IIT Mandi iHub & HCi Foundation
Technology in Harmony with Human Needs

Advertisement for Call for Proposals 5.0
IIT Mandi iHub and HCi Foundation
Last Date to Apply: 20th July 2025

About iHub:

IIT Mandi iHub and HCi Foundation (iHub) is a Section 8 company established under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS). The vision of iHub is "to be an internationally recognized hub that nurtures HCi research, enables technology translation for industry adoption, and scales skill development." For more information, visit www.ihubiitmandi.in

Call for Proposals (C*f* P 5.0):

IIT Mandi iHub and HCI Foundation, established under the Department of Science and Technology (DST)'s NM-ICPS initiative at IIT Mandi, invites research proposals aimed at developing innovative and practical solutions to real-world problems within defined budgets and timelines.

The current Call for Proposals (CfP 5.0) consists of 13 problem statements aligned with our core focus area: Human-centred AI (HCAI), as detailed in Annexure A.

All problem statements are presented in a uniform structure, with a brief description highlighting their significance. Principal Investigators (PIs) are expected to select one or more problem statements from Annexure A and conduct rigorous, independent scientific research to yield potential solutions at TRL 5 or above to design and prototype systems, products, or services. The goal is to foster the development of novel technology solutions with strong relevance and applicability to industry within the HCAI landscape.

Time Frame:

Typical proposals are expected to have a one-year timeframe, with exceptional proposals being provided for up to a two-year timeframe, with the goal of delivering a potential solution within the timeframe.

Guidelines to submit the proposal:

1. The proposal can be submitted either individually or in collaboration with other institutes by the Principal Investigator (PI) from Academia (as per point a) or by the Project Leader (PL) on behalf of the industry/startup (as per point b).

   Academia:

   a. Research Institute, a university with a well-established support system for research. The institute should have been established in India and have NAAC/UGC/AICTE or any equivalent recognition certificate, or any other Public/ Government organization/Institute of National Importance.

   Industry:

   b. Company (Startup, Small, Medium, or Large)/LLP incorporated under the Indian Companies Act, 1956/2013 or the Limited Liability Partnership Act, 2008.

   c. The PI/PL shall be responsible for the technical and managerial aspects of the project execution.

2. Applicants can submit applications for more than one project by filling in a separate application form for each project. However, iHub may fund only one project at a time.

3. The proposers should prepare a comprehensive solution in the prescribed format given in Annexure II and submit it within the specified timeline.
4. The proposals should have well-defined objectives, scope, outcomes, and quantifiable deliverables with specific timelines. Any additional relevant details other than those given in the format may be included in the proposal.
5. The applicant from Academia (PI)/Industry (PL) must submit an Endorsement Letter from their parent organization.
6. Applicants with collaborators (Co-PIs) from Academia and Industry must submit endorsement letters from all the participating entities.
7. The support under the program will be provided based on the review of project proposals submitted. The decision of TIH in this regard will be final and binding.
8. The application must be submitted only through the type form.

   ***Apply here:** https://xt9iuyp9fqg.typeform.com/to/qtvtHdRT

Selection and Assessment Criteria:

1. Focus on Industry Adoption would be a critical selection parameter:
   a. The development of technology that can be adopted across industries would be the critical goal. To achieve this goal, iHub will focus on proposals with a strong translational component that can result in products, platforms, patents, or initiate a start-up.
   b. Developing technology for adoption across any industry requires a multifaceted approach that includes collaboration among multiple disciplines, an entrepreneurial mindset, and a close, critical eye on industry adoption.
   c. The researcher should strive for an industry partner to assist in Alpha-Test/Beta-Test/Product-Market fit for the research-based solution with an aspired Technology Readiness Level of 5 (TRL 5) or above.
   d. Diversity of the team in terms of skills and expertise, including domain and technology, would be expected.

2. As such, the nature of the challenge and the scientific quality of the proposal are critical, as well as the suitability of the proposal to the requirement. Proposals will be evaluated based on the following criteria:

   1. **Foundational & Defensible Technology**: Solving this creates a new, core technological asset that is difficult for others to replicate.
   2. **Platform Potential:** The solution could become a platform that enables *other* products and services,
   3. **Market Creation vs. Market Serving:** The solution could technology create an entirely new market or capability?
   4. **Ambition & Focus**: The problem to be addressed can be ambitious, but it must also be well-defined and focused enough to be solvable.
   5. **Considerations for Cost, Timeline, and Indigenous Integration:** Solutions will be assessed based on cost-effectiveness while maintaining quality, feasible and attainable development timelines, and a strong emphasis on maximizing indigenous content.

