Components of the Context Aware Testing System

1. **User Interface Layer/Agent**:
    - **Test Management Dashboard**: A web or mobile interface where users can create, manage, and review test cases.
    - **Context Configuration**: Allows users to set and modify context parameters (like location, device type, user role).
2. **Context Acquisition Layer**:
    - **Sensor Integration**: APIs that collect data from various sensors or external data sources (GPS, device sensors, environmental sensors).
    - **User Context Data**: Collects data related to user behavior and environment (location, device type, network conditions).
3. **Context Processing Layer**:
    - **Context Modeling**: Algorithms and models that process incoming context data and determine the appropriate testing context.
    - **State Management**: Maintains the current state of the context and updates it as conditions change.
4. **Test Execution Layer**:
    - **Test Case Repository**: Stores all automated test cases and configurations.
    - **Test Executor**: Module that runs test cases based on the determined context and interacts with the application under test.
    - **Real-Time Result Analysis**: Analyzes test results and provides feedback immediately.
5. **Feedback Loop Layer**:
    - **Analytics Engine**: Gathers data from the execution layer to produce insights on test performance and context relevance.
    - **Reporting Module**: Generates reports and dashboards for stakeholders to review test outcomes and context impacts.

Data Flow

- Context data flows from the context acquisition layer to the context processing layer, which determines the testing context.
- Based on the context, appropriate test cases are executed in the test execution layer.
- Results and feedback from test execution are analyzed in the feedback loop layer, which informs users via the user interface layer.

Example High-Level Diagram Design