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Annexure-I

Concept Note

Battery Fitness Assessment Application

Document Information

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Reviewed By/ Approved By - Sonam Chugh and Vinay Pandey

Version Control

Version	Date	Author	Change Description	Approved By
v1.0	March 2026	NeGD Team	Initial Draft	Sonam Chugh
v2.0	April 2026	NeGD Team	Revised Key Objectives - For Individuals as well as for coaches	Vinay Pandey

Approvals

Name	Role	Date
Sonam Chugh	Project Manager	March 2026
Vinay Pandey	Senior Program Manager	April 2026

Confidentiality Statement

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1. Overview & Context

We need to develop an AI Assisted Battery Test Application that digitizes India's 10 Battery Fitness Assessment Tests using mobile technology and AI video analytics.

The actual users of the app will primarily be:

- **School-level stakeholders** for grassroots talent identification (PE teachers and students).
- **TIDC Committee members** conducting initial battery assessment tests at district, state, and regional levels.
- **Coaches** when assessments are conducted in Akhaadas, STCs, NCOEs or any other sports facilities.
- Any other authorized personnel wherever common assessment tests are required for talent identification, selection, or performance monitoring.

This ensures the app serves as a practical tool across the entire athlete development pipeline - from grassroots school-level screening to structured TIDC evaluations and ongoing coaching use.

The app must serve two primary use cases:

- Individual athletes who upload training videos to receive automated fitness measurements and AI-powered feedback.
- Coaches/TIDC Committee administering structured assessments in schools and sports facilities - should be able to use and record test data on the app, without additional equipment.

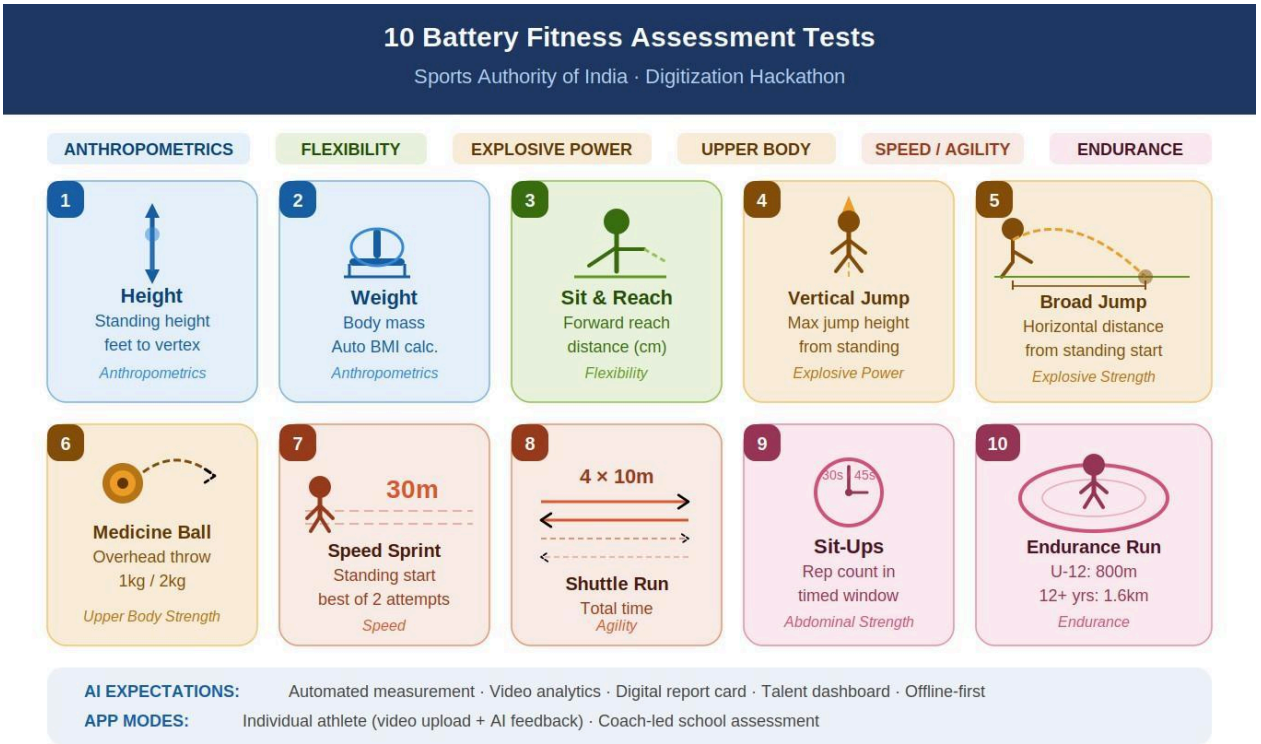
Currently, the 10 Battery Fitness Assessment Tests are conducted and recorded entirely manually, making the system resource-intensive, inconsistent, and difficult to scale. The Battery Test App must be practical for grassroots deployment across India's districts, including rural areas with limited infrastructure, and must function reliably on basic Android smartphones.