ANNEXURE – A

INSTRUCTIONS:

How to read the problem statements:

The problem statements presented in this document aim to guide researchers, professors, and industry collaborators in identifying relevant and impactful areas for innovation and applied research under the broad umbrella of **Human-Computer Interaction (HCi)**, as supported by IIT Mandi iHub.

Each problem statement follows a structured format to provide clarity and direction. Below is a breakdown of how to read and interpret each section:

Area of Research:

This identifies the thematic context or technological area within the research domain. It offers a broad direction for inquiry and hints at the types of solutions or investigations expected.

Example

An example, like a use case or challenge, is provided to illustrate the scope and depth of a potential project. **Note:** These are illustrative and not prescriptive. You may explore adjacent or evolved ideas around the stated example.

Research Domain:

Each problem belongs to one of the four HCi research domains identified by IIT Mandi iHub:

- **Assistive Technologies:** Making technology accessible to all users regardless of physical or cognitive abilities.
- **Device-led Technologies:** Leveraging sensors, touchscreens, cameras, and input modalities (voice, gestures, touch, camera) to create intuitive human-device interaction.
- **Experience Technologies:** Improving the overall functionality, usability, and enjoyment of digital systems.
- **Generative Design:** Transforming how interfaces and computational processes are designed, often using AI and automation.

PROBLEM STATEMENT - 1

Area of Research:

Real-time Indian Sign Language (ISL) Translation

Example:

Real-time Indian sign language translation using multi-modal Human-Computer interaction with vision language models.

What is the problem?

India has a huge number of people who are deaf or hard of hearing, but there aren't enough tools to help them communicate, especially using Indian Sign Language (ISL).

There's a strong need for a simple, real-time system that can translate sign language so that deaf people can easily interact with others and get equal access to schools, jobs, and government services.

Why is it Important to solve?

Most current sign language tools don't work well for India—they aren't made for Indian Sign Language (ISL) and can't translate in real-time or understand context properly. Fixing this issue will help deaf and hard-of-hearing people communicate better, make ISL more commonly used, and support India's efforts to create a more inclusive and accessible digital world.

What would be the deliverables?

- A multi-modal HCI system integrating Vision Language Models (VLMs) for real-time ISL translation.
- A bi-directional interface enabling communication from sign language to text/audio and vice versa.
- A scalable software prototype with plug-and-play potential for government services, education platforms, and customer service kiosks.
- A training dataset and benchmarking suite specifically curated for Indian Sign Language gestures and semantics.
- Comprehensive documentation and API for integration into third-party platforms

Potential possibility of collaboration opportunities

- Academic Partners: For dataset creation, model training, and validation (e.g., institutions working on linguistics, AI, and accessibility).
- Startups and Industry: For deployment, testing, and commercialization of the solution in real-world scenarios such as EdTech and healthcare.
- Government and NGOs: To support inclusive policy-making, pilot testing in public service systems, and end-user outreach within the deaf community.

Research domain: Assistive Technologies/Generative AI

PROBLEM STATEMENT - 2

Area of Research:

Portable EEG for Early Cognitive Decline

Example:

Development of a low-channel, AI-enabled portable EEG system for early screening of cognitive decline

What is the problem?

Conventional EEG systems are bulky, costly, and require time-consuming setup with gel-based electrodes, making them impractical for real-world, continuous use. Their limitations hinder deployment in rural camps, old-age homes, or for personal health tracking. Although recent innovations show the feasibility of low-channel EEG in decoding mental states, these remain confined to research prototypes. There is a lack of practical, user-friendly, and accurate portable EEG devices that can detect early neurodegenerative risks without compromising diagnostic relevance.

Portable devices could be helpful in increasing productivity in group tasks/ shared tasks when the brain activities of individuals tend to synchronize (Inter Brain Synchronization), which could be linked to the positive social outcomes.

Why is it Important to solve?

India faces a rising burden of cognitive and neurological disorders, yet most individuals remain undiagnosed due to limited access to early screening. The treatment gap ranges from 70% to 90%. A compact, interpretable, and non-intrusive EEG device could enable early detection, empower timely intervention, and promote mental wellness monitoring. It would support clinicians and also facilitate self-care, advancing decentralized and participatory healthcare.

