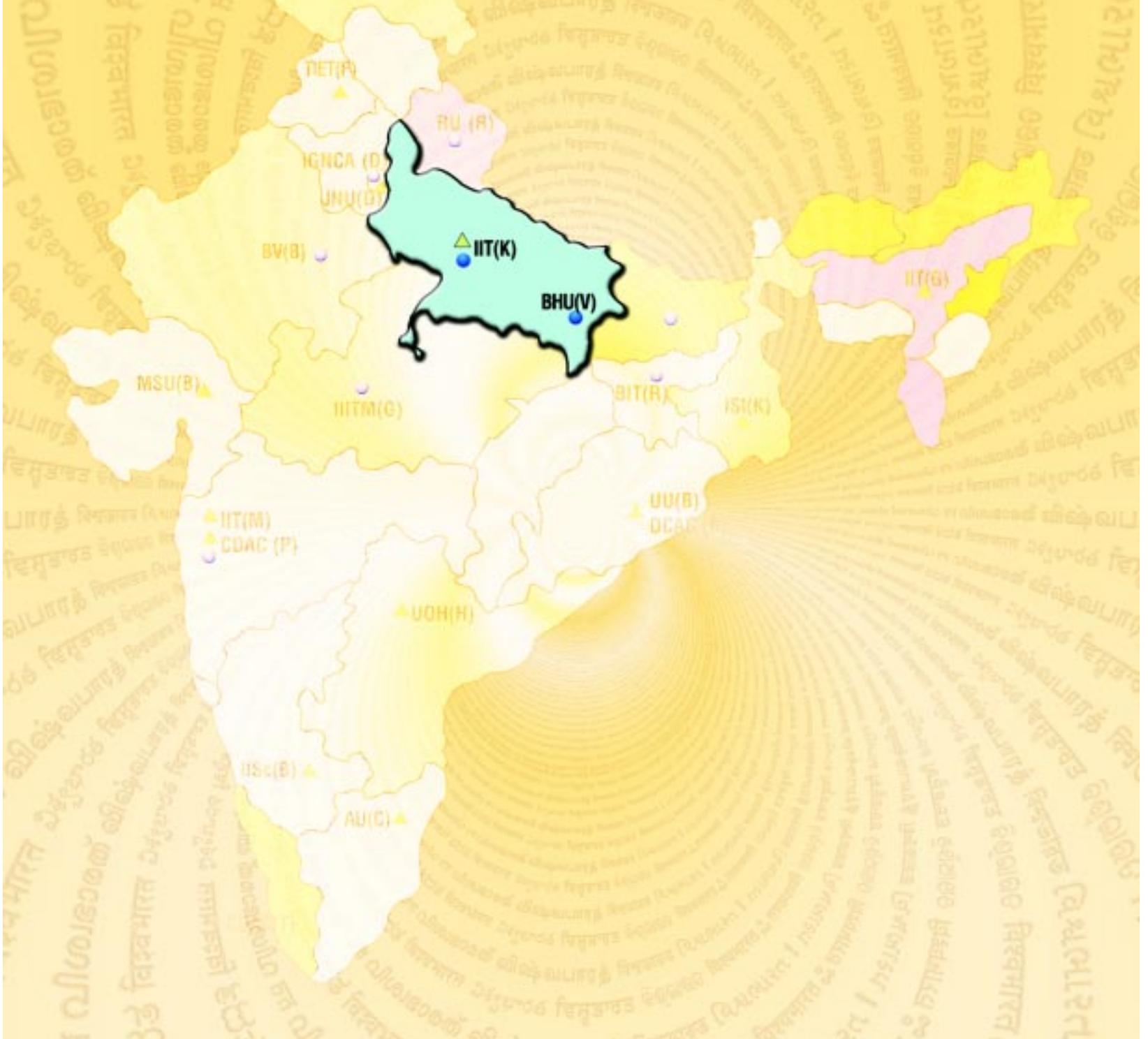


Resource Centre For
Indian Language Technology Solutions – Hindi, Nepali
Indian Institute of Technology Kanpur

Achievements



Department of Computer Science & Engineering
Indian Institute of Technology Kanpur-208016 India
Tel. : 00-91-512-2590762 E-mail : sgd@iitk.ac.in
Website : <http://www.gitasupersite.iitk.ac.in>
<http://www.cse.iitk.ac.in/users/langtech>



**RCILTS-Hindi, Nepali
Indian Institute of Technology, Kanpur**

Introduction

In 1995, Department of Electronics, Govt. of India, sanctioned a grant-in-aid for implementation of the project titled “Machine Aided Translation from English to Hindi for standard documents (domain of Public Health Campaign) based on ANGLABHARTI approach” for which ER&DCI (with its office at Lucknow and now moved to NOIDA) was associated for implementation and commercialization of this software on a PC platform in the domain of public health campaign. The ANGLABHARTI software already developed by IITK on SUN system was used in this project and was implemented (re-engineered) on PC under Linux jointly by IITK and ER&DCI under the supervision of IITK (R.M.K. Sinha, Ajai Jain). In 1996, IITK also designed and developed an Example-based approach for Machine Aided Translation for similar (Indian languages) and dissimilar (English and Indian Languages) under the leadership of Professor R.M.K. Sinha. This approach has been named as ANUBHARTI approach. A system to translate from Hindi to English has been implemented based on ANUBHARTI approach by IITK(R.M.K. Sinha, Ajai Jain and Renu Jain).