2. The 10 Battery Fitness Assessment Tests

The tests assess athletes across age groups using the following standardised parameters:

No.	Test Name	Fitness Component	Description
1	**Height**	Anthropometrics	Standing height, feet to vertex
2	**Weight**	Anthropometrics	Body mass; auto-calculates BMI
3	**Flexibility (Sit & Reach)**	Hip / Trunk Flex.	Forward reach, legs extended
4	**Standing Vertical Jump**	Explosive Power	Vertical jump height, standing
5	**Standing Broad Jump**	Explosive Strength	Horizontal jump distance

No.	Test Name	Fitness Component	Description
6	**Medicine Ball Throw (Overhead)**	Upper Body Strength	Backward overhead throw distance
7	**Speed (30m Standing Start)**	Speed	Time over 30m sprint
8	**Agility (4×10m Shuttle Run)**	Agility	Total time, 4-leg shuttle
9	**Sit-Ups**	Abdominal Strength	Rep count in 30 / 45 seconds
10	**Endurance (800m / 1.6km Run)**	Endurance	U-12: 800m · 12+ yrs: 1.6km



3. Objective

We need to design and build a Battery Fitness Assessment Test App covering all 10 Battery Fitness Tests. Participants are free to propose any technology architecture, AI methodology, or hardware approach that best achieves the goals below. The app does not prescribe specific tools - it seeks innovative, scalable, and practically deployable solutions.

4. Scope of the Application

- Development of a single, unified AI Assisted Battery Test Application (Android and iOS, web as stretch) that fully digitizes all 10 tests.
- Use of mobile cameras, sensors (accelerometer, gyroscope, GPS etc), and AI video analytics for automated measurements.
- Support for two core user journeys: (a) self-administered individual athlete records in-app or uploads video (in case there is an issue with in-app video recording) for training feedback and (b) coach-led structured assessments in field/school settings.
- Fully offline functionality with later cloud sync.
- Automatic generation of digital records, report cards, and basic dashboards.
- Solutions that work on basic Android/iOS smartphones in real-world Indian conditions (outdoor, low light, variable network).

5. What We Expect: Per-Test Expectations

For each of the 10 tests, participants must propose and build solutions that automate measurement, reduce assessor dependency, and generate reliable digital records.

1. Height

Propose a solution to accurately measure standing height using a mobile device in a field setting, without reliance on a stadiometer. The solution must display a confidence indicator, allow re-measurement, and auto-calculate BMI when weight data is available.

2. Weight

Propose a method for seamless weight data capture that supports manual entry as a baseline and reduces entry errors. Auto-calculation of BMI using age- and gender-appropriate categories is expected.

3. Flexibility (Sit & Reach)

Propose a method to measure forward reach distance using a mobile device, automatically identifying the best attempt across multiple trials without requiring manual entry by the assessor.