Further bringing positive social outcomes through phenomena like inter-brain synchronization with multimodal feedback through auditory, visual, and haptic modalities (which could amplify the effect of IBS).

What would be the deliverables?

- A portable hardware-software EEG prototype with 2–4 dry electrodes and wireless connectivity.
- A validated machine learning model for detecting early cognitive stress or decline.
- A mobile app for EEG data collection, visualization, and alert generation.
- Pilot deployments in real-world settings to assess usability and early detection performance

Potential for collaboration opportunities.

- Cognitive clinics and neuroscience labs for validation.
- Industry partners developing EEG wearables (e.g., Emotiv, OpenBCI, NeuroSky).
- Telehealth NGOs for rural deployment and community testing.
- Medical neuroscience departments or cognitive clinics (for data validation, ground truth labelling).

Research domain:

Assistive Technology/ Device-led Design

PROBLEM STATEMENT - 3

Area of Research:

Autonomous Drone Navigation in GPS-Denied Environments

Example:

AI-Enabled Autonomous Drone Navigation in GPS-Denied and Dynamic Environments Using Multi-Sensor Fusion

What is the problem?

Drones are being used for an expanding range of critical applications such as disaster response, infrastructure monitoring, and security surveillance. However, autonomous navigation in GPS-denied or cluttered environments, such as forests, tunnels, urban canyons, or post-disaster zones, is highly challenging. Relying on a single sensor type (e.g., GPS or camera alone) is unreliable due to occlusions, signal loss, and variable environmental conditions. There is a pressing need for a robust AI-based navigation system that processes data from multiple sources, such as cameras, LiDAR, IMUs, and acoustic sensors in real time to enable safe, intelligent pathfinding and situational awareness.

Why is it Important to solve?

Autonomous navigation that works in unpredictable and GPS-denied conditions will revolutionize drone utility in high-stakes scenarios. It reduces dependence on remote pilots, increases mission autonomy, enhances safety, and opens up drone usage in areas previously inaccessible or too dangerous for human intervention.

What would be the deliverables?

- AI-driven navigation system using sensor fusion (vision, LiDAR, IMU, acoustic) for real-time obstacle detection and route optimization.
- Lightweight edge-computing module for onboard processing and decision-making.
- Environmental modeling and SLAM (Simultaneous Localization and Mapping) in GPS-denied areas.
- A prototype drone platform equipped with the developed system and tested in real-world field conditions.
- Software development kit (SDK) for integration into commercial and defense drone systems.

What could be the potential collaboration opportunities?

Open for partnership with aerospace R&D organizations, drone manufacturers, disaster response units, and academic labs focused on robotics and embedded AI.

Research domain:

Device -Led Technologies

PROBLEM STATEMENT - 4

Area of Research:

Smart Assistive Device for Neurodegenerative diseases like Dementia Patients

Example:

Development of a smart assistive device to enhance the independence and safety of dementia patients during daily activities.

What is the problem?

Dementia patients often struggle with memory loss, confusion, and impaired judgment, which makes it difficult for them to carry out routine tasks safely and independently. Common daily activities such as medication intake, navigating spaces, or maintaining hygiene become challenging and pose safety risks. Caregivers are often overburdened, and constant supervision is not always feasible. There is a critical need for intelligent, context-aware devices that can aid dementia patients in daily rehabilitation while reducing caregiver strain.

Why is it Important to solve?

As the global population ages, dementia cases are rising rapidly, leading to increased demand for continuous care and support systems. Empowering dementia patients with smart assistive technologies can improve their quality of life, promote independence, reduce hospital readmissions, and alleviate caregiver burnout. It also supports aging-in-place and lowers healthcare costs in the long run.

What would be the deliverables?

- A wearable or ambient device that uses AI and sensors to assist dementia patients with daily tasks such as reminders for medication, step-by-step guidance for routines, and emergency alerts.
- Integration of speech-based or visual interfaces tailored to cognitive impairments.
- Real-time monitoring system to track location, vital signs, and detect unusual behavior patterns.
- A caregiver portal or mobile app to provide alerts, monitor progress, and customize intervention plans.

What could be the potential collaboration opportunities?

Collaboration opportunities with hospitals, neuropsychology research centers, elderly care institutions, rehabilitation therapists, and medical device manufacturers.

