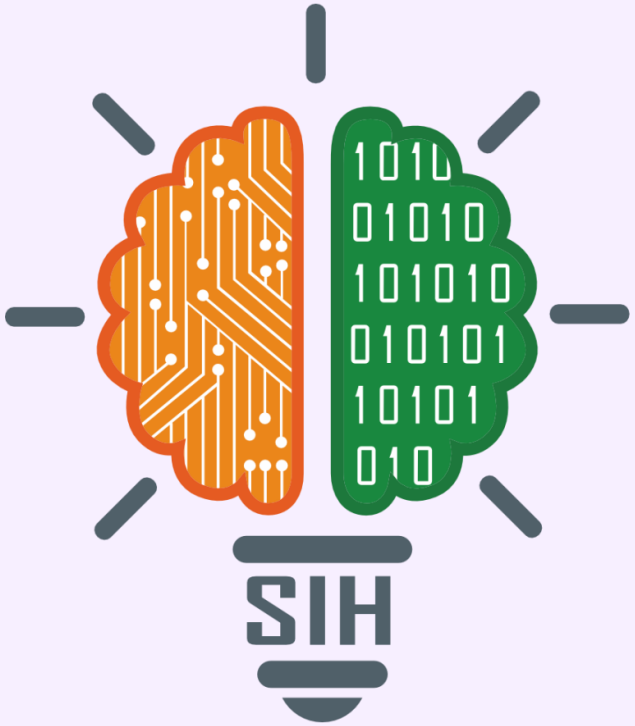
SMART INDIA HACKATHON 2025

SMART INDIA HACKATHON 2025

- **Problem Statement ID – SIH25073**
- **Problem Statement Title- AI-Powered Mobile Platform**

  For Democratizing Sports Talent Assessment
- **Theme- Fitness & Sports**
- **PS Category- Software**
- **Team ID- 80065**
- **Team Name- AlgoNomad**



AlgoNomad

Apex Athletic

AI-Powered Performance Analyzer

SMART INDIA HACKATHON 2025

Detailed explanation:

The **Sports Authority of India (SAI)** requires an innovative, mobile-based solution to democratize sports talent assessment. The proposed platform should:

- **Record or Upload Drills** – Athletes can download an app and either live-record or upload short clips of their sports activities.
- **AI Video Assessment** - Computer vision models analyze movements to measure speed, flexibility, and technique.
- **Personalized Feedback** - AI highlights strengths, detects errors (e.g., running form, bowling action), and gives insights.
- **Virtual Talent Cards** - Each athlete gets a sharable performance card with scores, benchmarks, and progress tracking.
- **Security** - Securely submit verified data to SAI servers for further evaluation and athlete profiling.

How it addresses the problem:

- **Fair & Accessible** - Any athlete with a smartphone can showcase skills, reducing bias and dependency on costly equipment.
- **Scalable Talent Discovery** - Coaches, schools, and colleges can identify hidden talent across regions, not just in urban or elite centers.
- **Affordable Innovation - L**ow-cost and lightweight, ensuring accessibility even on entry-level smartphones and low-bandwidth networks.

Innovation and uniqueness of the solution:

- **Instant Record-to-Feedback** – We trained to AI give insights through exclusive skeleton technology built by us.
- **Talent Cards for Visibility** - Creates digital profiles athletes can share with coaches, scouts, and institutions.
- **Multi-Sport Ready** - Flexible framework to adapt to different sports drills and techniques.

