

Workshop 2

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1 Review Workshop #1 Findings

2 Define System Requirements

2.1 Functional Requirements

2.1.1 Data Capture and Storage

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- RF-001** Capture all user interactions including hovers, clicks, and drags with their respective `x,y` coordinates and timestamp.
 - RF-002** Assign a unique `session_id` per game session.
 - RF-003** Link all interactions to a specific `user_id`.
 - RF-004** Store user configuration settings including `full_screen`, `hq`, and `music_volume`.
 - RF-005** Save the `level_group` and question progress.

2.1.2 Data Processing and Normalization

- RF-006** Remove erroneous or duplicate clicks (condition: ≥ 90 ms between clicks).
- RF-007** Normalize `x,y` coordinates by standardizing to a key resolution.
- RF-008** Extract temporal features: time between events, response speed.
- RF-009** Extract spatial features: movement patterns like trajectories.
- RF-010** Extract contextual features: difficulty level and number of retries.

2.1.3 Prediction Model

- RF-011** `screen_coord_x/y`: Mouse position at critical questions.
- RF-012** `event_name`: Actions like `cutscene_click` or `map_click`.
- RF-013** `elapsed_time`: Cumulative time in session.
- RF-014** `hover_duration`: Time spent on interactive elements.

2.2 Non-Functional Requirements

2.2.1 Performance

- RNF-001** The system must capture and store user interactions in real time without affecting the user experience.
- RNF-002** Data preprocessing and normalization must not exceed 500 ms per batch of captured events.

2.2.2 Reliability

RNF-003 The system must guarantee 99.9% availability during gameplay sessions.

RNF-004 An integrity check must be implemented for each processed data block.

2.2.3 Security

RNF-005 All sensitive data (`user_id`, `session_id`) must be stored and transmitted using AES-256 encryption.

RNF-006 The system must implement role-based access control for data management and visualization.

2.2.4 Ease of Use

RNF-007 The user configuration interface must be accessible and intuitive, allowing easy adjustments to parameters such as volume, resolution, and fullscreen mode.

RNF-008 Key metrics and model outputs must be visualized through interactive dashboards supported by tools such as **Grafana**, facilitating interpretation by non-technical users.

2.2.5 Interoperability

RNF-009 The system must integrate seamlessly with analysis platforms such as **Jupyter**, **Apache Kafka**, **Grafana**, and relational or NoSQL databases.

RNF-010 The predictive model must be exportable in **ONNX** format or similar, ensuring portability across languages and frameworks.

3 High-Level Architecture

4 Addressing Sensitivity and Chaos

5 Technical Stack and Implementation Sketch