Research domain:

Device -Led Technologies/ Assistive Technologies

PROBLEM STATEMENT - 5

Area of Research:

AI and Computer Vision for Ethical Textile Authentication

Example:

Development of an AI-based visual recognition system to detect the adulteration of pure Pashmina fibers with illegal Shahtoosh guard hair.

What is the problem?

The illegal trade and mixing of Shahtoosh (from the endangered Tibetan antelope) with Pashmina compromises wildlife conservation efforts and defrauds consumers. Traditional laboratory techniques for detection are time-consuming, expensive, and impractical for large-scale or field use. This makes the enforcement of wildlife and textile laws difficult.

Why is it Important to solve?

Shahtoosh is banned due to conservation concerns, yet its blending with Pashmina continues due to its high market value. Early and accurate detection using non-invasive, AI-based solutions can curb the illegal trade, protect endangered species, and maintain the authenticity and export value of Indian Pashmina.

What would be the deliverables?

- A deep learning-based computer vision model trained on microscopic fiber images to differentiate Pashmina and Shahtoosh.
- A portable detection system integrated with mobile or handheld imaging devices.
- A web-based dashboard for fiber classification and traceability logs.
- A dataset of labelled fiber images for future textile authentication research.

What could be the potential collaboration opportunities?

Open for collaboration with:

•Wildlife conservation authorities and law enforcement agencies.

•Textile research labs and Kashmiri Pashmina cooperatives.

•AI research institutions and startups focused on sustainable and ethical technology.

•Customs and export regulatory bodies.

Research domain:

Assistive Technologies

PROBLEM STATEMENT - 6

Area of Research:

AI for Cyber Attack Protection System

Example:

Development of an AI-based cyber protection and fakery detection system

What is the problem?

Fake news, deepfake videos, and online threats are becoming more common and harder to spot. This makes it difficult for people to trust what they see online, putting digital safety at risk. A robust system would help quickly identify and prevent fake content and cyberattacks.

Why is it important to solve?

Unchecked fakery and cyber threats can lead to severe consequences, including erosion of trust in digital media, national security risks, financial losses, and social unrest. Developing an AI-based protection system is essential to safeguard individuals, organizations, and governments against these evolving threats.

What would be the deliverables?

- A real-time cyber protection framework that identifies and mitigates cyberattacks.
- A dashboard or user interface for visualizing threat levels and reporting fake content or security breaches.
- An AI-powered system capable of detecting and flagging deepfake content, possibly at source, and misinformation.

Potential possibility of collaboration opportunities.

Co-development with start-ups, R&D organizations, cybersecurity agencies, and academic institutions.

Research domain: Assistive Technologies

PROBLEM STATEMENT - 7

Area of Research:

Low-Cost, High-Functionality Bionic Limbs/Robot

Example:

Design and validation of low-cost, high-functionality bionic limbs for reliable motor control and remote servicing in challenging environments.

What is the problem?

Thousands of civilians and soldiers have lost their limbs, particularly arms in due to accidents. There is a critical need for accessible, durable, and high-functioning prosthetic limbs to help restore independence and mobility for these individuals. Traditional prosthetics are often weak, fragile, and difficult to maintain, especially in a war-torn environment.

Why is it important to solve?

Restoring dignity and independence to amputees is vital, as their physical and psychological recovery relies on effective assistive technologies. The growing number of amputations due to conflict highlights the urgent need for innovative, durable, and repairable solutions that also advance humanitarian and global recovery efforts.

What would be the deliverables?

- Development and deployment of multifunctional bionic arms using muscle signal-based control systems.
- Creation of a cloud-based digital platform to remotely monitor, adjust, and improve prosthetic performance.
- Production of 3D-printed, lightweight, damage-resistant, and easily repairable prosthetic limbs.
- Clinical support infrastructure for fitting, training, and post-operative rehabilitation.

Potential possibility of collaboration opportunities.

- Medical Devices and Assistive Technology
- Healthcare and Rehabilitation
- Defence Healthcare Support System

Research domain:

Device -Led Technologies

PROBLEM STATEMENT - 8

Area of Research:

Multimodality-based ICU patient condition monitoring system

Example:

AI-Driven Real-Time Multi-Modal ICU Patient Monitoring for Early Detection of Clinical Deterioration.

What is the problem?

