TaskHub: Gamified Time Management

Max Barrett, Jaden Yon, Carter Koehn, and Ijahmin Balser

Virginia Tech, Blacksburg, VA, United States

Abstract. TaskHub is an app designed to address our own needs without introducing complicated features that only serve as detriments to our scheduling experience. To-Do Apps have been used as an effective tool for time management by countless people and organizations, however, they also can also become a major headache to properly utilise. We sought to create a simple app that would allow us to manage our time in a fun and useful manner. By gamifying the time management process we have created an app that will not only help users work effectively, but also make them want to as well.

1 Introduction

To-do lists have been proven to be an effective tool with many benefits for the people who use them. To-do lists allow for better time management by laying out a person's whole day letting them determine which task should be done next and how tasks link together. Lists can also give motivation still physically crossing off tasks that have been completed providing a dopamine rush making a person want to complete more tasks, and giving a person a sense of accomplishment seeing all the work they have done in a day[1]. They are also linked to reduced stress as they allow people to plan their days and weeks in advance making sure no major task catches them off guard. All of these factors will lead to people completing more work or completing their work faster which leads to more personal time greatly improving anxiety and mental health[2]. This is why it is pivotal that people have a well-made and reliable way to keep track of their tasks to maximize the benefits of doing so.

1.1 Problem Definition

All of the benefits that were listed hinge on the fact that a good task management system is being used. If a poor task tracking system is being used it can actually have the opposite effect in many cases. Poor To-Do lists can cause more stress, and anxiety wasting the user's time. The first major problem is that many To-Do lists allow users to add as many tasks as they want with complete disregard for the amount of time that user has. People are always going to try and be more ambitious when writing down all the work they need to get done thinking that they can do it all, but when it comes time to actually do the work they get overwhelmed. This can cause people to feel like they were not productive for the entire day and make them feel like they need to do more work the next day

to make up for it which creates a snowball effect. Another problem is that all tasks are given the same weight. Writing an email and writing an essay will take drastically different amounts of time, but appear as taking the same amount of effort on the To-Do list. This leads to people finishing all their easy tasks first because crossing things off a list gives a dopamine rush leaving all the hard tasks for the end of the day. Having to do all the difficult work back to back can lead to burnout and lowered productivity[3]. All of these problems can be mitigated by having a well-made To-Do application that keeps these aspects in check.

1.2 Project Solution

Our application introduces a couple of unique features to help mitigate some of the negative aspects of using a To-Do list. First, our application will make sure that users do not give themselves too much work. This will be done by first asking the user how much time they will have to complete this set of tasks. It will then prompt them to give an estimate of the time each individual task will take. This ensures that the users will not be too ambitious and reminds them that they should not give themselves an impossible amount of work to complete. Our second unique feature will be to make the size of each task proportional to the time that task will take. Using the information that the user has already given our application will use the time that a task will take and divide it by the total time to complete the list of tasks, which will give a percentage of the day that task will take. That percentage will then be used to visualize the size of that task. We also want to gameify our application by assigning points to each task and awarding points to the user when that task is completed. We also want to have a scoreboard to allow users to compete for the most points leading to more productivity. These three features will stop users from overwhelming themselves while still providing all the benefits that a To-Do list provides.

1.3 Motivating Example

Imagine you are a software engineer working at Mojang the developers of Minecraft. Throughout a hard day of work at Mojang, you will have many tasks to do. Let's say for this specific day you are working for the standard 8-hour day, which will be input into the application. Then you will input each task that you have to complete. For this hard day of work, you have to take a nap, which will take 1 hour. You must write 10 lines of code, which will take 2 hours. You will have lunch with coworkers, which will take 1 hour. You will then have to be play-testing for the rest of the day,which will be 4 hours. All of this information can be input into our software and displayed to the employee with their set of tasks. The tasks can be done in any order the user desires, but they will have the information available to complete them in the best order to not get burnt out.

1.4 Related Works

In order to create the best To-Do application we have to look at some of the other popular alternatives and learn from their features and implementations. One very

popular To-Do application is Todoist which is used by over 30 million people and used at large companies such as Netflix, Microsoft, Disney, and Amazon. Todoist has so many features that it would be impossible to list them all. It is clearly a mature service that we should take inspiration from as a successful To-Do application and implementation[4]. Another popular task-tracking service is TickTick which has a lot of features that allow it to be used across multiple platforms making it easier for users to interact with the application[5]. It is pivotal to look at other successful To-Do applications to make the best software that incorporates features that users expect.

2 Project Implementation

TaskHub is fully implemented as a personal task management application. It allows users to create new tasks with descriptions and time estimations, from which it will add a corresponding block to the task board. These blocks will be sized based on the estimated time, with larger blocks signifying more involved tasks. For a visual depiction of this, see Figure 1. These tasks can be completed for points (also generated based on the tasks) which are then added to a running total. These points can be compared to other users by viewing the scoreboard, a basic implementation of a points leaderboard. For a visual depiction of the scoreboard, see Figure 2. These two interfaces culminate to form the current implementation of TaskHub.

