# TaskScape: Fostering Holistic View on To-do List With Tracking Plan and Emotion

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## ABSTRACT

Despite advancements with intelligence and connectivity in the workspace, productivity tools, such as to-do list applications, still, measure workers' performance by a binary state—completed, yet completed, and thus the number of tasks completed. Such quantitative measurements can often overlook human values and individual well-being. While concepts such as positive computing and digital well-being are on the rise in the HCI community, few systems have been proposed to effectively integrate holistic considerations for mental and emotional well-being into productivity tools. In this work, we depart from the classic task list management tool and explore the construction of well-being-centered to-do list software. We propose a task management system–TaskScape—, which allow users to have awareness on the following two aspects: (1) how they plan and complete tasks and (2) how they feel towards their work. With the proposed system, we will investigate if having holistic view on their tasks can facilitate reflection on what they work on, how they stick to their plans, and how their tasks portfolio support their emotional well-being, nudging users to reflect upon their work, planning performance, and their emotional values towards their work. In this poster, we share the design, development, and ongoing validation progress of TaskScape, which is aimed to nudge workers to holistically view work productivity, reminding users that work is more than just work but life.

## CCS CONCEPTS

• **Human-centered computing** → **Visualization systems and tools**; • **Applied computing** → **Psychology**.

## KEYWORDS

Digital Well-being, Positive Computing, Productivity, Productivity tools, Task Tracking, Task Management, To-dos, User Experience

## 1 INTRODUCTION

In the age of smart and networked computing, the adoption of remote working has blurred the boundary between work and life. Despite advancements with intelligence and connectivity in the workspace, productivity tools, such as to-do list applications, still measure workers performance by a binary state—completed, yet completed, and thus the number of tasks completed. Such quantitative measurements can often overlook human values and individual well-being. Not only has numerous studies shown that a worker's happiness is positively correlated to productivity [4, 13, 14, 17], but there is also a moral imperative to consider a worker's happiness and emotional experience[18].

While well-being is gaining increasing attention in the HCI community and many affective health systems and digital interventions directly addressing mental health issues such as anxiety and depression [16], these solutions compartmentalizes emotional experiences as an isolated aspect while, in fact, they are integral to every aspect of our life. It is critical to ask how we can design systems to re-frame users' compartmentalized perception of life and work, nudging users to evaluate their values such as productivity holistically. Researcher have attempted to develop more holistic notion of productivity instead. Through experience sampling methods, Guillou and his team demonstrated that the use of the term 'Time Well Spent in workspace reflection invokes a more holistic view of productivity and well-being and promotes strong self-care concepts [10]. In this exploratory work, we apply the similar concept of holistic view on productivity to to-do list application. We propose a task management system–TaskScape—, which allow users to have awareness on the following two aspects: (1) how they plan and complete tasks and (2) how they feel towards their work. With the proposed system, we will investigate if having holistic view on their tasks can facilitate reflection on what they work on, how they stick to their plans, and how their tasks portfolio support the emotional well-being, nudging users to reflect upon their work, planning performance, and their emotional values towards their work.

## 2 BACKGROUND

Task management is a critical aspect of the modern knowledge workers' productivity. However, many studies have shown that we are, in fact, not good at planning tasks. Estimation bias and planning fallacy at work have been well examined [5, 11, 12]. Knowledge workers left 27% of planned work incomplete by end of the day [6], and, Hospital workers only executed about half of the procedures scheduled[3]. wegottafixthis Researchers have proposed task management systems battling this bias by primarily providing completion reflections and dairy, which has shown to improve accuracy in planning [3]. Ahmetoglu et all studied why when and how planning is inaccurate and found great number of people adopt minimal planning strategy. They appear to be largely unaffected by their time estimation failures and are more spontaneous and flexible when deciding which task to execute next [2]. With the pandemic introducing work from home, studies also found the dissolution of work-life boundaries seems to push more people to be disengaged from planning [1].

There's a research gap in building and evaluating task management systems that directly support awareness on their planning activity and their emotion towards their work at task level. In this