Currently, AnglaHindi, the English to Hindi MAT based on Anglabharti methodology, which accepts unconstrained text, has already been made available to the users and is very well received. AnglaUrdu which is based on AnglaHindi has also been demonstrated. HindiAngla, the Hindi to English MAT based on Anubharti methodology, has been demonstrated for simple sentences and further work is going on to handle compound and complex sentences. The current research at IITK is focused towards development of more efficient machine translation strategies with user friendly interfaces for these systems. Another dimension of diversification for future, is to cater to all other Indian languages by implementing AnglaSanskrit, AnglaBangala, AnglaPunjabi, and so on; SanskritAngla, BangalaAngla, PunjabiAngla, and so on; and

HindiSanskrit, HindiBangala, and so on; based on hybridization of Anglabharti and Anubharti methodologies.

1. Machine Translation

Chief Investigator: Dr. R.M.K. Sinha

Co-Investigator: Dr. A. Jain

Our work on machine translation started in early eighties when we proposed using Sanskrit as interlingua for translation to and from Indian languages (See the paper on “Computer processing of Indian languages and scripts - Potentialities and Problems”, Jour. of Inst. Electron. & Telecom. Engrs., vol.30,no.6, 1984). This was further elaborated in CPAL-1 paper presented at Bangkok in 1989.



Later in 1991, the concept of a Pseudo-Interlingua was developed which exploited structural commonality of a group of languages. This concept has been used in development of machine-aided translation methodology named ANGLABHARTI for translation from English to Indian languages. Anglabharti is a pattern directed rule based system with context free grammar like structure for English (source language). It generates a ‘pseudo-target’ (Pseudeo-Interlingua) applicable to a group of Indian languages (target languages) such as Indo-Aryan family (Hindi, Bangla, Asamiya, Punjabi, Marathi, Oriya, Gujarati etc.), Dravidian family (Tamil, Telugu, Kannada & Malayalam) and others. A set of rules obtained through corpus analysis is used to identify plausible constituents with respect

to which movement rules for the 'pseudo-target' is constructed. Within each group the languages exhibit a high degree of structural homogeneity. We exploit the similarity to a great extent in our system. A language specific text-generator converts the 'pseudo-target' code into target language text. Paninian framework based on Sanskrit grammar using Karak (similar to case) relationship provides an uniform way of designing the Indian language text generators. We also use an example-base to identify noun and verb phrasals and resolve their semantics. An attempt is made to resolve most of the ambiguities using ontology, syntactic & semantic tags and some pragmatic rules. The unresolved ambiguities are left for human post-editing. Some of the major design considerations in design of Anglabharti have been aimed at providing a practical aid for translation wherein an attempt is made to get 90% of the task done by the machine and 10% left to the human post-editing; a system which could grow incrementally to handle more complex situations; an uniform mechanism by which translation from English to majority of Indian languages with attachment of appropriate text generator modules; and human engineered man-machine interface to facilitate both its usage and augmentation. The translation system has also been interfaced with text-to-speech module and OCR input.

This project also received funding from TDIL programme of Govt. of India during 1995-97 and 2000-2002.

The English to Hindi version named AnglaHindi, of Anglabharti machine aided translation system has been web-enabled and is available at URL: <http://anglahindi.iitk.ac.in>

The technical know-how of this technology has been transferred on a non-exclusive basis to ER&DCI/CDAC Noida for commercialization.

A system for translating English to Urdu, named AnglaUrdu, has also been developed using our AnglaHindi system and Urdu display software of CDAC, Pune.

In 1995, we developed another approach for MT which was example-based. Here the pre-stored example-base forms the basis for translation. The translation is obtained by matching the input sentence with the minimum 'distance' example sentence. In our approach, we do not store the examples in the raw form. The examples are abstracted to contain the category/class information to a great extent. This makes the example-base smaller in size and further partitioning reduces the search space. The creation and growth of the example-base is also done in an interactive way. This methodology, named ANUBHARTI, has been used for Hindi to English translation and further details of this approach can be seen in the Ph.D. thesis of Renu Jain.

The Anubharti approach works more efficiently for similar languages such as among Indian languages. In such cases the word-order remains the same and one need not have pointers to establish correspondences.

