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5. India-Nepal Collaboration on AI -International Relations

India and Nepal signed a Memorandum of Understanding (MoU) to strengthen cooperation in artificial intelligence (AI), Digital Public Infrastructure (DPI), and language technologies between India's BHASHINI Division and Kathmandu University's DPI-AI Centre.

1. This partnership represents a strategic evolution in India's Neighborhood First Policy, moving beyond simple technology exchange to establish an inclusive ecosystem powered by Language AI.
2. The collaboration focuses on jointly creating digital solutions for low-resource and underrepresented languages addressing the challenge of "digital extinction" in the region.

1.Understanding Digital Public Infrastructure (DPI)

Definition and Core Concept

1. Digital Public Infrastructure (DPI) refers to foundational digital systems that enable secure, interoperable, and inclusive delivery of public and private services.
2. DPI forms the digital backbone of governance and the economy providing essential utilities for economic participation and service access.
3. The concept emphasizes accessibility, transparency, and citizen empowerment through technology.

India's DPI Model

1. Aadhaar provides digital identity to over 1.3 billion Indians enabling access to government services and financial inclusion.
2. Unified Payments Interface (UPI) enables real-time digital payments with low transaction costs promoting financial inclusion and digital commerce.
3. DigiLocker provides secure cloud-based storage for digital documents eliminating need for physical document verification.
4. India Stack integrates these platforms creating seamless, interoperable digital ecosystems.

Key Characteristics and Benefits

1. Interoperability enables different systems to communicate and share data reducing fragmentation and improving service delivery efficiency.
2. Scalability allows systems to expand access without proportionate cost increases making services affordable.
3. Low-cost access ensures economically disadvantaged populations can participate in digital economy reducing digital divide.
4. Inclusion focuses on serving marginalized populations including linguistic minorities and underserved communities.
5. Consent-based data sharing gives citizens control over personal information preventing unauthorized use.

Impact Across Sectors

1. DPI has strengthened Direct Benefit Transfers (DBT) by enabling targeted welfare delivery to intended beneficiaries through digital identification.
2. Digital payments through UPI have increased financial inclusion particularly in rural areas where banking infrastructure was limited.

3. E-governance platforms leverage DPI enabling citizens to access government services remotely reducing bureaucratic delays.
4. Startup innovation has flourished leveraging DPI foundations with entrepreneurs building applications on existing infrastructure.

Concerns and Challenges

1. Privacy concerns arise from centralized data collection enabling government and corporate surveillance if safeguards are inadequate.
2. Cybersecurity vulnerabilities in digital infrastructure create risks of data breaches and service disruptions.
3. Digital divide persists where unequal internet access and digital literacy prevent inclusive participation despite DPI availability.

2.Core Pillars of the India-Nepal Collaboration

Targeted Dataset Research and Development

1. Jointly creating high-quality Nepali language datasets providing training material for AI systems ensuring accuracy and cultural relevance.
2. Speech corpora collection documenting spoken Nepali language patterns and variations essential for voice-based applications.
3. Automatic Speech Recognition (ASR) systems development enabling computers to understand and process spoken Nepali language.
4. Text-to-Speech (TTS) systems creation allowing machines to convert written Nepali text into natural-sounding speech.
5. Machine translation tools development enabling seamless communication between Nepali, Hindi, and English languages.

Halting Digital Extinction

1. Digitizing linguistic and literary heritage of low-resource languages preserving cultural knowledge for future generations.
2. Focusing on underrepresented and borderland dialects like Maithili and Bhojpuri with small speaker populations and limited digital presence.
3. Creating comprehensive digital archives of oral traditions, folk literature, and historical records from trans-boundary India-Nepal region.
4. Using technology to ensure minority language speakers retain access to their cultural heritage in digital age.

Last-Mile Service Delivery

1. Deploying BHASHINI's open and interoperable model to help Government of Nepal expand digital public services reaching remote populations.
2. Overcoming traditional barriers by enabling citizens with low literacy levels to access digital services through voice and language interfaces.
3. Reducing need for digital intermediaries allowing citizens to directly access government services without dependency on literate assistants.
4. Targeting sectors like agriculture, local banking, and disaster management where digital access directly improves livelihoods.

Human Capital Synergy

1. Setting up joint research projects between Indian and Nepali institutions accelerating innovation and knowledge sharing.

2. Capacity-building programs training Nepali tech practitioners in Natural Language Processing (NLP) and AI technologies.
3. Training initiatives developing local expertise ensuring Nepal builds sustainable domestic capability rather than remaining dependent on external solutions.
4. Creating academic partnerships uniting universities, research institutions, and tech practitioners across both nations.

3. Project BHASHINI – India's Language AI Initiative

Mission and Scope

1. Project BHASHINI (BHASHa Interface for India) is India's national AI-led initiative designed to break language barriers and ensure multilingual digital inclusion.
2. The initiative recognizes language as fundamental to digital inclusion enabling citizens to access services in their native languages.
3. Addresses the challenge that many Indian and South Asian languages have limited digital representation hampering tech adoption.