4. Standing Vertical Jump

Propose a solution to measure maximum vertical jump height using a mobile device without specialised lab equipment. The system must detect take-off and landing events, compute jump height, and auto-select the best of multiple attempts.

5. Standing Broad Jump

Propose a contactless method to measure horizontal jump distance using a mobile device. The system must handle multiple attempts, identify the best result, and minimise assessor intervention.

6. Medicine Ball Throw (Backward Overhead)

Propose a solution measuring throw distance from release to first landing using mobile technology. Must support the standard protocol (1 kg for girls and boys under 12 years; 2 kg for boys above 12 years), capture the best of two attempts, and record results digitally.

7. Speed (30m Standing Start)

Propose a method eliminating assessor reaction-time error in manual stopwatch timing. The system must automatically detect start and finish over 30m, whether through video analytics, GPS, sensor-based triggers, or other approaches. Best of two attempts captured.

8. Agility (4×10m Shuttle Run)

Propose a solution that automatically detects shuttle-run turns and computes total time and individual leg splits without assessor tapping, working reliably in both outdoor and indoor settings.

9. Sit-Ups

Propose an automated method to count valid sit-up repetitions within a timed window (30 or 45 seconds per age-group protocol), distinguishing valid reps from incomplete movements and recording the final count when the timer expires.

10. Endurance Run (800m for U-12 · 1.6km for 12+ years)

Propose a solution for automated distance tracking and time recording, can be using a mobile device carried by the athlete. The system must handle auto-start and finish detection, support the age-appropriate distance variation, and record completion time without assessor intervention once the run begins.

6. Core Deliverables Expected from Participants

All participating teams must deliver:

- An AI assisted 10 Battery Test App (Android & iOS) covering all 10 Battery Assessment Tests with digital data capture, built-in protocol prompts, and offline capability.
- AI video analytics enabling athletes to record in-app or upload training videos and receive automated fitness measurements and feedback.
- A Digital Fitness Report Card generated automatically on test completion, showing scores, percentile ranks, and benchmark comparisons.
- A consolidated dashboard enabling coaches and administrators to view athlete performance trends, district-level rankings, and talent identification outputs.
- Secure, role-based access with geo-tagging and timestamped records.

7. Implementation Approach

7.1 Athlete and Coach Registration and Login Process:

All athletes, coaches, PE teachers, and TIDC assessors must be able to register/login through multiple seamless options to ensure inclusivity across school and non-school users:

- **APAAR ID** (for school students – preferred for grassroots/school-level assessments).
- **Aadhaar-based login** (with e-KYC where required).
- **NSRS ID login** (for existing SAI-registered athletes/coaches).

Profile creation and update flow:

- Users can create a new profile or update an existing one directly in the app.
- Upon entering any valid ID (APAAR / Aadhaar / NSRS), the system will automatically fetch and pre-populate all linked metadata (name, age, gender, school/centre details, previous performance history, etc.) via available external APIs.
- Users can review, edit, or add missing information before proceeding.

NSRS ID handling :

- If an NSRS ID does not exist at the time of assessment, the system will **NOT** create one automatically during registration.
- An NSRS ID will be generated **only** for athletes who successfully clear/complete the full battery of tests (auto-creation triggered post-assessment). This ensures no unnecessary load on the central NSRS database for preliminary or non-qualifying participants.

7.2 Platform Integration Capabilities

The digital assessment platform is designed with robust two-way integration capabilities with other relevant sports applications and systems. This bidirectional integration will enable seamless exchange of athlete profiles, performance data, assessment results, and other relevant information between the platform and external systems such as national talent identification databases, sports federation portals, or coaching management tools.

The final output (assessment results, digital report cards, performance data, etc.) must be **easy to push to different applications wherever required** via well-documented, modular APIs. This plug-and-play architecture ensures the app can feed data into any downstream system (NSRS, Khelo India Portal, state-level dashboards, federation tools, etc.) without custom development effort.