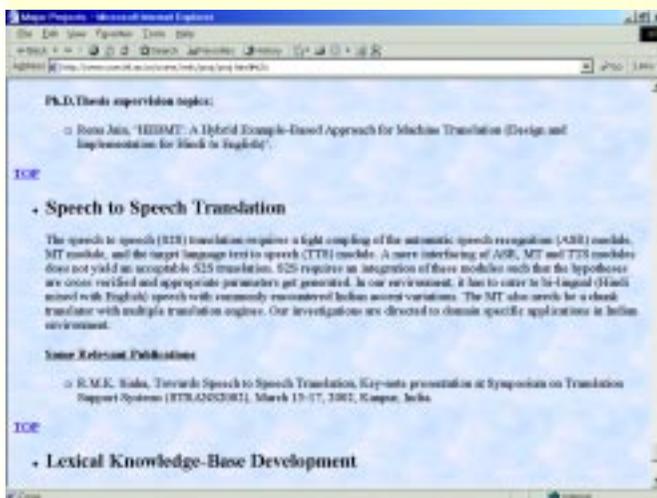
Currently, we are working towards developing an Integrated Machine-aided translation system (with funding from TDIL programme of Govt. of India, 2003 onwards) hybridizing the rule-based approach of Anglabharti, example-based approach of Anubharti, corpus/statistical based approaches to get the best out of these approaches. This is also being explored to be used for translation engine of speech to speech translation system.

In parallel, we are also developing MAT system for Hindi to English translation system, HindiAngla, based on our Anubharti approach with funding from COILNET project of Govt. of India (2001 onwards). AnglaHindi and HindiAngla have been used to demonstrate the two way reverse translation for simple sentences.

2. Speech to Speech Translation

The speech to speech (S2S) translation requires a tight coupling of the automatic speech recognition (ASR) module, MT module, and the target language text to speech (TTS) module. A mere interfacing of ASR, MT and TTS modules does not yield an acceptable S2S translation. S2S requires an

integration of these modules such that the hypotheses are cross verified and appropriate parameters get generated. In our environment, it has to cater to bi-lingual (Hindi mixed with English) speech with commonly encountered Indian accent variations. The MT also needs to be a chunk translator with multiple translation engines. Our investigations are directed to domain specific applications in Indian environment.



Some Relevant Publications

- R.M.K. Sinha, Towards Speech to Speech Translation, Key-note presentation at Symposium on Translation Support Systems (STRANS2002), March 15-17, 2002, Kanpur, India.

3. Lexical Knowledge-Base Development

Lexical knowledge base is the fuel to the translation engine. It contains various details for each word in the source language, like their syntactic categories, possible senses, keys to disambiguate their senses, corresponding words in target languages, ontology and word-net information/linkages. We are also working towards development of Indian language wordnet named ShabdKalpTaru in association with Dr. Om Vikas and Dr. Pushpak Bhattacharya.

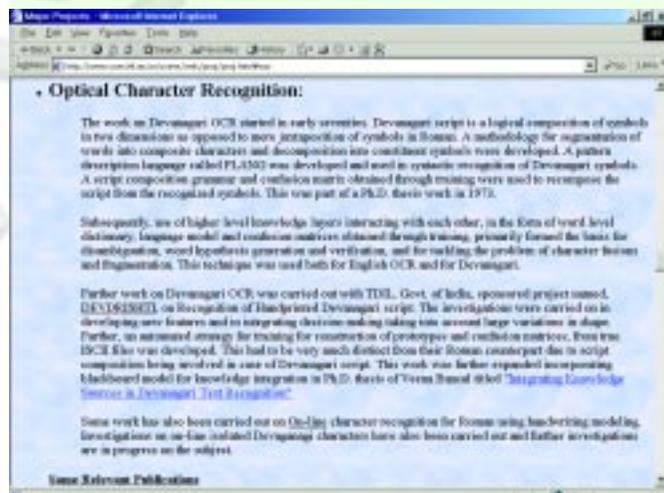
Some Relevant Publications

- Renu Jain and R.M.K. Sinha, 'On Multi-lingual Dictionary Design', Symposium for Machine Aids for Translation and Communication (SMATA96), New Delhi 1996.

- R.M.K. Sinha, K. Sivaraman, Aditi Agrawal, T. Suresh and C. Sanyal, 'On logical design of multi-lingual lexicon for machine translation', Technical Report TRCS-93-174, Department of Computer Science and Engineering, IIT Kanpur, 1993.