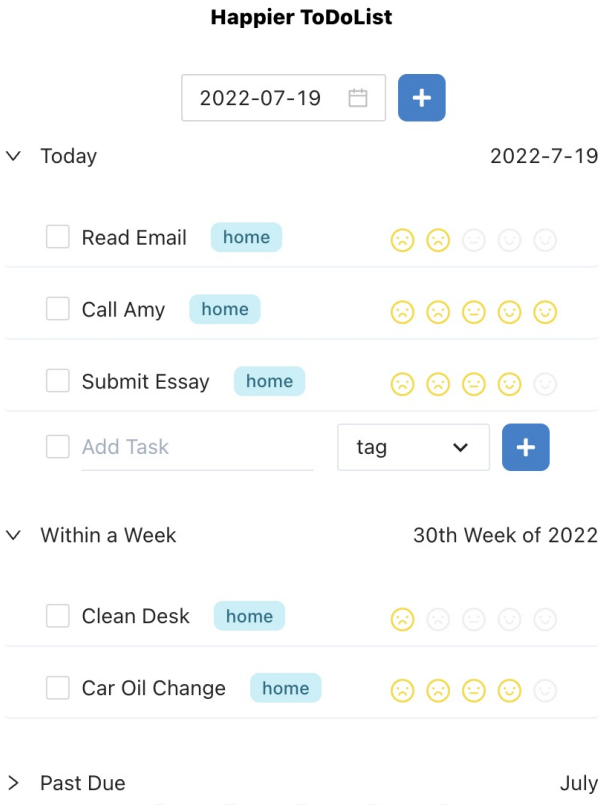


**Figure 1: The main interface of TaskScape. It allows users to rate the emotional experience of each tasks regarding the question "how pleasant or stressful do you feel about this task?" on the 5 point scale emojis, ranging from sad face to happy face. We also provide three types of time bracket: within today, within a week, within a month, which allow users to specify vague task deadline.**

project, we explore the construction of such a task management system with an intuitive interface that allow users to set the deadline vaguely and visualize how long it has been planned dynamically. In addition to the explicit deadline, the system offers a new way to sort tasks by time range: tasks to do within today, within a week or within a month. Lastly, by collecting users' emotional ratings of tasks, we also explore the construction of their landscape of their tasks, providing them a holistic view on their task prioritization and emotional well-being.

## 3 SYSTEM DESIGN

In Taskscape, we considered the following three key design goals:

- Task emotional rating: allow users to provide emotional feedback to tasks
- Remaining-time-based deadline: require users to specify tasks deadlines but only in vague time interval
- Planning performance and emotional experience visualization

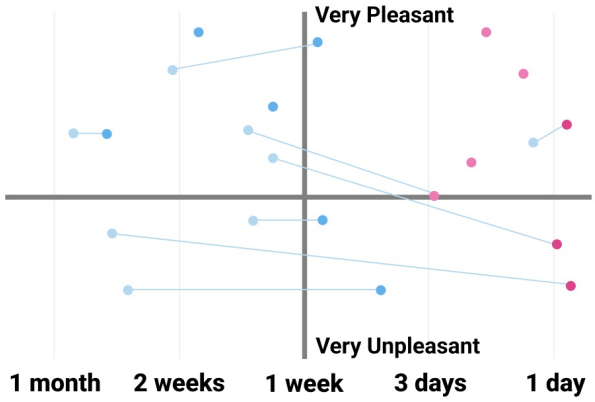


**Figure 2: TaskScape offers planning performance and emotional experience visualization. The y axis is the urgency, defined as the tasks that need to be finished in a month, 2 weeks or a day. The x axis represents the pleasantness of tasks, ranging from very pleasant to very non-pleasant. The visualization is updated daily with each blue dot signifying how long til they need to be completed with respect to 'today'. The visualization also features how long a task has been scheduled and how has users' feelings towards a task changed by showing the moving distance. Lastly, the tasks that are close to deadlines are highlights in color red.**

### 3.1 Task Emotional Rating

TaskScape allows users to rate the emotional experience of each tasks regarding the question "how pleasant or stressful do you feel about this task?" on the 5 point scale emojis, ranging from sad face to happy face, as shown on 1. This design decision is based on the two considerations. First, prior research suggests goal valence, the degree of attraction or aversion towards tasks, is related to the completion rate of tasks [7]. Unpleasant tasks are more likely to be procrastinated[15]. Second, we integrate non-interruptive emotional reflection into task management and we posit that such measure can also invoke self-care views, reminding users that work is more than just work but life. Guillou et al. took a similar approach in asking workers to reflect on their tasks every hour and ask "How do you feel about how well you have spent your time?" with a a 9-point scale with a neutral face at 5, frowns below 5, and smiles above 5.

It should be noted that Claessens in her study found no significant impact of task attractiveness on task completion. Their study did, however, demonstrate that the importance of a task ("determined by how important a supervisor considers it to be.") and the urgency of a task ("determined by when the task is needed to be completed") are found to be statistically significant on determining whether a task will be finished [6]. Hence, in addition to asking the pleasantness of tasks, we plan to explore other options such as asking how important/urgent users feel about the tasks. What specific emotional aspect should we ask workers to reflect is critical as it not only impact users' perception of tasks but also because we plan

to use the emotional ratings as the basis for further visualization and tasks prioritization. In future user study, we plan to examine the impact of both options (task pleasantness vs. importance) on workers' views of well-beings. We will finalize our design through a formative study.

### 3.2 Remaining-time-based Deadline

Most task list management system allows but not required users to specify the exact due date of a task, such as ToDoist, Things, Any.do. In TaskScape, we take an alternative approach by proposing the concept of task time brackets: the time intervals in which tasks should be completed, such as tasks to be completed within today, within a week, within two weeks, within a month, or even within a year. There will be a time bracket for tasks that are past due and a user will be asked to reschedule those tasks, as shown in the bottom of the interface in figure 1.

