Software Requirements Specification

ClockWork Time Estimation Tool

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1 Introduction

1.1 Purpose

The purpose of this document is to specify the requirements for a mobile application that will enable the user to improve their time-estimating capabilities by comparing their initial time-cost assumptions with their actual task performance, allowing the user to accurately judge the difficulty and scale of a given task, and allocate time and effort for maximal efficacy.

1.2 Scope

Our application is called ClockWork. It is a mobile application that improves a user's time management skills through improving their ability to estimate the time-cost of a given task. ClockWork allows users to track how long they have been working on a task versus their initial assumption. The user can define task profiles to fit what they are working on; begin a timed task session that can allow for pauses and breaks if needed; edit a task session, pause, and break details; estimate hypothetical task session performance; and lastly schedule task sessions.

1.3 Definitions, Acronyms, and Abbreviation

Time-cost: The amount of time needed to complete a task or goal, which may include its total completion time, but also the time needed to, for example, debug a feature.
Time estimation: The amount of time an actor expects will be required to complete a task or goal.
Task profile: A template that defines a task abstractly. It includes information about the task's title, difficulty, and category. Sessions are created from profiles and inherit their parameters as default values.
Task session: An instance of a task profile. Sessions are either Not Started, In Progress, or Completed. Not Started sessions are practically only placeholders. In Progress sessions have a timer the user can pause, unpause, or stop. Completed sessions have a timeline which shows all of the events which occurred while the session was In Progress.
Session initiation: The act of transitioning a session from Not Started to In Progress and beginning the session timer from 0.
Session termination: The act of transitioning a session from In Progress to Completed at which point the timer stops incrementing and cannot be retriggered.
Session marker: An event that occurred during the In Progress state of a session and is represented as a timestamp in the session timeline that becomes accessible on session termination.
Session controls: Pause, Stop, Add Marker

Break segment: A pair of events that occurred during the In Progress state of a session and is represented by the region between two timestamps in the session timeline. The first event began the break and temporarily disengaged the timer. The second event ended the break and reengaged the timer. Although visible in the session timeline, the time which elapsed between the two events is not included in the final session time.

1.4 Overview

The following sections of this document include the overall description of the project, the specific requirements that outline the core functionality of the system, and the interface requirements that define the layout and user interface of the system.

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2 Overall Description

2.1 Product Perspective

ClockWork is entirely local and does not require the integration of external devices.

2.2 Product Functions

The system has three core functions:
Task Completion Timing
Future Task Prediction
Task Schedule Creation

2.3 User Characteristics

This system caters to one type of user:
Computer Science Students:
Students whose course of study is that of computer science. These students are predominantly first-year or have changed their majors, and likely have no prior experience with programming assignments as well as rudimentary knowledge of computer science. They are likely to use the app extensively during their college career, using it to predict the time-cost of assignments with respect to difficulty, and schedule task sessions. The students will likely stop using the app after graduating, but some may continue using the app in their professional careers.

2.4 Assumptions and Dependencies

- *2.4.1* *The user has a GooglePlay account or iCloud account:* We assume as such because an account is required to download apps from the AppStore and the GooglePlay Store.
- *2.4.2* *The user has a smartphone that is compatible with the ActivityKit framework:* Without ActivityKit compatibility, the core functionality of the application will not function properly.
- *2.4.3* *The user has surface-level experience with smartphones:* We assume this because smartphones are a ubiquitous technology.
- *2.4.4* *The user has the Background Refresh (or Android equivalent) setting enabled:* If Background Refresh is enabled, the application can continue functioning while the screen is off.

3 Specific Requirements

3.1 Functional Requirements

3.1.1 Maintain Task Profile Registry

The system shall maintain a user editable registry of task profiles. Each profile represents a task that the user may perform and contains data about the nature of the task as well as a history of every user-recorded session of performing the task.

3.1.1.1 Define new profile

The system shall create a new entry in the task profile registry as directed by the user. Creating a new entry involves recording data about the nature of the task including the task's name, difficulty, and category.

3.1.1.2 Delete existing profile

The system shall delete an existing entry from the task profile registry as directed from the user. Deleting an existing entry will also delete all information associated with it including data about the nature of the task and the user's recorded session history.

3.1.1.3 Merge profiles

The system shall merge two existing entries from the task profile registry in two a single entry as directed from the user. Merging entries involves directing the user to resolve field and session conflicts should they appear. Conflicts include disparate values in corresponding fields between the two entries and two session timelines overlapping.

3.1.2 Time Task Sessions

The system shall track the time between the user initiating a task session and ending that same task session, subtracting the time where the user indicated they were not actively working on the task.

3.1.2.1 Create new session

The system shall create a new session of a task profile as directed by the user. Creating a session involves directing the user to make an initial time estimation, which they may elect to forgo. The system shall also allow the user to alter the parameters of the task that were inherited from the task profile if the nature of the session deviates from that established in the profile.

3.1.2.2 Start created session

The system shall begin incrementing its accumulating record of time units since the initiation of the session (this instant) as directed by the user.

3.1.2.3 Pause ongoing session

The system shall stop incrementing its record of the time units accumulated since the user initiated the session as directed by the user but it shall not terminate the stopped session. This action can only be performed if the system is actively incrementing its accumulating record for a session.