4. Optical Character Recognition

Work on Devanagari OCR was carried out with TDIL, Govt. of India, sponsored project named, DEVDRISHTI, on Recognition of Handprinted Devanagari script. The investigations were carried on in developing new features and in integrating decision making taking into account large variations in shape. Further, an automated strategy for training for construction of prototypes and confusion matrices, from true ISCII files was developed. This had to be very much distinct from their Roman counterpart due to script composition being involved in case of Devanagari script. This work was further expanded incorporating blackboard model for knowledge integration in Ph.D. thesis of Veena Bansal titled "Integrating Knowledge Sources in Devanagari Text Recognition"

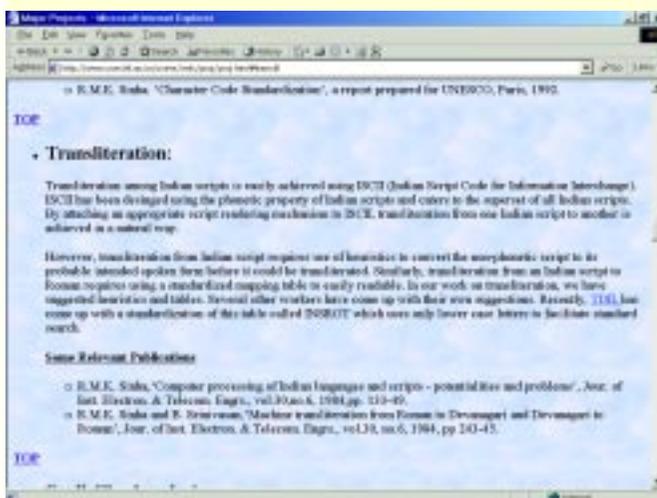


Some work has also been carried out on On-line character recognition for Roman using handwriting modeling. Investigations on on-line isolated Devanagari characters have also been carried out and further investigations are in progress on the subject.

(Editorial Comment : This technology was declined for test & evaluation by STQC)

5. Transliteration

Transliteration among Indian scripts is easily achieved using ISCII (Indian Script Code for Information Interchange). ISCII has been designed using the phonetic property of Indian scripts and caters to the superset of all Indian scripts. By attaching an appropriate script rendering mechanism to ISCII, transliteration from one Indian script to another is achieved in a natural way.



However, transliteration from Indian script requires use of heuristics to convert the non-phonetic script to its probable intended spoken form before it could be transliterated. Similarly, transliteration from an Indian script to Roman requires using a standardized mapping table to easily readable. In our work on transliteration, we have suggested heuristics and tables. Several other workers have come up with their own suggestions. Recently, TDIL has come up with a standardization of this table called INSROT which uses only lower case letters to facilitate standard search.

Some Relevant Publications

- R.M.K. Sinha, 'Computer processing of Indian languages and scripts - potentialities and problems', Jour. of Inst. Electron. & Telecom. Engrs., vol.30,no.6, 1984,pp. 133-49.
- R.M.K. Sinha and B. Srinivasan, 'Machine transliteration from Roman to Devanagari and Devanagari to Roman', Jour. of Inst. Electron. & Telecom. Engrs., vol.30, no.6, 1984, pp 243-45.

6. Spell-Checker Design

For Indian scripts, there is a very loose concept of a spelling. Writing in Indian scripts is a direct mapping of the inherent phonetics and you write as you speak. There are geographical variations in the spoken form and so the spellings vary. Our approach to design of a spell checker is to develop an user error model for each class of user where the source of error may be due to incorrect phonetics, inaccurate inputting or other influences. The spell-checker uses this error-model in making suggestions for the error.

7. Knowledge Resources

Introduction

The seeds of this work were planted in the pre-Internet days with a project undertaken by Dr. T.V. Prabhakar, Indian Institute of Technology (IIT) Kanpur, funded by the Chinmaya International Foundation (1989). A DOS version of Swami Chinmayananda's book, The Holy Geeta was hyperised and published as Geeta Vaatika (1992), perhaps the first electronic book in India. After the emergence of Internet standards, Geeta Vaatika was redone in HTML (1996).

As the World Wide Web grew, the **Government of India (Department of Electronics)** funded a project that continued this work. Work began on the Gita Supersite, which included multiple commentaries and translations of the Bhagavadgita. A website was designed and built, with the programming (business logic) initially all on the client side.

Resource Centres for Indian Language Technology Solutions were established throughout the country. Under one such Resource Centre established at IIT Kanpur, work on the Gita Supersite has continued. The technology was extensively reworked and the content was converted into a database, with all the business logic on the server side. Currently work is going on to convert the data into a font-independent ISCII database, streamline the programs, improve the audio content, add many more commentaries on the Bhagavadgita and provide additional features on the site.

Meanwhile, the idea of building Heritage Websites related to Indian philosophical texts emerged. A series of websites were planned, including the Upanishads (to include 12 major Upanishads with Sankara's commentaries and translations in English & Hindi), Brahma Sutra, Complete Works of Sankara, Ramcharitmanas and the Yoga Sutra.

The experience of building websites in Indian languages was shared with others and a bi-lingual site was designed and built for the Uttar Pradesh Trade Tax Corporation, Government of India. A site on the life and works of the contemporary sage, Paramhans Rammangaldasji was also built. Moving in another direction, an all-Hindi site on disease-information and health, Bimari-Jankari was created.