Post-operative patients in the ICU require continuous monitoring of vital parameters like heart rate, blood pressure, oxygen saturation, body temperature, respiratory rate, and more. Manual monitoring is prone to delays or errors, and traditional alert systems lack the predictive intelligence needed to preempt complications. There is a strong need for an AI-based system that continuously processes multi-modal patient data to detect deterioration early and support timely medical intervention.

Why is it Important to solve?

Delayed recognition of declining patient conditions can lead to medical emergencies, extended ICU stays, or even fatal outcomes. An intelligent, real-time monitoring system enhances decision-making for clinicians, improves patient safety, and optimizes ICU resource utilization.

What would be the deliverables?

- A multi-modal AI model that integrates vital signs and patient history for real-time stability prediction.
- A real-time data ingestion pipeline connected to ICU monitoring equipment.
- Visual dashboard with intuitive risk indicators and actionable alerts.
- Retrospective analysis module for clinicians to understand patient health trajectories.
- Clinical trial report and protocol for deployment in hospitals.

Potential possibility of collaboration opportunities

Hospitals, medical device manufacturers, healthcare AI startups, and clinical research institutions.

Research domain:

Assistive Technology

PROBLEM STATEMENT - 9

Area of Research:

Road Safety on Indian Roads

Example:

Development of a deep-tech road hazard detection and accident prevention system for hilly terrains

What is the problem?

Roads in hilly terrains are prone to accidents due to sharp turns, unpredictable weather conditions, low visibility, landslides, and narrow roadways. Traditional safety measures are insufficient in predicting or mitigating these risks in real time. There is a lack of intelligent systems that can detect hazards ahead, assess driver behavior, and communicate timely alerts to prevent accidents.

Why is it Important to solve?

Accidents in hilly regions often cause high casualties due to tough terrain and limited rescue access. AI-based monitoring and real-time tools can improve road safety, reduce accidents, and support safer transport in these challenging areas, aligning with national road safety goals.

What would be the deliverables?

- AI-enabled camera and sensor fusion system for real-time detection of road hazards like landslides, sharp turns, and sudden weather changes.
- ML-based driver fatigue and distraction detection module.
- Predictive accident risk mapping system using historic and real-time data.
- Dashboard for authorities to monitor risk zones and system health.

Potential possibility of collaboration opportunities.

With the transport departments of state governments for pilot deployments.

Research domain: Device-Led Technologies

PROBLEM STATEMENT - 10

Area of Research:

Reliability of Health Data from Wearables

Example:

Evaluating the clinical reliability and psychological impact of health data from fitness trackers

What is the problem?

With the widespread adoption of fitness trackers and smartwatches, more people are using these wearable devices for continuous health monitoring. However, these devices often suffer from inaccuracies in key health metrics—such as heart rate, blood pressure, calorie expenditure, sleep quality, and ECG outputs—due to technological limitations (e.g., PPG sensor constraints), environmental and physiological factors (e.g., skin tone, motion), and user misinterpretation. This disconnects between perceived and actual medical accuracy creates a critical need to assess the reliability of these devices and address the emerging public health concern over their misuse as diagnostic tools.

Why is it Important to solve?

Over-reliance on fitness trackers without medical guidance can lead to psychological distress, misdiagnosis, and self-medication. It also risks undermining public health education by blurring the line between consumer tools and medical devices, making it crucial to address this growing concern.

What would be the deliverables?

- Standardized benchmarking protocol for comparing health metrics (e.g., heart rate, BP, sleep data) across devices.
- A software platform or API that can integrate with device manufacturers to test and verify their health data outputs.
- Data-driven decision support system for users and healthcare providers to interpret wearable data accurately.
- Compliance-ready assessment toolkit for regulatory submissions (e.g., FDA, CE) and health-tech accreditation.

Potential possibility of collaboration opportunities.

Healthcare Institutions: For clinical validation of device readings and psychological impact studies

Research domain: Device-Led Technologies

PROBLEM STATEMENT - 11

Area of Research:

Predictive Maintenance Solution for Industry

Example:

Smart and user-centric predictive maintenance system for industrial machinery

What is the problem?

Unexpected machine breakdowns result in expensive delays and repairs. The current high-tech tools are too complex for everyday workers to utilize. There is a significant need for a simple, intelligent maintenance system that employs ML, IoT, and user-friendly design to assist workers in easily preventing issues and keeping operations running smoothly.

Why is it important to solve?

Smart, user-friendly maintenance tools enhance factory operations by minimizing unexpected breakdowns, reducing costs, increasing safety, and enabling more staff to utilize them without requiring expert assistance. They also perform well across various industries and sizes.