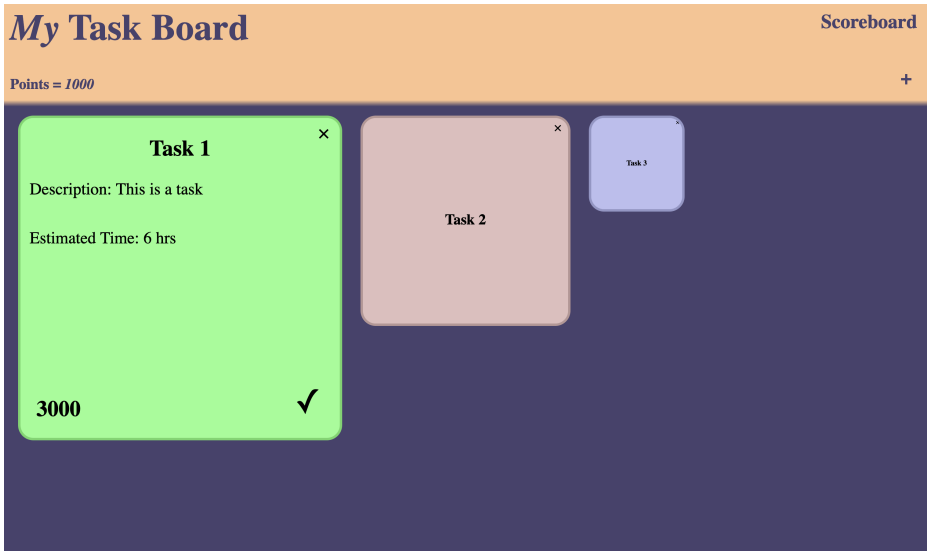

Fig. 1. TaskHub task board with sample tasks added.

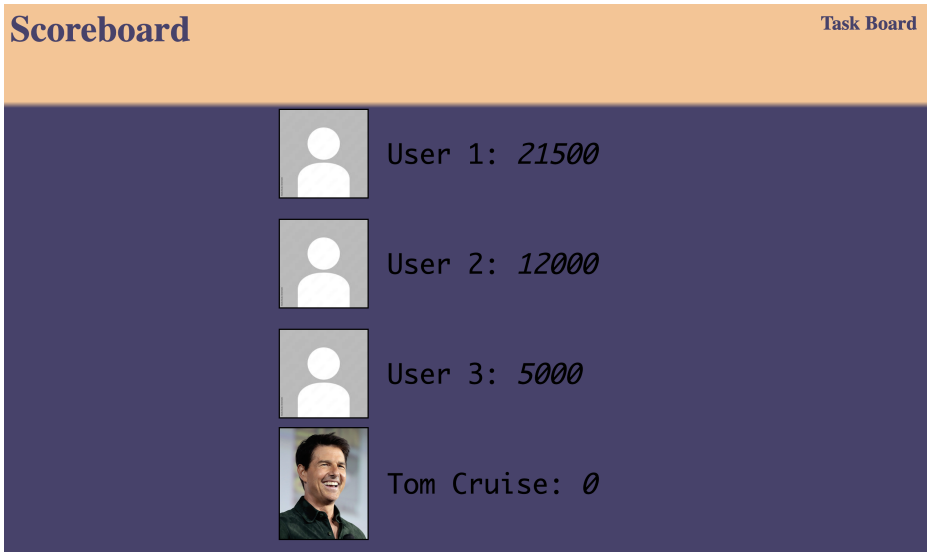

Fig. 2. TaskHub scoreboard with sample users and scores.

2.1 Design Decisions

Our implementation of TaskHub was centered around being able to produce quick results so that we could refine our design. To facilitate this, we used the prototyping model as it fit our approach the best. We also chose to implement our app using a combination of HTML, CSS, and Javascript as these tools/languages seemed like the easiest way to get a working implementation that we could further refine. This also allows us to introduce cross-platform compatibility in an efficient manner as most modern devices are capable of supporting our chosen tools.

2.2 Testing

Our testing plan is centered around manual testing of our own and user bug reports. TaskHub itself is a simple enough product that we feel comfortable simulating the user experience ourselves and declaring the app fit for deployment if we find no issues. User feedback will, however, supplement our manual testing as we simply don't have the capability of simulating what each and every user will use our app for. We have created a black-box testing plan for our current version of the app and will further refine it as we continue to add new features. In future updates to TaskHub we will deploy updates to small groups of users at a time to ensure that new versions of the app are in fact better and also do not contain major issues that would break our app or leak user's information.