Technical Capabilities

1. Engine supports 36 text languages covering major and minor Indian languages enabling text processing in diverse linguistic contexts.
2. Supports 23 voice languages allowing speech recognition and synthesis in regional languages.
3. Processes 35 international languages facilitating cross-language communication and translation.
4. Processes over 15 million AI inferences every single day demonstrating substantial technical scale and reliability.

Governance and Reach

1. Managed via National Hub for Language Technology providing centralized coordination and resource sharing.
2. Powers more than 800 government websites ensuring government services remain accessible to non-English speakers.
3. Processes massive daily traffic ensuring scalability and robustness for supporting national-scale deployment.

4. Digital India BHASHINI Division (DIBD)

Institutional Framework

1. Specialized division under Digital India Corporation (DIC) which functions under Ministry of Electronics and Information Technology (MeitY).
2. Operates as dedicated institutional vehicle for language technology innovation and deployment.
3. Works across multiple government ministries ensuring interoperability and standardization.

Ecosystem Functions

1. Anchors open-source innovation allowing external developers to build on BHASHINI infrastructure.
2. Supports dataset creation and sharing providing resources for training AI models.
3. Enables startup participation through APIs and tools reducing barriers for entrepreneurs developing language-based applications.
4. Makes India's foundational tech infrastructure accessible to external partners fostering ecosystem innovation.

Global South Vision

1. Acts as primary vehicle for exporting India's open-source tech models to international markets, particularly in Global South.

2. Promotes non-proprietary technology models that can be freely used and modified by other developing nations.
3. Strengthens India's leadership in digital cooperation among developing countries.

5. Significance of India-Nepal Collaboration

DPI Diplomacy and Regional Leadership

1. Represents strategic evolution in India's Neighborhood First Policy moving beyond bilateral engagement to technology cooperation.
2. Demonstrates India's commitment to sharing non-proprietary technological solutions rather than imposing proprietary systems.
3. Positions India as a cooperative partner offering sovereign digital alternatives in South Asia reducing external dependence.
4. Strengthens India's regional leadership by enabling neighbors to build digital capacity on their own terms.

Socio-Economic Empowerment

1. Voice-first ecosystem allows citizens with low literacy levels to access vital services without requiring reading and writing skills.
2. Enables digital commerce participation for marginalized populations increasing economic opportunities and financial inclusion.
3. Provides access to e-governance services, online education, and banking without technology literacy barriers.
4. Directly contributes to poverty reduction by removing information asymmetries and transaction costs.

People-to-People Connections

1. Targeting underrepresented border dialects uses soft power to preserve shared civilizational heritage.
2. Digitizing languages like Maithili and Bhojpuri with significant populations in both countries strengthens cultural bonds.
3. Promotes mutual understanding by recognizing and valuing linguistic diversity across borders.

6. Challenges Requiring Attention

Data Scarcity for Low-Resource Languages

1. Many local languages lack structured digital texts and recordings making it difficult to train highly accurate Machine Learning models.
2. Limited historical digitization of Nepali language materials creates knowledge gaps in training datasets.
3. Requires substantial investment in data collection and annotation activities to build usable training corpora.

Infrastructure Gaps in Deployment

1. Deploying complex AI solutions at last mile requires consistent electricity supply, often unavailable in remote areas.
2. High-speed internet necessary for cloud-based services faces topographical bottlenecks in Nepal's rugged, mountainous terrain.
3. Rural areas lack supporting telecommunications infrastructure limiting service deployment feasibility.

Data Governance and Cross-Border Issues

1. Nations must synchronize legal frameworks regarding data privacy, sovereignty, and secure storage standards.
2. Cross-border speech data collection raises sovereignty concerns requiring careful regulatory harmonization.
3. Absence of bilateral data protection agreements creates risks for sensitive linguistic and personal data.

7.Way Forward

Scaling DPI Diplomacy

1. Use this agreement as working model to extend interoperable digital platforms to other South Asian neighbors including Bhutan, Bangladesh, and Sri Lanka.
2. Create regional DPI standards through multilateral cooperation strengthening South Asian digital sovereignty.

Deploying Ground-Level Pilots

1. Shift focus toward running targeted pilot projects in high-impact rural sectors such as agriculture, local banking, and emergency disaster management.
2. Test voice-based interfaces in actual agricultural extension services demonstrating practical benefits.

Fostering Academic and Startup Hubs

1. Co-develop incubation ecosystems allowing tech startups and researchers to build localized commercial applications.
2. Establish joint research centers attracting talent and driving innovation in language technology.

Harmonizing Data Standards

1. Set up joint bilateral task force to quickly resolve cross-border data security and privacy regulations.
2. Establish bilateral data protection agreement ensuring safe, long-term deployment of services.

Source - <https://www.ibef.org/news/india-nepal-sign-mou-to-develop-ai-powered-multilingual-language-platform>