What would be the deliverables?

- A smart predictive maintenance platform using IoT-enabled sensors and ML models for failure detection and prediction.
- A user-friendly dashboard/interface designed with HCi principles for seamless operator interaction.
- A mobile or handheld device-integrated system for field accessibility.
- Real-time alerting and visualization tools for actionable maintenance decisions.
- Integration modules for connecting with existing industrial automation systems (e.g., SCADA, ERP).
- Field validation and performance benchmarking report demonstrating efficiency gains and usability.

Potential possibility of collaboration opportunities.

- Manufacturing (Automobile, Electronics, Heavy Equipment)
- Oil & Gas and Energy Plants
- Steel and Mining Industry
- Pharmaceutical and Chemical Plants
- Utilities and Power Generation

Research domain:

Device -Led Technologies

PROBLEM STATEMENT - 12

Area of Research:

AI-based personalized healthcare and treatment monitoring system

Example:

To develop multimodal, AI-based solutions for pre-surgical brain mapping, precision oncology monitoring, and personalized dietary planning informed by real-time biomarkers.

What is the problem?

Traditional healthcare often uses one-size-fits-all treatments that ignore individual differences in brain structure, tumor behavior, treatment response, or metabolism. In brain tumor surgeries, the absence of precise pre-surgical mapping can damage critical areas. Chemotherapy often risks incorrect dosing, leading to poor outcomes or severe side effects. Similarly, dietary advice for diabetics is rarely adjusted in real time to match actual blood sugar levels. There is a clear need for AI-driven solutions that integrate diverse data to deliver personalized mapping, monitoring, and treatment recommendations.

Why is it Important to solve?

Improving surgical precision, optimizing cancer treatment efficacy, and preventing long-term metabolic complications are critical goals in personalized medicine. AI-based real-time systems can significantly reduce post-operative risks, improve chemotherapy outcomes, and enhance lifestyle disease management. Solving these problems will lead to better patient safety, increased treatment success rates, and reduced healthcare costs.

What would be the deliverables?

- A multimodal AI model integrating imaging and neuro-mapping for brain tumor surgery planning
- A real-time AI monitoring system for precise chemotherapy dosage optimization
- A wearable patch-based system linked to a personalized food recommendation engine based on real-time blood glucose data

Potential possibility of collaboration opportunities

Collaborations with hospitals and the healthcare industry.

Research domain:

Assistive Technology/ Generative AI

PROBLEM STATEMENT - 13

Area of Research:

AI and mechatronics-based smart cleaning and defect detection system for solar panels

Example:

Development of an AI-enabled system for automated detection and cleaning of dust and defects on solar panels to improve energy efficiency

What is the problem?

Efficiency of silicon solar modules are being continuously enhanced from Al- BSF (18-19%), PERC (20-22%), Topcon (22-24%), HJT (24-26%) through intensive research spending billions of dollars but in real life field operations of these solar modules generate solar power output much less than their rated specifications because of dust deposition on these solar modules. In India, the problem of dust deposition is very important. Studies show that in many locations in India, dust deposition on solar modules degrades the power output @ almost 1% per day. This implies that for a normal schedule of cleaning, once per month may degrade the power output of even the most advanced solar modules by 30%.

Why is it Important to solve?

Regular monitoring and cleaning of dust deposition on solar modules is critically important to ensure the efficient generation of the desired solar power output. Dust accumulation—both dry and wet—significantly reduces the energy efficiency of solar panels, especially in regions with high dust exposure like many parts of India.

Despite a lab-level demonstration of a dust detection, monitoring, and cleaning technology by an Indian institute, there is currently no simple, scalable, and commercially viable solution available for real-world conditions in India. Without a reliable field-ready technology, solar power systems will continue to underperform, leading to reduced energy yields and economic inefficiencies.

What would be the deliverables?

- An AI-driven vision system for detecting dust accumulation and surface defects
- An automated cleaning mechanism is integrated with the detection system.
- A performance dashboard for real-time monitoring and alert generation.
- Deployment-ready mobile and web application interfaces for system control and diagnostics

What could be the potential collaboration opportunities?

Collaborations with renewable energy companies, smart manufacturing industries, academic R&D labs in AI and robotics, and government solar mission programs

Research domain:

Smart Maintenance and productivity-enhancing systems

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