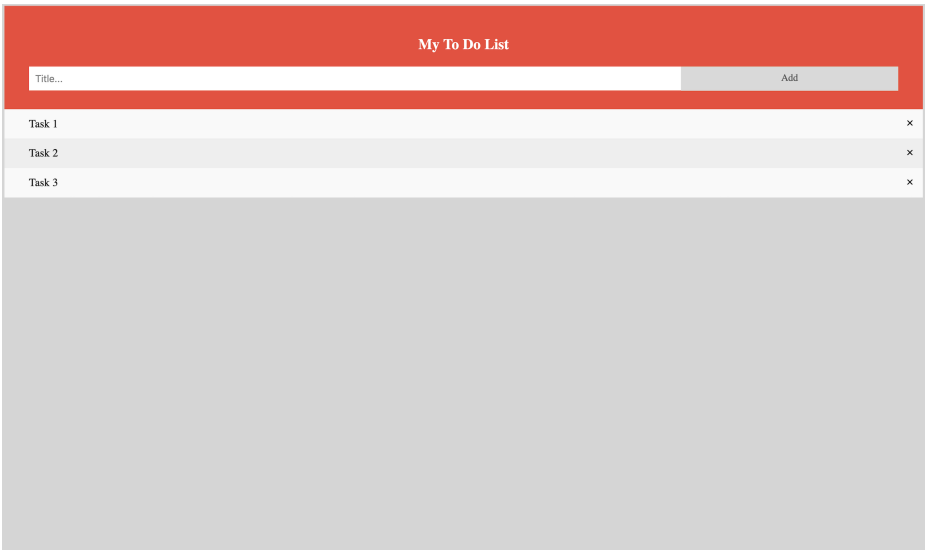

Fig. 3. Initial prototype with sample tasks added.

2.3 Deployment Plan

Deployment of TaskHub would be broken into two major points: web development and deploying to the google play store. Splitting deployment in such a manner is a result of how our app is designed. Currently TaskHub is only available as a web page, so utilizing something like Amazon Web Services would allow us to easily host our app. Mobile app stores would require us to rework the structure of TaskHub, so deploying to them would be conditional on TaskHub gaining popularity as a web app. Maintaining our app would mainly involve ensuring that we have sufficient space to store user data, and also implementing scheduled maintenance to allow us time to make any changes that may be necessary. We would also do regular performance evaluations to determine if we would need to upgrade the hardware used to host TaskHub.

3 Discussion

To-do apps are very common in today's world, and many of them have been developed alongside large scale companies. They're integrated in Apple and Microsoft systems, which makes it hard to create a new one that will be used by other consumers as it won't directly integrate with our devices. However, to combat this, we are creating a cloud based server to run our to do program. We plan for it to allow connections to a database to allow for users to navigate the app between devices. The main addition that our app implements involved gamifying tasks in a form of gamification. By assigning tasks points that you can score by completing the task and adding the element of competition, users will

be more motivated to complete the task. The algorithm that assigns the points is naive right now, but in the future work, we plan on addressing that.

3.1 Limitations

Full integration of a to-do may be challenging to impossible because our app is a web-based application, so integrating it immediately with IOS or Microsoft might not be directly possible. This is the main limitation because the user would have to open up the web app for the web app to have any control whereas IOS to-do apps are seamlessly integrated into IOS devices like iPhones. We are also limited to hosting it on a cloud server because those aren't always free, and can be a hassle to maintain when the team doesn't have the time or interest to maintain this app when other tools already exist. We do believe however that gamifying tasks would have an edge over existing tools, but without the infrastructure, it's hard to physically implement it in real world conditions.

3.2 Future Work

Eventually, our implementation will be hosted on a cloud server so multiple platforms will be able to easily connect to it. It will be a web based application for ease of connection, which means there will be a database that contains the users and their respective tasks. This way a user could sign in to view their tasks without too much hassle. For the graphical part of the interface, we plan to implement more customizability to allow for multiple themes/color options. Furthermore, we could allow the website to pull the theme from the browser for a more seamless integration. Our to-do app creates task score/points based off of hours; however, we want to include a more complex algorithm to justify it's score. This could be artificial intelligence or machine learning, but it could also be more simple but thought out. This would allow the score to be a function dependent on more than just the time to complete the task, but also the inferred difficulty.

4 Conclusion

To-do apps are a tool consumers use to navigate everyday life a little bit more organized. They allow users to complete tasks and award themselves by marking them as complete. This little bit of dopamine can help some people complete their tasks with the ultimate goal of having no more tasks to do for the day. Additionally, having tasks planned out in a meaningful way allows for less stress, better time management, and consequently better overall health. However, for some people, this isn't enough motivation. To combat that, we are applying gamification to our application to add the incentive to complete tasks. This will also make completing tasks a game, which people will find as fun whilst still being productive. Our actual implementation is far from perfect, but our idea and methodology of completing TaskHub is close to it.

References

1. V. Sawhney, "Why we continue to rely on (and love) to-do lists," Harvard Business Review, https://hbr.org/2022/01/why-we-continue-to-rely-on-and-love-to-do-lists (accessed Dec. 11, 2023).
2. Indeed Editorial Team, "The benefits of using daily to-do lists to attain your goals - indeed," Indeed, https://ca.indeed.com/career-advice/career-development/daily-to-do-list (accessed Dec. 11, 2023).
3. A. Tank, "Your to-do list is sabotaging your true productivity. here's what to do instead," FastCompany, https://www.fastcompany.com/90890188/your-to-do-list-is-sabotaging-your-true-productivity-heres-what-to-do-instead
4. Todoist Features Page, https://todoist.com/features. Last accessed Dec. 11, 2023)
5. TickTick Features Page, https://ticktick.com/features. Last accessed Dec. 11, 2023) Oct 2017