The following sites were developed under the TDIL scheme:

Gitasupersite :	http://www.gitasupersite.iitk.ac.in
Brahmasutra :	http://www.bramsutra.iitk.ac.in
Yogasutra :	http://www.yogasutra.iitk.ac.in
Complete Works of Adi Sankara :	http://www.sankara.iitk.ac.in
Ramcharitmanas :	http://www.ramcharitmanas.iitk.ac.in
Upanishads :	http://www.upanishads.iitk.ac.in
Minor Gitas :	http://www.gitasupersite.iitk.ac.in/minigita/index.html
Kavi Sammelan :	http://www.kavya.iitk.ac.in
Munshi Premchand :	http://www.munshipremchand.iitk.ac.in
Bimari-Jankari :	http://www.bimari-jankari.org
U P Trade Tax :	http://upgov.up.nic.in/tradetax
Paramhans Ram Mangal Das Ji :	http://www.rammangaldasji.org

Short write ups on some of the above sites are given below:

7.1 Gitasupersite

On the Gita Supersite, one can view the entire Bhagavadgita in its original language (Sanskrit) in any of ten Indian language scripts (assamese, bengali,

devanagari, gujarati, kannada, malayalam, oriya, punjabi, tamil and telugu) or in Roman transliteration. The Supersite also contains Classical and Contemporary Commentaries on the Bhagavadgita, with translations in Hindi and English.

The Gita Supersite has been designed to open Multiple Windows, so that one can view multiple translations and/or commentaries on the Bhagavadgita simultaneously. A Two-Book option for comparative study is also available. The Search facility on this Supersite enables a search for the occurrence of any word in the original text of the Bhagavadgita.

The Gita Supersite is available for Windows, Unix/Linux and Mac Platforms, with web browsers that support frames, JavaScript and Java (such as Netscape Navigator 4.0/ Internet Explorer 4.0 or higher versions). Users will not need to download fonts because Dynamic Fonts have been used on this website.

The Audio of the chanting of the Bhagavadgita shlokas by Swami Brahmananda of Chinmaya Mission Bangalore is also available on this website.

Texts are included in the Gitasupersite are:

Mool Slokas [Sanskrit Verses] of the Bhagavadgita in all major Indian Language Scripts

Hindi translation - *Swami Ramsukhdas*

Hindi translation - *Swami Tejomayananda*

English translation - *Swami Gambhirananda*

English translation - *Dr. S Sankaranarayan*

English translation - *Swami Sivananda*

Sanskrit Commentary - *Sri Abhinavagupta*

English translation of Sri Abhinavagupta's Sanskrit Commentary - *Dr. S Sankaranarayan*

Sanskrit Commentary - *Sri Ramanuja*

English translation of Sri Ramanuja's Sanskrit Commentary - *Swami Adidevananda*

Sanskrit Commentary - *Sri Sankaracharya*

Hindi translation of Sri Sankaracharya's Sanskrit Commentary - *Sri Harikrishandas Goenka*

English translation of Sri Sankaracharya's Sanskrit Commentary - *Swami Gambhirananda*

Hindi Commentary - *Swami Chinmayananda*

Hindi Commentary - *Swami Ramsukhdas*

English Commentary - *Swami Sivananda*

Sanskrit Commentary - *Sri Anandgiri*

Sanskrit Commentary - *Sri Jayatirtha*

Sanskrit Commentary - *Sri Madhvacharya*

Sanskrit Commentary - *Sri Vallabhacharya*

English translation - *Swami Adidevananda*

Sanskrit Commentary - *Sri Madhusudan Saraswati*

Sanskrit Commentary - *Sridhra Swami*

Sanskrit Commentary - *Sri Vedantadeshikacharya Venkatanatha*

Sanskrit Commentary - *Sri Purushottamji*

Sanskrit Commentary - *Sri Neelkanth*

Sanskrit Commentary - *Sri Dhanpati*

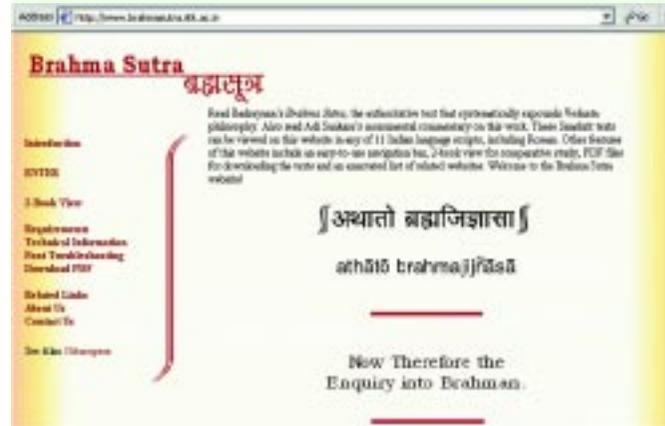
A sample page from the site is shown below



7.2 Brahma Sutra

The Brahma Sutra of Badrayana is one of the *Prasthan Trayi*, the three authoritative primary

sources of Vedanta Philosophy. No study of Vedanta is considered complete without a close examination of the Brahma Sutra.



