

USER REQUIREMENT SPECIFICATION (URS)

Automated Hazard Perception Test (HPT) System

1. Introduction

1.1 Purpose

This User Requirement Specification (URS) defines the functional, technical, security, integration, and operational requirements for the procurement, installation, and implementation of an Automated Hazard Perception Test (HPT) System for the Motor Vehicles Department, Kerala, and for the Accredited Driver Training Centres proposed to be established in the State.

1.2 Background

As part of the Annual Plan Scheme 2025–26, the Department proposes to modernise the driving licence testing framework by introducing a standardized Hazard Perception Testing system aligned with ADTC framework and MoRTH guidelines.

1.3 Scope

The scope includes centralized web-based HPT software, question bank management, Sarathi integration, evaluation engine, result synchronization, reporting, , installation, training and maintenance support.

2. System Architecture & Access

- The system shall be a Centralized web-based platform designed with a multi-tier architecture to ensure security and scalability across the department's offices.
- Dual Module Interface:
 - Admin Module: Centralised control for User management, question bank curation, and statewide reporting.
 - User/Office Module: Localised interface for each department office (01,02,03 etc) to manage daily candidate testing
- Decentralized User management: Provision for creating individual login credentials for staff at each department office to facilitate localized supervision.

- Sarathi Portal Integration: The application must utilize APIs to fetch candidate data (Name, Photo, Application Details) directly from the Sarathi portal upon entry of Application Number and Date of Birth.
- Multi-Factor Authentication: Integrated security via an OTP (One-Time Password) generated and sent to the candidate's mobile number as registered in the Sarathi database.

3. Test Dynamics & Question Bank

The test engine must deliver high-definition video content with randomized selection to maintain the integrity of the examination.

- Randomized Selection: For every candidate, the system shall randomly select 4 videos from a pre-approved question bank of 30 videos.
- Video Parameters:
 - Duration: Exactly 5 minutes per video.
 - Hazard Density: 5 developing hazards per video.
- Admin Content Management:
 - Field Data Input: Provision to upload real-time videos captured from field surveys.
 - In-App Video Editing: Administrative tools to edit videos and define "hazard zones" within the timeline.
 - Hazard Configuration: Provision for setting the precise timestamps for each developing hazard and assigning associated marking parameters.

4. Candidate Interaction

- Single-click hazard detection.
- Maximum 5 clicks per video.
- Spam-click prevention mechanism.
- Simple and intuitive user interface.

5. Evaluation & Scoring Logic

The scoring engine must be automated and based on the candidate's interaction with the "developing hazard" timeline.

- Scoring Structure:
 - Maximum Marks per Hazard: 5 Marks.
 - Maximum Marks per Video: 25 Marks.
 - Grand Total: 100 Marks.
- Dynamic Marking: Marks must vary according to:
 - Detection Accuracy: How quickly the candidate identifies the hazard.
 - Response Timing: The appropriateness of the remedial action taken relative to the hazard's progression.
- Input Restriction: To prevent "spam clicking," the system must restrict input to a maximum of 5 clicks per video (one per hazard window).
- Pass Criteria: A minimum aggregate score of 60% (60/100 marks) is mandatory to be declared "Pass."

6. Result Management & Reporting

- Automated Portal Sync: The Pass/Fail status must be automatically pushed to the candidate's history sheet on the departmental portal without manual intervention.
- Immediate Candidate Feedback: The result must be displayed on the monitor immediately after the fourth video is completed.
- Retest Provision: If a candidate fails, the system must automatically enable a provision for the candidate to book a slot for a retest.
- Comprehensive Audit Trails: The Admin module shall generate detailed reports on:
 - User activity logs (Office-wise).
 - Aggregated test results and pass percentages.
 - Question bank performance analytics

7. Software Requirements

- Secure web-based platform (HTTPS).
- API-based integration capability.
- Configurable test parameters.
- Protection against unauthorized access and tampering.

8. Installation, Training & Support

- Vendor to install and commission system.
- Provide training to officials.

- Warranty and AMC support.
- Regular updates and technical assistance.

9. Performance Requirements

- No perceptible latency.
- Stable continuous operation.
- Scalable for statewide deployment.

10. Acceptance Criteria

- Demonstration of all functional requirements.
- Verification of scoring accuracy.
- Successful API integration testing.
- Validation of randomization and audit logs.

11. Budgetary Provision

Implementation within sanctioned budget of ₹5,00,000/- under Head of Account 5055-00-050-98 for FY 2025–26.