AlgoNomad

TECHNICAL APPROACH

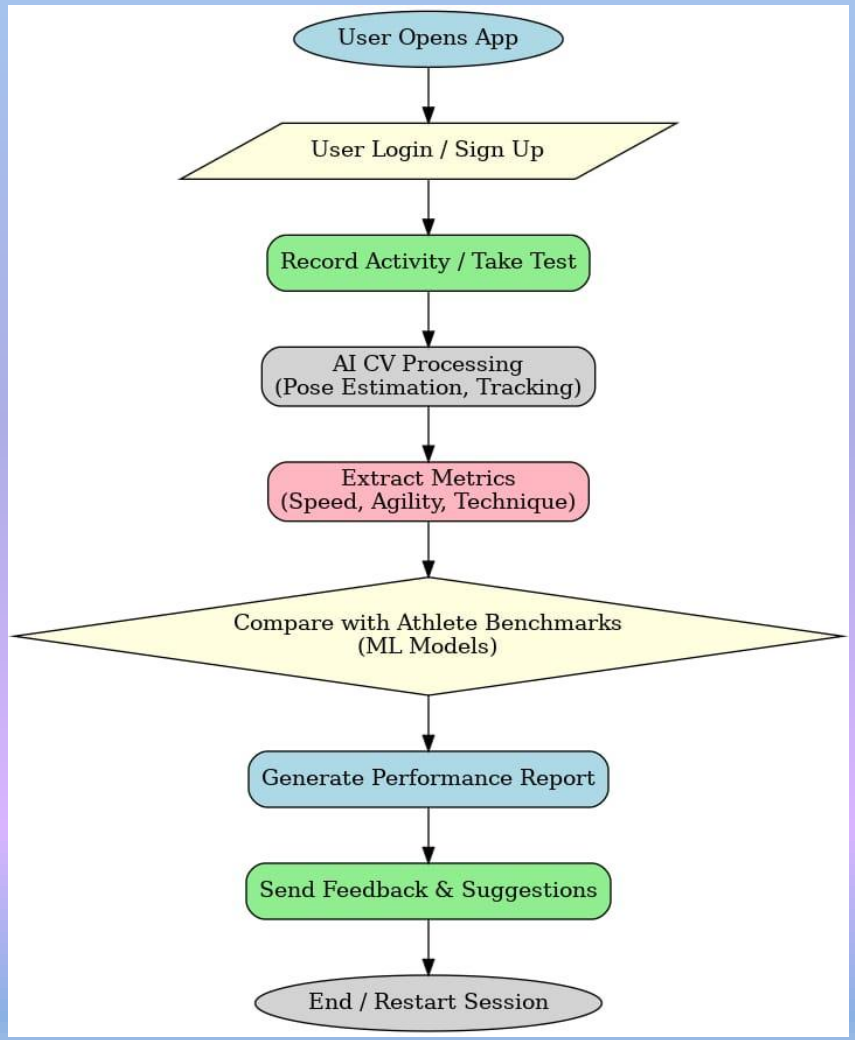
SMART INDIA HACKATHON 2025

Technologies Used:

Programming Languages & Frameworks:

- **Mobile App:** Flutter / React Vite(TypeScript) (cross-platform iOS & Android)
- **Backend:** Node.js
- **AI/ML:**
  - **Pose Estimation & Motion Tracking:** MediaPipe (Skeleton tech)
  - **Video Analysis & Metrics Extraction:** TensorFlow
  - **Optional Analytics & Leaderboards:** Python (pandas, NumPy)
- **Database:** Supabase (athlete data, scores, leaderboards)

Methodology & Implementation:



FEASIBILITY AND VIABILITY

AlgoNomad

SMART INDIA HACKATHON 2025

Feasibility:

- **Technical Feasibility:** Any athlete can use just a smartphone to get AI-powered feedback on their performance by our self built tech.
- **Financial Feasibility:** Affordable platform that grows with users, needs minimal investment but offering real impact.
- **Market Feasibility:** Gives hidden talent a chance to be seen and recognized, no matter where they come from.
- **Operational Feasibility:** Easy-to-use app where athletes can upload videos, track progress, and share their talent cards.

Challenges & Risks:

- **Technical Challenge:** Phones and lighting may trick the AI, affecting accurate feedback.
- **Financial Challenge:** Growing the platform while keeping it affordable can stretch resources.
- **Market Challenge:** Talented athletes might never find the app without strong outreach.
- **Operational Challenge:** Protecting user videos and personal data is essential to build trust.

Mitigation Strategies:

- **Technical Mitigation:** Standardize video input and guide users on lighting & angles for accurate AI feedback.
- **Financial Mitigation:** Start lean with minimal costs and add premium features as the user base grows.
- **Market Mitigation:** Launch targeted campaigns and partner with schools/academies to reach hidden talent.
- **Operational Mitigation:** Use encrypted storage, anonymize data, and get clear consent to protect user privacy.

AlgoNomad

IMPACT AND BENEFITS

SMART INDIA HACKATHON 2025

Potential Impact on Target Audience:

- **Athletes:** Get AI-driven insights to improve skills faster and smarter.
- **Coaches:** Evaluate talent at scale and design personalized training efficiently.
- **Sports Academies & Schools:** Discover hidden talent, giving all athletes a fair chance.
- **Parents & Guardians:** Track progress clearly and safely with understandable metrics.

Benefits of the Solution:

- **Social:** Promotes inclusivity and equal opportunities and reduces scouting bias.
- **Economic:** Saves time and resources which enables cost-effective recruitment for clubs and academies.
- **Environmental:** Cuts travel for trials, assessments happen remotely via mobile.
- **Educational:** Encourages growth through actionable insights and gamified feedback.
- **Scalable:** Easily expands across sports, regions, and age groups with minimal infrastructure.

AlgoNomad

RESEARCH AND REFERENCES

SMART INDIA HACKATHON 2025

Key Research & Technologies:

- **AI & Computer Vision in Sports:**
  - Motion analysis and pose estimation using **MediaPipe**, **OpenPose**, **TensorFlow**.
  - Example studies: *"Automated Athlete Performance Analysis Using Pose Estimation"*, *"Deep Learning for Sports Skill Assessment"*.
- **Talent Identification & Assessment Frameworks:**
  - Research on metrics for agility, speed, endurance, and sport-specific skills.
  - Example papers: *"Objective Metrics for Youth Sports Talent Scouting"*, *"AI-Based Performance Predicting Athletes"*.
- **Mobile Integration:**
  - Use of smartphones sensors for remote monitoring of athletes.
  - Example: *"Mobile-Based Sports Analytics for Grassroots Talent Development"*.
- **Privacy & Ethical Data Handling:**
  - Guidelines for biometric and video data in sports research.
  - Reference: *GDPR, ISO/IEC 27001, and consent-first data processing studies*.

Useful Links / Resources:

- MediaPipe Documentation: https://mediapipe.dev
- TensorFlow Models for Pose Estimation: https://www.tensorflow.org/hub
- OpenPose GitHub: https://github.com/CMU-Perceptual-Computing-Lab/openpose
- Research papers: Google Scholar search for *"AI sports talent assessment"* and *"computer vision athlete analysis"*.
- Prototype website link: https://apex-athletic.web.app/
- Youtube link: https://youtu.be/LTqa6NvdWUQ?si=6uCDj2F8f51blJpb