It is in this text that the teachings of Vedanta are set forth in a systematic and logical order. The Brahma Sutra consists of 555 aphorisms or *sutras*, in 4 chapters, each chapter being divided into 4 sections each. The first chapter (*Samanvaya*: harmony) explains that all the Vedantic texts talk of Brahman, the ultimate reality, that is the goal of life. The second chapter (*Avirodha*: non-conflict) discusses and refutes the possible objections against Vedanta philosophy. The third chapter (*Sadhana*: the means) describes the process by which ultimate emancipation can be achieved. The fourth chapter (*Phala*: the fruit) talks of the state that is achieved in final emancipation.

Indian tradition identifies Badrayana, the author of the Brahma Sutra, with Vyasa, the compiler of the Vedas. Many commentaries have been written on this text, the most authoritative being the one by Adi Sankara, which is considered to be an exemplary model of how a commentary should be written.

7.3 Complete Works of Adi Sankara

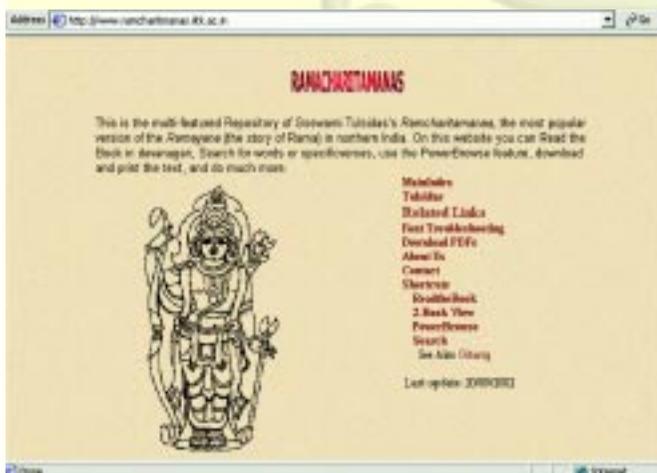
Adi Sankara, the 9th century philosophical giant of India was both an intellectual genius and a prolific writer. In his brief life-span of 32 years, he composed over 30 original works on *vedanta*, wrote authoritative commentaries on 11 Upanishads, the Brahma Sutra, Bhagavadgita, and other major texts, and also created inspiring devotional hymns to various gods and goddesses.



This website is perhaps the first online repository of the Complete Works of Adi Sankaracharya. The texts can be read in the original Sanskrit in any one of 11 Indian language scripts. The texts can also be downloaded for printing, making this vast, invaluable resource easily accessible to users all over the world.

7.4 Ramcharitmanas

The *Ramcharitmanas*, the 16th century masterpiece written by Goswami Tulsidas, is the story of Lord Rama. The text is an unparalleled combination of devotion and pure non-dualistic philosophy. This website is an attempt to use contemporary technology to facilitate and enhance the study of this ancient scripture. Some of the features available on this website are:



Read the book : Read Ramcharitmanas with a unique, user-friendly interface. Navigation through the book can be linear, using the 'next' and 'previous' buttons. Or, you can use the Navigation Bar to go

directly to the verse — *doha* (or *sortha*), *chaupai*, *sloka* or *chhanda* — of your choice.

2-Book View: Open two copies of Ramcharitmanas simultaneously, for a comparative study of different *kaandas* of the text.

Word Search: Alphabetic Search for the occurrence of any word in Ramcharitmanas

Verse Search: Search for verses in Ramcharitmanas, using the first few words of the verse

Power browse: This option is for Power Users of Ramcharitmanas who wish to get an overview or quickly browse through the *dohas* and *chaupais* of any *kaanda* of the text

Download: Get printer-friendly chapters of Ramcharitmanas

Tulsidas: Read about Tulsidas, the author of Ramcharitmanas

Related Links: Annotated Links to related sites

7.5 Upanishads

The Upanishad site consists of all the major upanishads given below :

- | | |
|----------|-------------------|
| Savasya | Mandukya's karika |
| Kena | Taittiriya |
| Katha | Aitereya |
| Prasna | Svetashvatra |
| Mundaka | Brihadaranyaka |
| Mandukya | Chandogya |



For each Upanishad we have several commentaries and translations as given below. For a detailed list of available translations and commentaries for each Upanishad please see the appendix.

7.6 Kavi Sammelan

This is the first Virtual Kavi Sammelan on the Web. On this site, you can “create” a Hindi kavi sammelan, choosing from a database of around 100 poems. Selections for your kavi sammelan can be made based on the mood [*rasa*] or metre [*vidha*] of the poems and the poet(s) whose poems you wish to include. Video and audio recordings of the poems are available, so you can ‘see’ and ‘hear’ the poets recite their own poems.