7.3 Video Submission Requirements

To ensure accuracy, standardization, and reliability of performance assessment, athletes and coaches are required to record/upload **separate videos for each individual test** rather than a single combined video. Each video must correspond exclusively to one designated test (e.g., 30m sprint, vertical jump, agility drill, skill-specific assessment, etc.).

The following measures will be implemented to maintain data integrity and prevent the upload of random or non-compliant videos:

- All videos must be recorded in a **continuous, unedited single take** from an appropriate angle that clearly captures the full performance.
- Each video should begin with a brief verbal announcement stating the athlete's name, the specific test being performed, and the date of recording.
- Submissions must be accompanied by a digitally signed declaration from the athlete and coach confirming the authenticity and originality of the video.
- The platform will enforce technical controls including minimum resolution (720p or higher), MP4 format, appropriate duration limits per test, and mandatory metadata tagging (test name, athlete ID).
- Videos combining multiple tests or containing irrelevant footage will be automatically rejected. Repeated non-compliance may result in disqualification from the assessment process.

Detailed recording guidelines, recommended camera positioning, and step-by-step upload instructions will be provided to all registered participants in advance.

7.4 Modus Operandi: Conduct of Battery of Tests

The assessment will follow a structured **battery of tests** comprising standardized physical fitness evaluations.

Participants (athletes and coaches) will be able to clearly visualize the sequence of events through the following steps:

1. **Pre-assessment Preparation**: Upon NSRS/APAAR/Adhaar-Based registration and login, participants will receive detailed test protocols, equipment requirements, setup diagrams, and sample videos demonstrating correct execution of each test. A general warm-up (jogging, dynamic stretches) will be mandatory before starting the battery.
2. **Test Administration Sequence**: Tests will be performed one after another in a logical order (e.g., speed and power tests first, followed by agility, strength, and endurance tests). Adequate rest intervals will be provided between tests to minimize fatigue. Each test will have clear instructions on starting position, execution technique, number of attempts (usually best of 2 or 3), and success criteria.
3. **Video Recording and Upload**: For every individual test, the athlete will perform the task. The coach or athlete can record the video either directly **within the application** or using an external camera and then upload it. The video for that specific test must be recorded/uploaded before proceeding to the next test in the battery.
4. **On-ground Safety and Standardization**: Coaches must ensure a safe testing environment - even surface, proper marking with cones, adequate spacing between stations, hydration breaks, and medical readiness. Only the performing athlete and supervising coach(s) will be allowed in the testing area during each attempt.
5. **Post-assessment**: After all tests in the battery are completed and videos recorded/uploaded, the platform will facilitate automated or expert review of submissions, scoring, and generation of performance reports.

This clear, step-by-step modus operandi supported by the in-app recording option will help athletes and coaches mentally prepare, organize logistics and execute the assessment smoothly, ensuring fairness and high-quality data collection.

8. Application Benchmarks

Submissions will be evaluated against the following minimum performance thresholds:

Category	Minimum Threshold
Performance & Speed	App launch < 3s · Test screen loads < 1s · Data syncs in < 5s on stable connection · Offline queue syncs within 30s of reconnection
AI & Measurement	Height within ±1 cm · Jump detection within ±2 cm · Sit-up accuracy ≥95% · GPS run timing within ±1s · Shuttle touch detection ≥95%
Offline Capability	Full 10-test battery completable with zero connectivity · Minimum 500 athlete sessions stored locally · No data loss on crash
Usability & Access	UI in Hindi and English minimum · Readable in low-light and direct sunlight · Standard rear camera
Reporting	Report Card generated within 10s of completion · Percentile rank shown instantly · PDF export without internet connectivity
Scale & Security	Backend supports 10,000+ concurrent sessions · API response < 500ms · Results tied to GPS, and timestamp

9. Expected AI-Enabled Outcomes

Beyond digitization, the AI Powered Battery Test App is expected to power a national-scale talent identification and athlete monitoring ecosystem. Participants are encouraged to propose solutions that enable:

- **Scalable Talent Identification -** Automated identification of top-percentile performers at district, block, and state levels - with clustering into high-potential fitness archetypes and automated "Emerging Talent" lists.
- **District-Level Talent Mapping -** AI-driven dashboards showing performance heatmaps, talent density clusters, sport-specific suitability patterns, and gender- and age-wise comparative analysis.
- **Objective Ranking & Selection Support -** Automated age-group rankings, performance band categorisation (Emerging / Promising / High Potential), and sport suitability mapping to support transparent selection.
- **Athlete Progression Monitoring -** Year-on-year performance tracking, growth curve analysis, and plateau detection enabling structured athlete development from grassroots to elite pathways.
- **Evidence-Based Resource Planning -** Aggregated intelligence to support Government bodies in allocating coaching resources and infrastructure investment based on measurable talent density.

- **Future scalability-** The system must support the addition of new sports-related tests beyond the initial 10 Battery Fitness Assessment Tests. Each test will be defined by a configurable set of criteria, and upon video upload by a coach or athlete, the system should automatically validate the submission against those criteria to determine pass/fail. The platform must be flexible enough to onboard new test types along with their respective evaluation criteria without requiring structural changes to the system.

10. Conclusion

This is an opportunity to transform India's grassroots sports assessment framework from a manual, resource-intensive process into an intelligent, scalable national sports development engine. The AI Powered Battery Test App built through this initiative will serve as the foundational entry point of India's national athlete development pipeline - enabling every child, in every district, to be identified, assessed, and nurtured based on objective, data-backed evidence.

Participants are encouraged to bring innovative, practical, and scalable solutions that align with India's vision of becoming a global sporting powerhouse.

Annexure-II

Note # 1

Subject: Competition for Digitization and AI Integration of SAI Battery Fitness Assessment System (Battery – 10 Physical Fitness Tests)

1. Background

Sports Authority of India (SAI) conducts the Battery Fitness Assessment comprising 10 physical fitness tests for athletes across age groups. At present, the assessment process involves significant manual measurement, timing, counting, and data recording, which leads to:

- Higher dependency on manpower
- Variations in reporting across locations
- Delays in generating consolidated insights at district/state/national levels

To address this, it is proposed to launch a Competition to develop an end-to-end solution for Digitization and AI Integration of the Battery Fitness Assessment System. The solution will:

- Standardize test execution through digital workflows
- Enable faster and more reliable reporting and rankings
- Support scalable analytics for talent identification and monitoring across India

2. Concept Note

A **Concept Note** on "Integration of Artificial Intelligence in SAI Battery Fitness Assessment System" has been drafted. The Concept Note outlines the proposed approach for digitization and AI integration strategy for Project 10 Physical Fitness Tests, with a focus on maximum practicality for deployment across districts, including rural areas with limited infrastructure.

The Concept Note covers the following broad outcomes:

- Digitization of all 10 tests
- Instant digital report cards
- Consolidated dashboards for talent identification and monitoring

Further, the Concept Note proposes a structured framework beginning with mobile-based standardized data capture (including test parameters, athlete profile details and assessment metadata such as geo-tag, timestamp, assessor ID), AI-based ranking and talent assessment,

governance/validation mechanisms, and visualization for decision support. This note has been approved by SAI team too and a copy is also attached herewith.

3. Proposed Approach: Competition through MeitY Startup Hub (MSH)

It is proposed that the design and development of the "Digitization and AI Integration of SAI Battery Fitness Assessment System" may be conducted as a Competition through the MeitY Startup Hub (MSH) platform.

3a. Platform & Implementation

- MSH will host, implement, and conduct the competition, while SAI/NeGD will provide the Concept Note as the reference document, along with rewards for winners and any required funding support for hosting the challenge.