In our system, displayed in figure 1, we provide three types of time bracket: within today, within a week, within a month. When creating tasks, users can specify explicit deadline similar to other to-do list applications. However, in TaskScape, a user has an option to specify the time bracket they would like to assign the task to. The reason why we added remaining-time-based deadline is to facilitate scheduling tasks that may not have explicit deadlines. For example, lots of tasks have explicit deadline, especially when one works with someone. However, there can be tasks that may not be urgent but still important or a task that a user have longed to accomplish (e.g., updating a professional website, reading an academic paper from an author that they follow, or cleaning up download folder). Typically, those tasks do not have explicit deadline. In this case, a user is encouraged to add this task to the to-do list and 'roughly' specify the deadline by choosing the desired bracket e.g., "within a month". In this way, tasks with explicit deadlines and tasks with rough deadlines can co-exists in the to-do list.

The task list in each time bracket is dynamically updated each day with tasks that are not completed in the more recent interval automatically move downwards. For instance, tasks that used to be in "Within a week" will be moved to "Within today" if it reaches the actual deadline. Therefore, some tasks that they scheduled as "Within in a month" will gradually move up to the shorter time bracket, within two weeks, within a week, and eventually within a day bracket. Dynamic task list helps users balance between urgent tasks and non-urgent tasks because non-urgent tasks will eventually be promoted to the urgent time bracket. Of course, one can assign a new date if they are not ready to do the task, which will help them have better awareness on how the original plan was not realistic or how they had to focus on urgent tasks and overlook the tasks that are not urgent. This dynamic task list will show users how often and to what extent do they over-estimate what they can do.

We hypothesize that time bracket effectively encourage users to add various tasks with rough timelines, not only the ones that have to finish but the ones that they *want to* accomplish. A more concrete timeframe to the expected completion of their tasks is shown to be effective at improving tasks completion rate[8, 9]. This design decision is motivated by findings of minimal planning strategies where workers tend to adopt low efforts when scheduling tasks. Bellotti and her work show not only do most people track tasks with minimal effort but the to-do item they created are also often with vague deadline [5] and we argue creating tasks based on time brackets is consistent with the mental model of this user group.

Lastly, task lists in time brackets are dyamically updated each day, addressing the need of handling stale todos of low importance [3]. Ideally, within today (and past due) task lists will be emptied everyday and users can start every new day afresh. We posit that such feature can reduce users' cognitive load in having holistic view of tasks in terms of urgency. Since this feature will automatically move down the stale unfinished tasks, it also provides effective ways for users to keep track of their planning performance — how many tasks they have scheduled are actually completed as they were planned without having to reschedule them.

### 3.3 Planning performance and emotional experience visualization

In TaskScape, by collecting the pleasantness of tasks as well as the dynamically updated time constraints of tasks, we provide powerful visualization as shown in figure 2. The y axis is the urgency, defined as the tasks that need to be finished in a month, 2 weeks or a day. The x axis represents the pleasantness of tasks, ranging from very pleasant to very non-pleasant. The visualization is updated daily with each blue dot signifying how long til they need to be completed with respect to 'today'. The visualization also features how long a task has been scheduled and how has users' feelings towards a task changed by showing the moving distance (i.e. the light blue line between the light blue dot, the original remaining time when it was scheduled, and the blue dot, the current relative due time). Lastly, the tasks that are close to deadlines (i.e. within today) are highlights in color red. This plot allows users to holistically reflect on their tasks completion and taking into account of their emotional experience. For instance, in the plot there can be few dots/tasks in the third quadrant (bottom left) which can be a sign that the worker tend to complete tasks that are less pleasant and less urgent or the tasks that are not urgent tends to be pleasant (dots appear on the topleft). The plot can also show how long has the worker been procrastinating on certain tasks by visualizaing the reschedule history. The visualization will be another way to update the emotional rating as well as time bracket. If a user drag and drop a dot from topright corner to the bottomleft corner, the task will have a new deadline and new emotional rating, which is a way to officially procrastinating by giving up a new deadline and specifying how they feel about the task or their procrastinating the task. Overall, one can see how their tasks are distributed in two dimensions and better understand the nature of their work and focus on tasks that are missing or shape their career in a way that can be more balanced. For example, all tasks being in the unpleasant region can encourage them to think about their jobs and what causes their emotion towards their career.

## 4 ONGOING EFFORTS

Currently, we are in the process of implementing the visualization and task recommendation engine. We plan to deploy the system and conduct multiple users studies with semi structure interviews. The system is designed with two goals: nudge users to holistically view work productivity and improve workers' well-being. The user

studies will thus be done in a longer term to measure the impact on possible changes of attitude. We plan to conduct two weeks long term studies. Each participants will be asked to incorporate TaskScape into their workflow of task list management for two weeks. Prior to the study, we plan to measure items such as workers' perception of traditional productivity concepts, subjective experience of task workload, workers' personality traits, workers' anxiety and stress scores, as well as their perceived happiness. After two weeks of use, we will measure some of the same item to see the psychological and perceptive changes in terms of well-being. We will interview the participants and ask both the usability and how have they adopt TaskScape.

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