Gnananidhi

A National Multi-Lingual Information Storage and Retrieval System

Created: August 28 2014; Updated: Oct 22, 2019

India's Language Bank

We know that civilizations around the world developed languages for communication. This development took thousands of years. What we take for granted today as a language must have required the collective effort of several great people over generations to create and perfect. India's languages are its intellectual assets – assets that are not shown in any balance sheet. When one compares the word "Alphabet" rhyming with Alpha Beta with "Akshara" encompassing every letter of the alphabet from "Aa" to "Ksha", one realizes the beauty and richness of India's language bank.

We know that all major Indian languages are joined together in their aksharas. But what many don't realize is that Indian languages have been global leaders in taking advantage of symbolic thinking processes. Ancient Indians perfected the use of symbols and abstraction to advance human knowledge. The Indian languages of today have contributed to the evolution of mankind around the world. No wonder, India was the richest nation in the world for more than 95% of recorded history.

For millenia, India competed with rest of Asia on the philosophical foundations of thinking. Indian's evolved symbolic thinking, where as civilizations in other countries such China, Japan and Korea worked on the use of pictures to power their thought processes.

The methodology and structure created by the great language (and computer scientist) Panini nearly 2500 years ago (some records suggest over 5000 years ago) are used even today for developing advanced computers.

Unfortunately -- Since Independence, if there is one area of societal development that we as a nation have neglected – it has been the concerted vision driven development of language technologies. The focus has been to just teach the official language to every one instead of developing fundamental new language technologies that help transform India's language diversity into a source of technological advancements.

India's language bank remains largely untapped slowly losing its relevance in major areas of the economy. In fact, major segments of the economy see themselves losing relevance as a result of not understanding an "international language" like English.Unfortunately, segments of the economy don't just go irrelevant, they go extinct creating millions of lost jobs leading to unemployed and underemployed youth and spreading poverty.

Independent India has managed to transform what is Akshara into kshara. The question then becomes, can India do something about this ? Can India leverage its Language Bank and rebuild a nation where knowledge of one's mother tongue becomes a source of advantage ? Can the collective intellectual capabilities of 1.4 billion thinking Indians join together to fuel sustainable and inclusive economic growth eradicating poverty in all its forms from India and around the world ?

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A Prelude To Gnananidhi

A 2011 round table by Gravity 2.0 Education and Skills society pointed out the fact that 9 of the top 10 global economies of the world used their native language for primary communication. India was found to be the only exception. While India may today rank amongst the top 5 global economies, it ranks towards the bottom half of the global nations in terms of per capita GDP.

A vision to create a more knowledge driven society has already been illustrated in the Bharat Knowledge Vision 2017 document by Super Computing Consortium of India with a focus on evolving a collaboration strategy to create the ecosystem for development of smart information devices.

Against this background, Sankhya Technologies has crafted a vision and a proposal to leverage India's a) Language Bank 2) Language Technology Platforms and 3) R&D strengths to place the Indian economic ecosystem into a higher knowledge orbit transforming the economic landscape of the country towards higher value addition leading to the spread of prosperity.

Gnananidhi

Gnananidhi is a proposed super computing system for supporting a national multi-lingual information archival and retrieval system. Gnananidhi uses Sanskrit as a language for information archival and retrieval combined with meta-model driven representational abstraction for building a national multi-lingual information archival and retrieval system.

Gnananidhi will include at least 50 translation models from every language to Sanskrit thereby achieving the capability to perform 2500 different language-translations.

Gnananidhi will allow information from various parts of India (and world) in various languages to be translated and stored in Sanskrit and also be accessed on demand from any language.

Gnananidhi Benefits

- Reinforce the notion of One India
- Farmers from across the country can share information on best practices in pest control and farm productivity using Gnana Nidhi.
- Students can access information on the latest developments from any part of the world using their mother tongue.
- Doctors and para medics can retrieve information on the latest in disease control in real time.
- Digital divide separting the citizen and knowledge will disappear.
- National Internet bandwidth will be better utilized.
- E-Governance applications will be able to use Gnana Nidhi for multi-language support.
- Gnananidhi will help develop national capabilities in advanced next generation computing.

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The project will obviously have countless other spin off benefits for other applications that require large scale use of computing. In fact, the use of synthetic compute technologies for Gnananidhi will ensure that the same exact methodology can be used to develop high performance computing systems for other societal applications.

Gnananidhi Development

Gnananidhi demands a focused mission which includes multiple projects over a 3-5 year period.

- Develop 50 Machine Translation Systems between all Indian / Major Foreign Languages and Sanskrit
- Develop high performance Synthetic Processor Platforms to power Gnananidhi compute and storage nodes.
- Develop Gnananidhi compute blades and racks.
- Develop high performance information storage and retrieval system in Sanskrit
- Develop mobile / web / desktop applications for accessing Gnananidhi
- Support the development of Gnananidhi Smart Information Devices

Gnananidhi Status

- Gnananidhi was selected by KT for Sanskrit editorial team for publication in July 2019 edition of the KT for Sanskrit journal.
- SANKHYA V-One (hamara.in) offers a platform to publish content.

- Natural Language Processing and Machine Translation powered by representational abstraction can significantly reduce the cost of creating Gnananidhi. The SANKHYA Translation Framework (patent protected) platform offers easy way to achieve representational abstraction through multi-form translation models.
- Synthetic Processor Development Platforms (SANKHYA Teraptor) offer a way to create Gnananidhi processing nodes rapidly using a model driven agile system development methods.
- Sanskriti a 16-bit information coding standard is under standardization at Super Computing Consortium of India. This 16-bit coding standard allows efficient and elegant encoding of Indian language content into bits (0s and 1s)
- Dreamchip Electronics has successfully demonstrated a Gnananidhi Smart Information Device Design using a 32-bit synthetic processor and SoC (Dreamchip Siddhi) in 2017
- SANKHYA Infiniproc has been shown to scale well on multi-computer grids paving the way for an Indian technology stack to support the development of high performance computing systems
- SANKHYA Cognition models have successfully demonstrated the representational and

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translation capabilities of SANKHYA Translation Framework in real world applications for such diverse tasks as "JSON data handling" and "Sentiment Analysis"

- Department of Telecom and SCCI have jointly envisaged the design and development of an operating system "SOIL" (Standard Operating System for Indian Languages); SOIL through the use of Sanskriti and Siddhi SoC can power design and development of sub Rs 500 embedded devices for applications in transportation, smart factories, robotics, surgeon robots and speech processing consumer applications.

Gnananidhi already represents the pinnacle of India's Digital R&D capabilities; SANKHYA Gnananidhi can connect many Government of India programmes like Make In India , Digital India and Skill India ; Further progress on this important visionary project can firmly put India on the path to becoming an Advanced Economy. .

Sankhya Technologies invites central and state government departments and private and public research organizations to join a collaborative effort to further develop Gnananidhi in a time bound manner. Given the broad scope of SANKHYA Gnananidhi; spnsor organizations can define specific sub-goals and channel their funds to achieve those sub-goals through collaborative R&D under SANKHYA Gnananidhi;

To contribute please contact **research@sankhya.com**