3b. Evaluation Committee / Jury

A Committee / Jury will be constituted comprising domain experts and representatives from relevant organisations. The Committee / Jury will:

- Evaluate applications in stages and shortlist proposals based on the defined criteria
- Invite shortlisted participants to demonstrate / present their solutions in subsequent rounds
- Shortlist two finalists at the end of the challenge stage 2 based on technical and functional evaluation

Thereafter, for actual implementation, a detailed Scope of Work (SOW) covering customization, integration, deployment, implementation support, and associated service obligations will be prepared and shared with the shortlisted 2 finalists. The final implementation partner will then be selected through an L1 bidding process.

The finally selected company shall not only provide the solution / codebase but shall also remain associated for implementation, integration, deployment support, and operationalization of the final solution as per the requirement of SAI.

3c. Intellectual Property Rights (IPR)

The Intellectual Property Rights (IPR) of the final solution, including source code, documentation, and related deliverables, shall remain with SAI as per applicable policy, while due credit may be provided to the solution owner / developer, as appropriate.

3d. Duration and Expected Timelines

SN	Activities	Timelines
1	Approval of the Grand Challenge	7 days
2	Launch of Call for Proposals	2 days
3	Round 1 – Submission of Concept, Solution Architecture, Approach and Figma / Prototype	15 days
4	Preliminary short listing of proposals and Declaration of shortlisted participants for Round 2	5 days
7	Round 2 – Submission of Codebase Repository, Prototype / Functional Build, and Technical Documentation	30 days
8	Technical Evaluation and Shortlisting of Finalists	5 days
9	Pitching / Demonstration by shortlisted finalists before Jury	4 days
10	Declaration of Top 3 Finalists	3 days
11	Preparation and issuance of detailed SOW for customization, integration, and implementation to the shortlisted finalists	7 days
12	Financial bidding / L1 / reverse bidding process among shortlisted finalists	5 days
13	Final selection of implementation partner	3 days
Total Execution Time for the Challenge – 3 Months		

4. Stakeholder Alignment

It is also proposed that the Concept Note may be shared with the relevant SAI technical stakeholders / implementing teams (including platform owners and IT teams supporting assessments) so that they may align their existing assessment workflows, data capture mechanisms, and reporting systems with the proposed Digitization and AI Integration framework for the Battery Fitness Assessment.

5. Problem Statement

The Battery Fitness Assessment under SAI is currently conducted through manual measurement, timing, counting, and data entry by assessors, making the overall process resource-intensive, prone to inconsistencies, and difficult to scale uniformly across districts/states. Hence, a practical, scalable and standardized Digitization + AI-enabled solution is required to ensure uniform data capture and

automation of outputs such as:

- Digitization of 10 battery tests
- Instant digital report cards
- A consolidated dashboard for talent identification and monitoring across India

6. Stakeholder Consultations

Several rounds of discussions were conducted with key stakeholders, including:

- SAI technical leadership / IT teams
- Program stakeholders
- MeitY Startup Hub (MSH)
- Relevant industry / domain experts

These discussions helped refine the Digitization and AI Integration approach for the Battery Fitness Assessment System and identify key implementation and rollout challenges.

7. Comparative Review of Existing Solutions

A comparative review was carried out to evaluate the feasibility of leveraging existing market solutions / proven methodologies for rapid development and high accuracy. The Concept Note highlights that solutions such as Google MediaPipe can be leveraged as foundational building blocks. However, the same Concept Note concludes that an integrated, purpose-built Digitization + AI system is required for the Battery—covering:

- Standardized mobile-based data capture across districts
- A centralized national fitness repository
- An AI-driven talent intelligence layer
- Governance and audit mechanisms

8. Competition Focus Areas

Accordingly, a Startups Competition / Coding Challenge is proposed to be conducted in collaboration with MeitY Startup Hub (MSH) to drive innovation in the development of the Digitization and AI Integration solution for the Battery Fitness Assessment System, aligned with the drafted Concept Note. The competition will focus on:

A. **Designing an end-to-end digitization architecture** for the 10 Physical Fitness Tests with standardized, protocol-driven mobile workflows and offline-first data capture.

