భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

1. **Title of the Project** – AI for Social Good: Think Global, Act Local

2. **PI details with Dept and Designation** – Dr. Maunendra Sankar Desarkar, Head, Department of AI

3. **Origin /Background Problem** – The proposed funding will focus on building on our existing strengths, and developing IITH as a world-class hub and a Centre of Excellence on the theme of "**AI for Social Good: Think Global, Act Local**". While the development of AI technologies so far has largely been driven by developed nations and the commercial interests of large corporates, there is an impending and increasing need to leverage the capabilities of AI for the development of indigenous technologies for nationally relevant problems that can spearhead India's foray as a global technology leader in the next decade, as well as improve the quality of life of the proverbial "next billion" people that live in developing and underdeveloped conditions around the world.

4. **Aim and Objectives, Current Status and Proposed Work:** Achieving the aforementioned objectives requires concerted efforts both from a fundamental perspective as well as an applied perspective. From a <u>fundamental perspective</u>, this necessitates research efforts on problems such as:
   - **Learning with Limited Labeled Data** - to enable AI and ML in application domains (such as agriculture or healthcare in rural areas) where there may be very little data or little available expertise to annotate data. Problems in this space include active learning, self-supervised learning, continual learning, zero-shot learning, few-shot learning, domain adaptation, domain generalization, dimensionality reduction, etc.
   - **Resource-efficient AI/ML** - to enable the practice of AI and ML in settings (such as rural areas) where there may not be sufficient access to high-end GPU computing resources. Problems in this space include model compression, knowledge distillation, embedded AI/ML, AI on IoT devices (AI on the Edge), parallel/distributed AI, compilers for AI, etc.
   - **Fairness, Explainability and Ethical AI/ML** - to enable the use of AI technologies in a fair, transparent and ethical manner, especially when such technologies are used across large populations that may include individuals that are challenged physically, socially or technologically. Problems in this space include explainable AI models, uncertainty estimation in AI models, causality, model verification, etc.
   - **Multimodal, Multilingual and Multimedia Learning** - to enable the use of AI technologies in the Indian context where data is often multi-lingual and multi-modal (such as images, videos, speech, language, graphs, etc), and data may also contain errors. Problems in this space relate to core issues in the subdomains of computer vision, speech understanding and natural language processing, as well as bringing these subdomains together for specific applications.

From an <u>applied perspective</u>, our efforts will focus on the following domains that are essential for indigenous technology development in the Indian context. Each of these domains presents unique challenges that are also necessary for the improvement of the quality of life of every Indian citizen, as well as India's growth as a global leader in the coming decade.
   a. Agriculture
   b. Smart Mobility
   c. Technologies for the Differently Abled

d. Security and Defense
e. Disaster management
f. Education
g. Healthcare

In many of these application domains, including agriculture, smart mobility, security and defense and disaster management, IITH has already made rapid strides in collaboration with organizations such as the Govt of Telangana, ICRISAT, Japan International Cooperation Agency, DRDO labs, as well as other universities in Japan. Multiple works have been or are being conducted through Hubs and consortium projects like TIHAN, M2Smart, etc, This proposed project will further help consolidate these seemingly disparate efforts and help unify the efforts as well as bring focus and purpose to our research activities.

5. **Thematic areas covered under SDGs** – *SDG 3, 4, 9, 10, 11*

6. **Budget Details (***Please do not include any overheads. Overheads will be added as per institute CSR norms. Bifurcations within the budget may be provided. However, this can also be provided later. Please include the year wise budget with a max of 3 years.***

	Year 1 (in Lakhs)	Year 2 (in Lakhs)	Year 3 (in Lakhs)	Total (in Lakhs)
Manpower ● PhD students (~60L) ● Postdocs (~40L), ● Staff/Research assistants (~25L) ● Visits of international faculty (~25L)	50	50	50	150
Capital Equipment ● GPU servers and workstations (~2C) ● Expansion of AI Data Centre, power backup (~60L) ● Smartracks (~40L)	200	100	0	300
Travel, Contingency, Consumables ● Conference registration/travel support ● Outreach activities, Organization of conferences/workshops ● Dataset collection and annotation ● Consumables	20	15	15	50
Total	270	165	65	500

7. **Social Impact (*Qualitative and Quantitative*)** - The proposed project will result in: (i) publications at top-tier prestigious venues in AI/ML and related areas; (ii) dataset repositories that are essential for progress in AI for the Indian context; (iii) code and related resources that will be made publicly available; (iv) training of skilled manpower in AI at the level of bachelors, Masters, PhD and postdoc level, an important need for India at this time; (v) conduct of workshops and symposia for

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dissemination of state-of-the-art research; (vi) invited visits of luminaries for close interactions and collaborations. We will also leverage our close relationship with AISEA, IIT-H's startup accelerator, to translate our technologies to commercial products where possible through this funding.