ClockWork: Time Estimation

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Goal and Motivation

- Improve user's time estimation skill

Secondary

- Assist user scheduling
- Facilitate work habit improvements

Approach

- User can track work habits and log task completion
- User can check task estimates against actual task durations to practice time estimation
- User can view automated time estimates for tasks

Novel Features

- Focus on user time estimation
  - Other apps have timers
  - Other apps have task logs
  - Other apps might combine them
  - In ClockWork, these features are designed to assist the user to improve their intuition of how much time they need to do work

Algorithms and Tools

- Kotlin
  - De facto official language for Android Development
- Android Studio
  - IDE with Android integrations (emulator, Compose previews, and Room inspector)
- Jetpack Compose
  - Modern Android UI toolkit
- Android Room
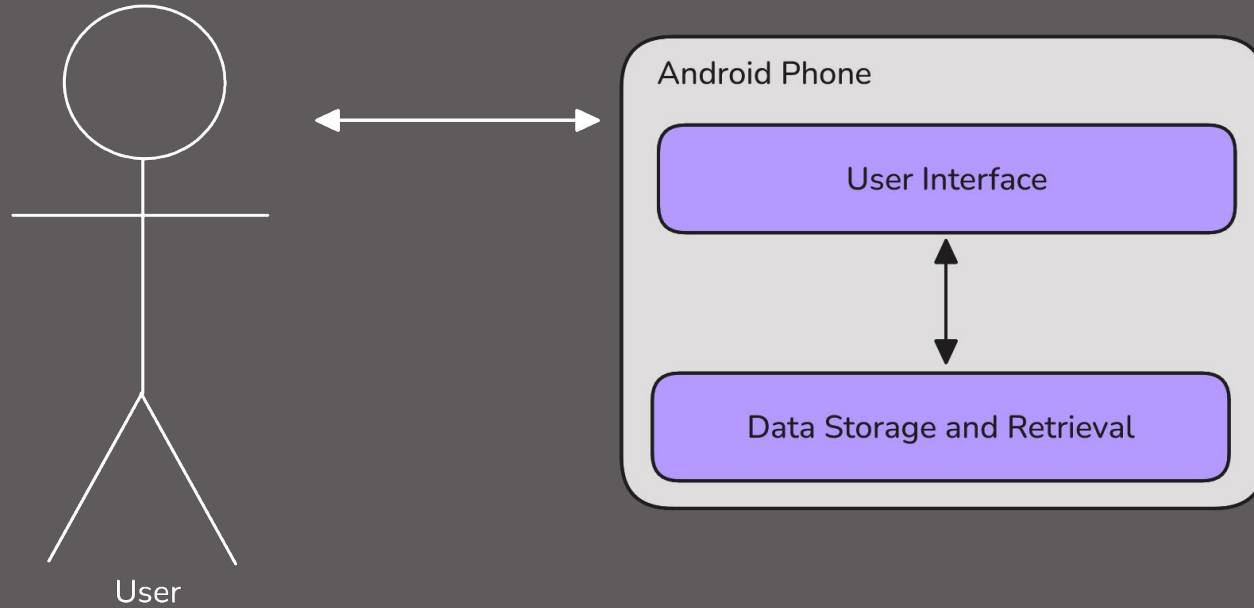 - Android/Kotlin SQLite abstraction layer

