

ClockWork: Time Estimation

Milestone 4

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Task: Add Session Markers

Brief: Pressing the “Add marker” button on the timer screen should add a marker to the session at the current elapsed time value.

Status: Met all documented criteria

- + Added a pop up to tell the user marker was successfully added at the current time

Task: Save User Estimates

Brief: User estimates should be saved to app storage and recalled when editing an existing session.

User should be able to save a session without an estimate.

Status: Met all documented criteria

Task: Task Profiles

Brief: Add a UI page that lists all profiles

- Add a UI page for profile creation

- Add a UI page for profile editing

- Add the ability to delete a profile

- Add a UI page that lists all of the sessions made with the profile

Status: 95% Complete, Missing Profile Deletion

Task: Complete Sessions

Brief: Timer's finish button should end the current session and take the user to a after action report

Report should show work time vs break time and total time vs user estimate

Add a Ui page that lists all completed tasks

Status: Met all documented criteria

+ Each profile's page has a list of its completed sessions

Task: Finish Live Timer Notification

Brief: Format notification contents and add more information

Add more controls

Status: Complete

Formatted elapsed time, added session name and color

Added an “Add Marker” button and tapping the notification opens the timer page

Task: Session Deletion

Brief: Add a method for the users to delete sessions

Status: 40% Complete, Missing backend

Task: Duration Estimator

Brief: App generates its own session duration estimation based on user filled session parameters and performance history.

Use a calculated expected error and apply it to the estimation the user provided.

Status: 80% Complete, Kinda...

Task: Duration Estimator

Plan: Use either an XGBoost or SARIMAX model with user estimate as input and an adjusted estimate as output that retrains itself after a set number of new data points

Actuality: The machine learning approach was not progressing quickly enough to meet the deadline for user evaluations

Task: Duration Estimator

New Plan: Use a weighted average of historical user estimate error with weighted standard deviation.

Use Gower's Distance to calculate similarity score between new session and each completed session.

Combine similarity score with a recency bias to create the weights for the average and deviation

Task: Duration Estimator

Gower's Distance:

Calculate the similarity score for each field then combine using weights

$$S(A, B) = \frac{\sum_{k=1}^n w_k \cdot s_k(A, B)}{\sum_{k=1}^n w_k}$$

Similarity score formula for a numerical field. R denotes the range of the fields over all records in the dataset

$$s_k = 1 - \frac{|A_k - B_k|}{R_k}$$

Task: Duration Estimator

Recency Bias:

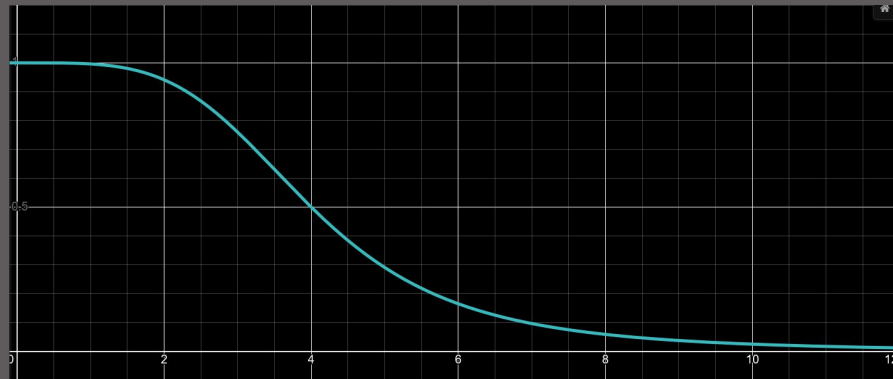
Reduce the influence
of sessions

completed long ago.

d is a decay intensity
parameter and h

denotes the point at
which the bias is 0.5

$$b = \frac{h^d}{x^d + h^d}$$



Task: Duration Estimator

Weighted Mean:

Average of values
multiplied by their
assigned weights

$$\mu_{\mathbf{w}} = \frac{\sum_{i=1}^n w_i \cdot x_i}{\sum_{i=1}^n w_i}$$

Weighted Standard Deviation:

Incorporate weights
into standard deviation
calculation

$$\sigma_{\mathbf{w}} = \sqrt{\frac{\sum_{i=1}^n w_i (x_i - \mu_{\mathbf{w}})^2}{\frac{M-1}{M} \sum_{i=1}^n w_i}}$$

Task: Duration Estimator

Result: App calculates expected error of a new session and apply it to the estimation the user provided to generate its own duration estimate. Same result, different approach

Status: 80% Complete

Create user history scenarios to test and tune weights

Task	% Done	Anthony	Christian	Peter	Pierson	To do
1. Task session markers	100%	0%	0%	100%	0%	
2. Save task session user estimate	100%	0%	0%	20%	80%	
3. Task profiles	95%	0%	0%	100%	0%	Profile deletion
4. Completed sessions	100%	0%	95%	5%	0%	
5. Finish live timer notification	100%	0%	0%	70%	30%	
6. 1st iteration auto estimator	80%	50%	0%	50%	0%	Tune weights, test with more data
7. Task session deletion	40%	0%	0%	0%	100%	Complete backend

App Demo

[Video Demonstration](#)

Milestone 5

- Implement second iteration auto session duration estimator
- Timeline visualization
- Timeline modification
- User history and statistics
- Database item deletion
- Conduct evaluation and analyze results
- Senior design poster

Task	Anthony	Christian	Peter	Pierson	Task
1. Finish session deletion	0%	0%	0%	100%	1. Finish session deletion
2. Finish profile deletion	0%	0%	100%	0%	2. Finish profile deletion
3. Completed session timeline visualization	0%	0%	0%	100%	3. Completed session timeline visualization
4. Completed session execution event editing	0%	0%	75%	25%	4. Completed session execution event editing
5. User history and statistics page	0%	100%	0%	0%	5. User history and statistics page
6. Custom profile fields	50%	0%	50%	0%	6. Custom profile fields
7. Next auto estimate iteration	75%	0%	25%	0%	7. Next auto estimate iteration

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¿Hay Preguntas?