Poems in five moods and five metres are available here. The five moods are: *vira rasa*, *hasya/vyanga*, *shringar rasa*, *shant rasa*, *vividha rasa*. The five metres are: *geet*, *ghazal*, *doha*, *chhanda mukta*, *muktak*. 13 poets have been featured on this website. These poets are: Gopaldas Neeraj, Govind Vyas, Dharmal Awasthi, Madhup Pandey, Buddhinath Mishra, Urmilesh, Kailash Gautam, Shiv Om Ambar, Surya Kumar Pandey, Surendra Dube, Vineet Chauhan, Kamal Musaddi, Suresh Awasthi.

Audio recordings of the poets talking about what poetry means to them is also available. A detailed biography and a photo-gallery of each poet has been put up. Other features include book-reviews, interviews and articles.

An introductory article on the History of Hindi Kavi Sammelans has been specially written by Dr. Upendra for this website. Listen to Dr. Upendra summarise the development of kavi sammelans over the years.

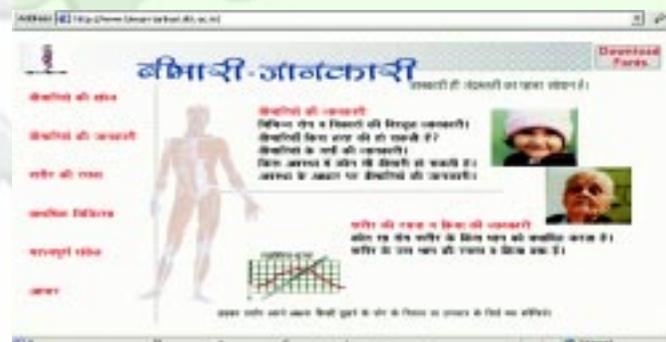
7.7 Bimari-Jankari

Bimari-Jankari is a medical website created for the benefit of Hindi-speaking people. Special efforts

have been made to simplify both the language and the concepts that are explained on the site. The major idea behind this website is to supplement a doctor's function. By reading about medical conditions and diseases, a patient (or patient's family and friends) would understand their own situation, and therefore be in a better position to cooperate with the doctors' advice and prescription.

Navigation or moving within the website has been simplified to make it easy to search for information on any disease. Under each disease, information has been provided in an easy to understand, question-answer format. To enable the user to understand the disease process better, the related functional anatomy and physiology has been briefly explained.

Images/illustrations have been profusely used throughout the site. Most of these images have been prepared specially for this website. Some of the images have been obtained, with permission from WHO/TDR and CDC.

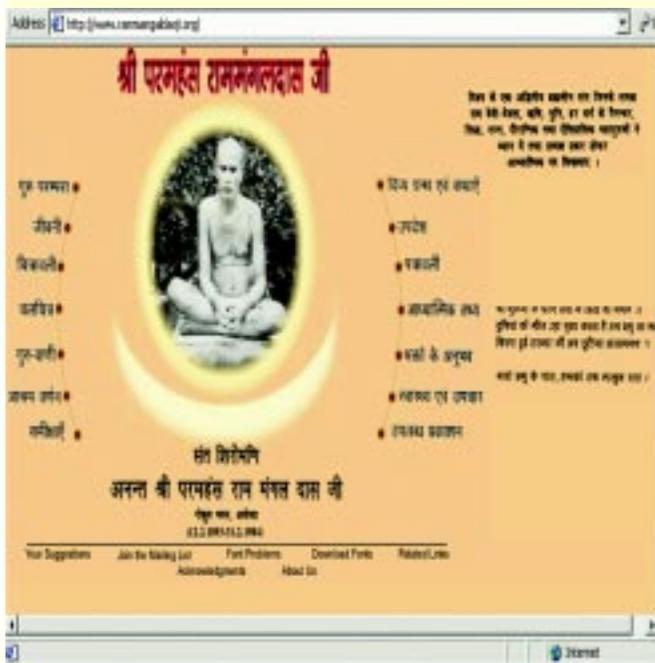


7.8 Paramhans Ram Mangal Das Ji

Sri Paramhansa Ram Mangal Das ji (1893-1984) was an extraordinary sage of our times. He was blessed with a divine vision by virtue of which he could communicate with saints from the past. Over 2000 saints and gods belonging to all religions of the world, visited him and gave him their messages, which he transcribed. These transcribed messages (over 3500 in number) are in the Avadhi dialect and run into four volumes called the *Divya Granths*.

This website contains these *Divya Granths*, together with other works of Sri Ram Mangal Das ji.

The messages have been uniquely indexed and can be read chronologically or alphabetically. A topic index is also to be included very soon. A photo gallery, as well as some audio and video recordings of Sri Ram Mangal Das ji are in the pipeline. A simple Avadhi-Hindi dictionary is also under preparation.