B. **Developing the centralized national fitness repository layer**, with secure storage, standardized schema, API readiness, and role-based access control for scalable consolidation.

C. **Implementing the AI & Talent Intelligence layer**, enabling percentile scoring, district/state rankings, talent clustering, emerging talent tagging, and sport suitability mapping for objective talent identification at scale.

D. **Embedding governance and validation mechanisms**, including explainable scoring logic, audit trails, bias detection, human-in-loop validation, and security standards such as encryption.

E. **Building dashboards and decision-support views** to visualize insights for district/state/national program monitoring and talent identification.

9. End Product & Deployment Readiness

A. The challenge is intended to identify and technically validate the most suitable solution approaches. At the end of the challenge stages, two finalist solutions shall be shortlisted based on technical merit, feasibility, scalability, and deployment readiness.

B. Subsequently, a detailed implementation SOW shall be shared to the shortlisted finalists for submission of financial bids under an L1 / reverse bidding process for actual customization, integration, deployment, and implementation support.

C. The final selected company shall be responsible not only for providing the solution / codebase and technical documentation, but also for supporting implementation and rollout of the solution.

D. The objective is to develop a standardized, scalable, and reusable Digitization + AI framework for the Battery Fitness Assessment, enabling:

   a. Uniform digital capture of all 10 tests

   b. Instant digital report cards

   c. District / State / National rankings

   d. Consolidated dashboards for talent identification and monitoring

10. Evaluation Committee / Jury

A Committee is proposed to govern the coding challenge and contribute as the jury for the evaluation and shortlisting of participants for Round 1 & 2. The Committee can co-opt representatives from respective organizations to participate in the evaluation process of the coding challenge. The Committee can also modify the framework of challenge based on evolving needs.

Entity	Role	Details
MeitY Startup Hub	Chairperson	Shri Panneerselvam Madanagopal Chief Executive Officer (CEO)
DIC	Member	Shri. Debabrata Nayak Chief Technology Officer
NeGD	Member	Shri Sunil Sharma Director – Programme Management & Project Appraisal / Admin & HR
SAI	Deputy Director	Representative, SAI
NASSCOM	Member	Representative, NASSCOM DeepTech
Google FIT	Member	Representative, Google FIT
Open AI	Member	Representative, Open AI

11. Budget & Costing

Stage	Category	Winners	Prize	Total Cost (₹)
Round 1: Architecture Challenge	Top 6 Designs	6	₹1,00,000	₹6,00,000
Round 2: Coding Challenge	Winner	1	₹25,00,000	₹25,00,000
	2nd Place	1	₹15,00,000	₹15,00,000
Empanelment of MSH (for 4 months)			MSH to Sponsor	
Total Budget				**₹46,00,000**

12. Terms of Reference (ToR) for the Evaluation Committee / Jury

12a. Evaluation Process

A. Review and assess submissions received under the Startups Competition / Coding Challenge based on predefined evaluation criteria.

B. Assess alignment with the proposed framework for Digitization and AI Integration of the Battery Fitness Assessment System.

C. Assess technical feasibility, scalability (district/state/national deployment), interoperability,

and security aspects of the proposed solutions.

D. Evaluate usability for field assessors (including offline-first operability), ease of integration, modularity, and maintainability.

E. Evaluate governance aspects such as data validation, audit trails, transparency/traceability, and safeguards for responsible AI usage (where applicable).

12b. Selection of Winning Solutions

A. Shortlist top-performing solutions based on technical assessment and comparative benchmarking.

B. Conduct presentations/demos for shortlisted solutions to validate functionality and feasibility.

C. Recommend the Top 2 finalists for progression to the next stage.

12c. Oversight & Advisory Role

A. Guide the technical implementation roadmap post-challenge for rollout and scaling.

B. Recommend enhancements and best practices for national deployment, operations, and continuous improvement.

C. Suggest governance and operational interventions, if required, to ensure adoption and uniform implementation across testing locations.