction-design. 2017. *Skeuomorphism is dead, long live skeuomorphism*. [ONLINE] Available at: <https://www.interaction-design.org/literature/article/skeuomorphism-is-dead-long-live-skeuomorphism>. [Accessed 15 December 2017].
- Bellare, G., Sheth, S. 2014. *Responsive eLEARNING Design & Development*. [ONLINE] Available at: <https://www.interaction-design.org/literature/article/skeuomorphism-is-dead-long-live-skeuomorphism>. [Accessed 7 December 2017].
- Modernizer. 2017. *Modernizer Document*. [ONLINE] Available at: <https://modernizr.com/docs>. [Accessed 1 December 2017].
- Paiva, A., Leite, L., Ribeiro, T. *Emotion Modelling for Social Robots*. [ONLINE] Available at: <http://people.ict.usc.edu/~gratch/CSCI534/Readings/ACII-Handbook-Robots.pdf>. [Accessed 16 December 2017].
- Paul Ekman. 1977. *Facial Expression*. [ONLINE] Available at: <https://www.paulekman.com/wp-content/uploads/2013/07/Facial-Expression.pdf>. [Accessed 16 December 2017].
- Kazunori Terada and Chikara Takeuchi. 2017. *Emotional Expression in Simple Line Drawings of a Robot's Face Leads to Higher Offers in the Ultimatum Game*. [ONLINE] Available at: <https://www.frontiersin.org/articles/10.3389/fpsyg.2017.00724/pdf>. [Accessed 14 December 2017].