Creation of this website has been an exercise in making a format using which the works of the innumerable great sages of our times can be preserved as part of our rightful heritage.

7.9 Nepali Texts

The Nepali site has the following original texts:

Basai	Leelabhadhur Shatri
Bhanubhaktko Ramayana	Bhanubhakt Acharya
Kunjani	Laxmi Prasad Devkota
Langda ko Sathi	Lain SinghVadadail
Maaitghar	Lain SinghVadadail
Moona Madan	Laxmi Prasad Devkota
Ritu Vichar	Lekhnath Paudwal
Tarun Tapsi	Lekhnath Paudwal

Vinod Pushpanjali

Rajeshwar Dvekota

Abstract Chintan-Pyaz

Shankar Lamichhane



8. Technical Issues

Some of the major features of these sites are:

The server side is written in PHP

The content is stored in MySQL in ISCII (as against ISFOC)

On the fly transliteration into ISFOC for any Indian language.

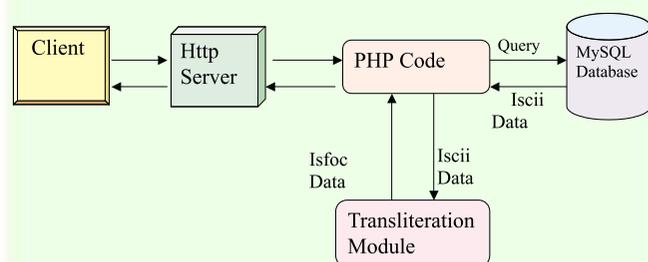
Search in all Indian languages.

On the fly PDF generation in all Indian languages.

Chanting of the Gita Shlokas.

Continuous Play of the Gita Shlokas.

Architectural Diagram of the Gitasupersite and its sister sites



9. Appendix - Details of Texts/Commentaries for each of the Upanishads

#ISAVASYA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#KENA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#KATHA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#PRASNA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#MUNDAKA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#MANDUKYA's KARIKA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#TAITTIRIYA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#AITEREYA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

English Translation - *Swami Gambhirananda*

Hindi Translation - *Gita Press Gorakhpur*

Hindi Commentary - *Harikrishandas Goenka*

Sanskrit Commentary - *Sri Shankaracharya*

Hindi Translation of Sri Shankaracharyas Sanskrit Commentary - *Gita Press Gorakhpur*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Gambhirananda*

#SVETASHVATRA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Sivananda*

English Commentary - *Swami Sivananda*

Hindi Commentary - *Harikrishandas Goenka*

#BRIHADARANYAKA

Mool Mantra [Sanskrit Verses] of the Upanishad

English Translation - *Swami Madhavananda*

Sanskrit Commentary - *Sri Shankaracharya*

English Translation of Sri Shankaracharyas Sanskrit Commentary - *Swami Madhavananda*

10. The Team Members

R.M.K. Sinha	rmk@iitk.ac.in
T.V. Prabhakar	tvp@iitk.ac.in
Harish C. Karnick	hk@iitk.ac.in
T. Archana	archna@iitk.ac.in
Murat Dhvaj Singh	murat@cse.iitk.ac.in
Rajni Moona	ajnimoona@cse.iitk.ac.in
Madhu Kumar	madhuk@cse.iitk.ac.in
Amit Mishra	mamit@iitk.ac.in
Md . Masroor	masroor@iitk.ac.in
Mahaluxmi	luxmi@iitk.ac.in
Rajeev Bhatia	rajeevkb@iitk.ac.in

Others Who Helped

Dr. Vineet Chaitanya vc@iiit.net (VC) was the driving force behind the Geeta Vaatika, as well as the inspiration for the Gita Supersite. Now he watches our activities from IIIT Hyderabad, and is still one of the few who truly understand the spirit behind this work.

Nagaraju Pappu, the first one, wrote 100,000 lines of c-code for the initial versions of Geeta Vaatika. His DOS version had more features than the current HTML one!

A part from the current team, those who have contributed to the growth of these websites in a major way include:

K. Anil Kumar, Anvita Bajpai, Ashutosh Sharma, Gita Pathak, K. Ravi Kiran, Rohit Patwardhan, Samudra Gupta, Shrikant Trivedi and Tripti Singh.

*Courtesy: Prof Sanjay Dhande
Indian Institute of Technology*

*Department of Computer Science & Engineering
Kanpur - 208 016*

(RCILTS for Hindi & Nepali)

Tel : 00-91-0512-2597174, 2598254

E-mail : sgd@iitk.ac.in

Editorial Comment : Because of very large number of publications related to the above article by the Resource Centre & constraint of space, we could not include the publication details here these have already been listed in the April 2003 issue of VishwaBharat. For getting the publications please contact Prof. Sanjay Dhande/ Prof. R.M.K. Sinha, IIT(K).