Algorithms and Tools

- LiteRT
  - Google's on-device Android ML model runtime
- SARIMAX or XGBoost
  - ML regression models
- Bayesian Regression
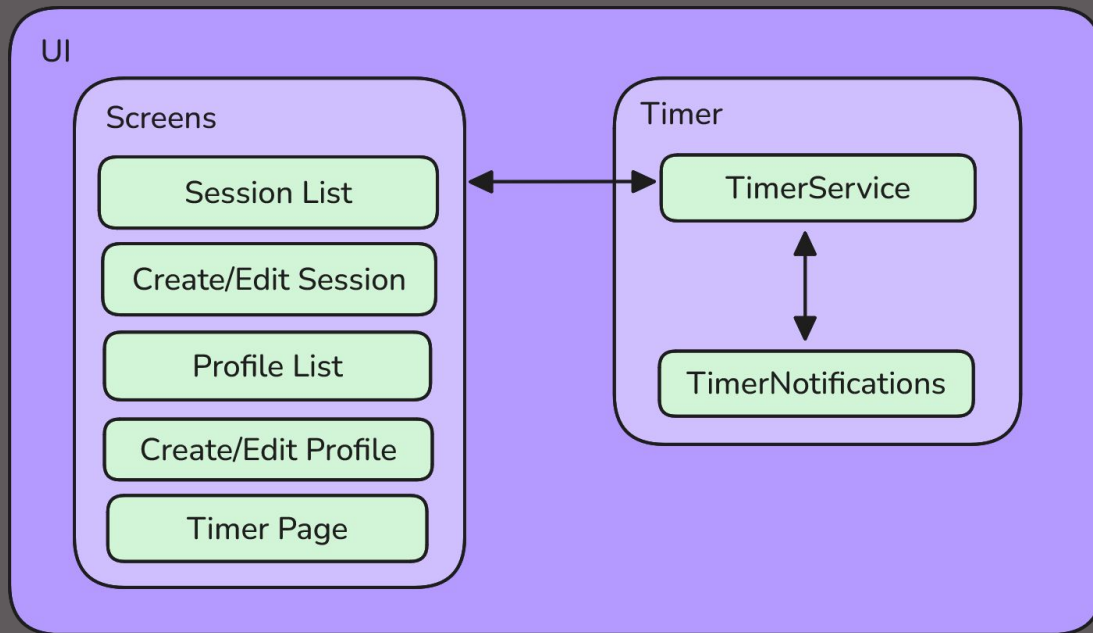 - Model to produce probability distribution

Technical Challenges

- Implementing automatic time cost estimation using machine learning models on mobile device hardware.

- Interpreting user performance and formulating progress reports within the program

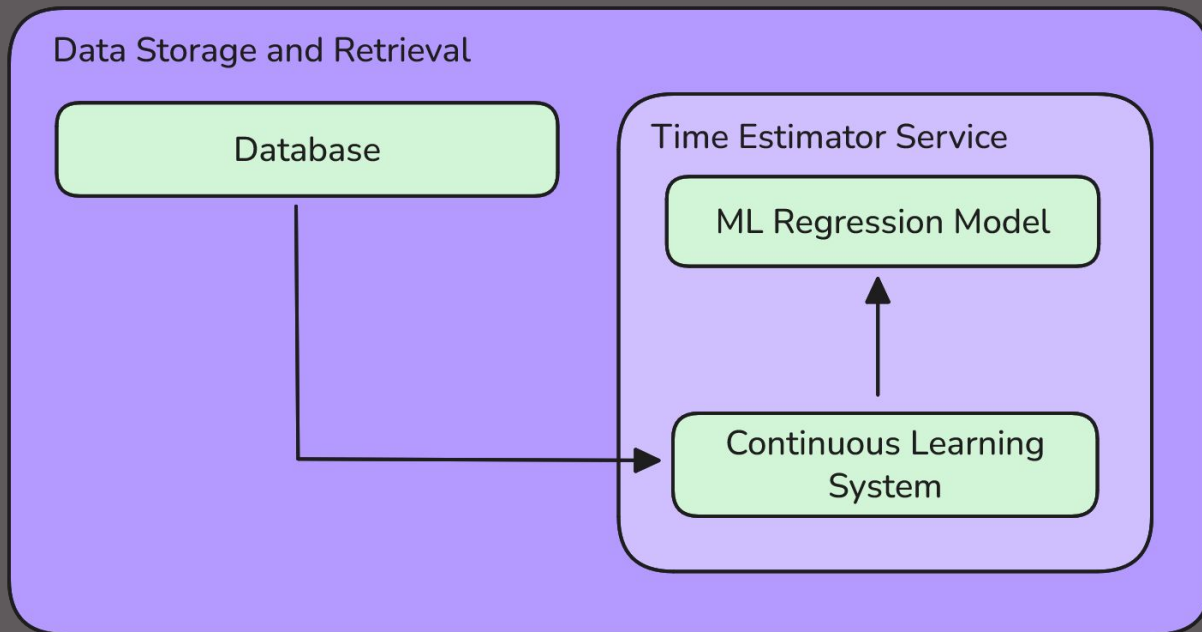- Visualization of session execution timeline