3.1.2.4 Resuming a paused session

The system shall continue incrementing its record of the time units accumulated since the user initiated the session as directed by the user. This action can only be performed if the system is not actively incrementing its accumulating record for a session which has not been terminated.

3.1.2.5 Set marker

The system shall ‘mark’ the current timestamp when directed by the user if its record of the time units accumulated since the user initiated the session is actively being incremented. The system shall not enable the user to alter the information associated with the marker at this time.

3.1.2.6 End ongoing session

The system shall stop incrementing its accumulating record of time units since the user initiated the session as directed by the user and shall terminate the stopped session.

3.1.3 Edit Completed Task Sessions

3.1.3.1 Add breaks

The system shall insert a break segment into the timeline of a completed task session as directed by the user. Inserting a break segment involves directing the user to indicate the start and end times of the segment. The system shall not permit the insertion of a segment before the session was initiated or after the session was terminated.

3.1.3.2 Edit breaks

The system shall alter the start position of a break segment as directed by the user. The system shall not permit the alteration of a segment's start time to come on or after that of its end time nor shall it permit it to come on or before the time at which the session was initiated.

The system shall alter the end position of a break segment as directed by the user. The system shall not permit the alteration of a segment's end time to come on or before that of its start time nor shall it permit it to come on or after the time at which the session was terminated.

The system shall alter the start and end position of a break segment simultaneously and by the same offsets as directed by the user. The system shall not permit the alteration of either position to be placed on or before the time at which the session was initiated nor on or after the time at which the session was terminated.

3.1.3.3 Remove breaks

The system shall remove existing break segments from the sessions timeline as directed by the user. Removal of break segments involves deleting records of both a start position and an end position both of which must belong to the same segment.

3.1.3.4 Adjust session start time

The system shall alter the recorded timestamp at which the session was initiated as directed by the user. The system shall not permit the session initiation

timestamp to be altered to a value equal to or greater than the timestamp at which the session was terminated or the timestamps of any other events on the timeline.

3.1.3.5 Adjust session end time

The system shall alter the recorded timestamp at which the session was terminated as directed by the user. The system shall not permit the session termination timestamp to be altered to a value equal to or less than the timestamp at which the session was initiated or the timestamps of any other events on the timeline.

3.1.4 Estimate Hypothetical Task Sessions

The system shall calculate how long the user will take to complete a task, informed by the user's historical session data and given parameters inputted by the user where dictated by the profile of the task.

The system shall make multiple estimates using various strategies (such as mean, median, weighted, excluding breaks).

3.1.4.1 Estimate Hypothetical Task Sessions for New Profiles

The system shall calculate how long the user will take to complete a task when no historical session data is available by leveraging data from similar and analogous tasks.

3.1.4.2 Exclude Sessions from Consideration

The system shall exclude included sessions when calculating estimates as directed by the user.

3.1.4.3 Include Sessions in Consideration

The system shall include excluded sessions when calculating estimates as directed by the user.

3.1.5 Schedule Task Sessions

The system shall associate existing but uninitiated task sessions with a start date and time as directed by the user. The system shall extrapolate the duration of the scheduled session with app estimations or user estimations.

3.1.5.1 Alert Schedule Conflicts

The system shall alert the user when task sessions overlap. The system shall alert the user if the trajectory of their current session indicates a collision with a later session.

3.2 Interface Requirements

3.2.1 Touchscreen User Interface

The system shall accept user input through manipulation of its host device's touchscreen.

3.2.1.1 Text fields

The system shall defer character string input to host devices capabilities e.g. software keyboards with or without Speech-to-Text.

3.2.2 Graphical User Interface

3.2.2.1 Display Colored Task Profiles

The system shall display GUI elements associated with task profiles colored as directed by the user. These include the profile entries in the profile list and task sessions in the calendar timeline.

3.2.2.2 Display Scheduled Task Sessions on a Calendar Timeline

The system shall display scheduled task sessions on a calendar timeline such that the beginning of the graphical element appears on the day and time as scheduled and the end of the element is offset from the beginning by the system's or user's time estimation if either are present.

3.2.2.3 Display Task Session Timeline

The system shall display the timeline of a completed session populated with the events that occurred during the session such as markers and breaks.

3.2.2.4 Display Incrementing Session Timer

The system shall display the incrementing session timer once a session has been initiated and until it has been terminated.

3.2.2.5 Display Task Session History

The system shall display the session histories for each task profile. A session history includes the duration and the error in the user's initial estimate of each session.

3.2.3 Ergonomics

3.2.3.1 Quick Access to Session Controls Outside of the App

The system shall make accessing the session controls from outside of the app quick and convenient by placing them on the phone's lock screen, control panel, and notification center.

3.2.3.2 Quick Access to Session Controls Inside of the App

The system shall make accessing the session controls from inside of the app quick and convenient by placing a persistent status bar on the screen while in the app.

3.3 Performance Requirements

The system shall respond to user input immediately. This includes all timer control UI elements and navigation inputs.

The system shall not introduce empty or unresponsive pages between receiving the impulse to open the app or moving between pages in the app and completing the actions.