Design

User

Android Phone

User Interface

Data Storage and Retrieval

Design

PS

Design

Data Storage and Retrieval

Database

Time Estimator Service

ML Regression Model

Continuous Learning System

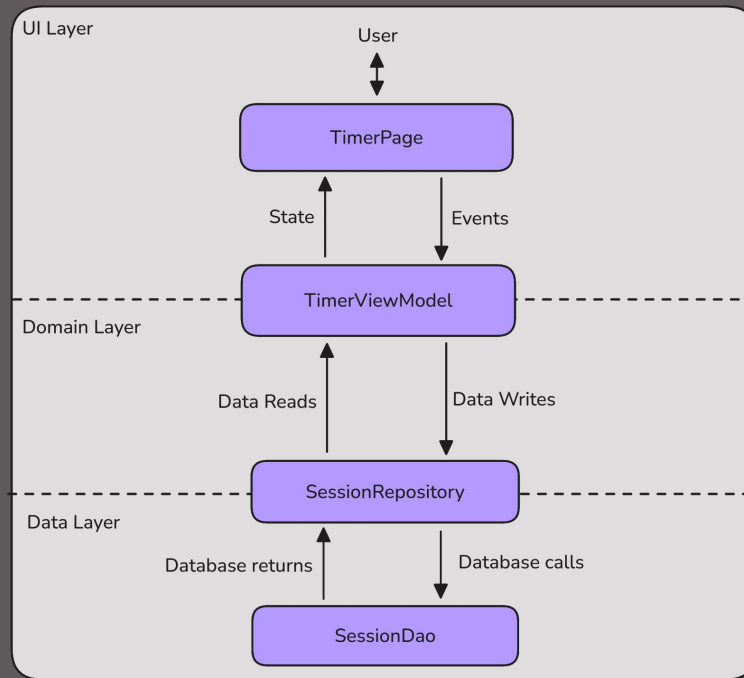# Design

- Model-View-ViewModel "Clean" Architecture

- Repository Pattern

- Dependency Inversion

- Core/Feature Organization

Evaluation Categories

- Convenience/Ergonomics

  - How difficult is it to use?

- Effectiveness

  - How much merit is there to using it?

- Accuracy

  - How good is the auto time estimator?

Evaluation Strategy

- User Survey
  - How often did the users use the app to track task durations?
    - What factors discouraged them from using the app?
  - How often did the users consider past performances when making new estimates?
    - Did the users notice any improvements in their ability to predict task duration?
    - Did the users notice any alterations to their work habits?

- Auto Estimator Tests
  - Perform "in-house" tests to check the estimator's accuracy
  - Use data from user survey to test the estimator's accuracy
    - How did the app's estimate differ from the actual task completion time?
    - How do the differences change over time? Increase/Decrease ?

Development Progress

Module/Feature	%	Todo
Session Timer	85%	• Finish live notifications • Always accessible in-app controls • Ensure resilience
Task Sessions	65%	• Association with profiles • Association with categories • Save user estimate and auto estimate • Timeline markers • Completed sessions • Delete session

Not Started

- Task Profiles
  - Milestone 4

- User History and Statistics
  - Milestone 5

- Auto Session Duration Estimator
  - 1st Iteration - Milestone 4

- Task Categories

  - Milestone 5 (Contingent on 2nd Iteration Estimator)

App Demo

[Video Demonstration](#)

Milestone 4

- Implement first iteration auto session duration estimator

    ○ single model, based solely on user estimate

- Task profiles

- Completed sessions

- Add task session markers

- Finish live timer notification

- Task session deletion

- Save task session user estimate

Task	Anthony	Christian	Peter	Pierson
1. Task session markers	0%	0%	50%	50%
2. Save task session user estimate	0%	0%	20%	80%
3. Task profiles	0%	0%	100%	0%
4. Completed sessions	0%	100%	0%	0%
5. Finish live timer notification	0%	0%	50%	50%
6. 1st iteration auto estimator	75%	0%	25%	0%
7. Task session deletion	0%	0%	0%	100%

Milestone 5

- Implement second iteration auto session duration estimator

  ○ incorporates user parameters or Bayesian Regression or both

- Session timeline visualization and editing

- Task Categories

- User history and statistics

- Conduct evaluation and analyze results

- Create poster for Senior Design Showcase

Milestone 6

- Polish and unify user interface design

- Task profile name template variables

- Test/demo of the entire system

- Conduct evaluation and analyze results

- Create user/developer manual

- Create demo video

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¿Hay Preguntas?