

Advanced Centre for Technical Development of Punjabi Language, Literature and Culture (www.learnpunjabi.org)

To meet the challenges of 21st century, Punjabi University has anticipated that without technical development, no language can develop and survive. Keeping this in view, Punjabi University, which has one of its primary goals of development of Punjabi language established an Advanced Centre for Technical Development of Punjabi Language, Literature & Culture on Mother Tongue's day 21st Feb 2004. With the establishment of this centre by the Vice-Chancellor S. Swaran Singh Boparai, Punjabi University, became the first University in the world to set up such a Centre.

The Centre is led by Dr. Gurpreet Singh Lehal, Professor in Department of Computer Science and Engineering. Dr. Lehal is the pioneer in software development in Punjabi and has to his credit the first Gurmukhi Optical Character Recognition System, Punjabi Word Processor, Punjabi Spell Checker and Gurmukhi-Shahmukhi transliteration software to name a few.

In a short period of its establishment the centre has already made some remarkable achievements and many path breaking technologies have been developed by the staff of the centre and research students, which have simplified usage of Punjabi on computers and helped in bringing together the Punjabi community by breaking the script and language barriers. All of these resources are provided online for free usage at the Centre's website (www.learnpunjabi.org). A brief account of these online resources is below:

1. Gurmukhi-Shahmukhi Transliteration

A unique feature of Punjabi is that it is written in two mutually incomprehensible scripts. In India Punjabi language is written in Gurmukhi script,

while in Pakistan it is written in Shahmukhi (Urdu) script. This has created a script wedge as majority of Punjabi speaking people in Pakistan cannot read Gurmukhi script, and similarly the majority of Punjabi speaking people in India cannot comprehend Shahmukhi script. The first and foremost achievement of the centre has been development of high accuracy software, which enables the user to convert Gurmukhi script into Shahmukhi script and Shahmukhi script to Gurmukhi with just a click of a mouse. The transliteration software transcends the script barriers and brings close the Eastern & Western Punjabs including the Punjabi speakers scattered around the world. A medium sized book written in Gurmukhi script can be converted to Shahmukhi script with a high word accuracy of more than 98% in a few minutes, which manually could take weeks. Similarly the text in Shahmukhi can be converted to Gurmukhi in matter of seconds, resulting in a great saving of time and manual efforts. The software can even transliterate complete websites from one script to another. As an example, the website www.wichaar.com, which is in Shahmukhi can be completely converted and read in Gurmukhi using this software.

In addition to above, software have also been developed that can transliterate any Gurmukhi document to Roman or Devnagri scripts and vice versa. The centre has also developed a high accuracy Urdu/Hindi transliteration system, which can convert any Hindi website to Urdu and any Urdu website to Hindi. All these software are available for free use on the centre's website.

2. Punjabi Teaching

Visualizing that the younger generation particularly among the

Punjabi Diaspora are being detached from their mother tongue and common heritage, the centre has provided an online teaching program of Punjabi language. The program which has been developed with latest multimedia has following modules:-

"Punjabi alphabet formation : The animation of all the Gurmukhi alphabets along with the sounds, tones, pictures and description has been provided.

"Punjabi word formation : The common Punjabi words along with their animated formation, pictures and sounds have been developed.

"Interactive quizzes : Interactive quizzes designed to test the users knowledge of Punjabi alphabet have been developed.

"Multimedia content : Games like crossword puzzles, hanging man, recognising a word from its pronunciation, tongue twisters, folk tales, rhymes and talking stories that make learning easy and interesting are nicely presented.

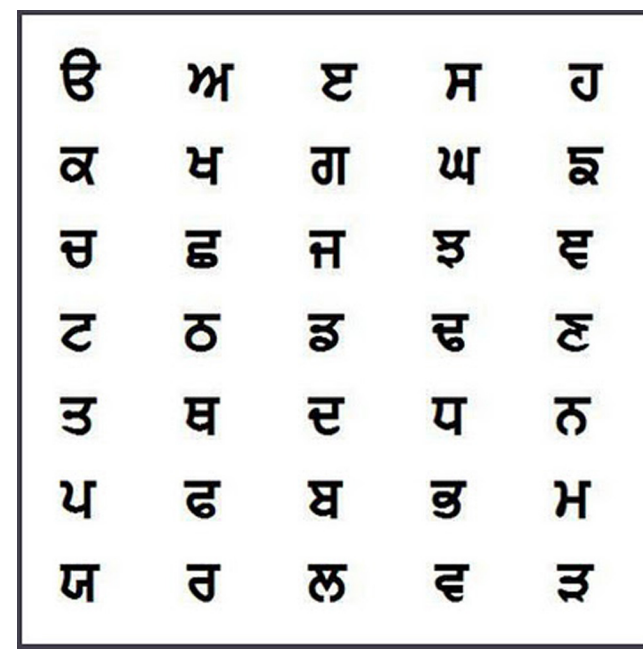
"Pictorial vocabulary : A pictorial vocabulary of common Punjabi forms classifying various immediate environments like body parts, building, birds, animals, numbers etc. is also provided.

"Punjabi grammar : Eight lessons explaining about Punjabi grammar followed by multiple choice quiz have been developed.

Besides the above modules, more advanced courses are being added to the site including 21 video lectures by eminent Punjabi scholars. An interactive audio Punjabi teaching course divided into 20 chapters is also being developed, incorporating all the basic elements required to learn the language.

3. Legacy to Unicode Font Convertor

More than 500 ASCII based legacy fonts are currently available for



Punjabi. The availability of too many fonts makes text recognition difficult as each font makes use of different keyboard mapping. With Unicode being the accepted standard for processing Punjabi across computers of all varying hardware and software, it becomes necessary to convert the Punjabi text encoded in legacy fonts to Unicode. For the first time, an intelligent legacy to Unicode font convertor has been developed, which uses statistical techniques to automatically detect font of any Punjabi text and convert the text to Unicode. This utility is also very useful to convert any PDF file to Unicode or to convert text encoded in any unknown font to Unicode. The font convertor has also been integrated with other utilities, such as Gurmukhi-Shahmukhi transliteration utility, which makes it easier for them to process Punjabi text encoded in any of the popular legacy fonts. This is first time any such utility has been developed for any Indian language.

4. Punjabi Typing Tool

Punjabi typing, particularly for inputting Unicode text, is much more complex as compared to English typing. For this purpose a Gurmukhi Unicode typing pad to simplify Unicode based Punjabi typing has been developed. While using this

Gurmukhi Unicode pad the user can type and view Phonetic, Remington or on-screen keyboard as per his wish. This pad also provides an easy interface to convert existing text files of popular Gurmukhi fonts like Asees, Satluj and Anmol Lipi into Unicode. Not only this, Gurmukhi typing pad has the capability to send e-mails in Shahmukhi text by using powerful inbuilt transliteration module.

5. Online Dictionaries

Dictionaries are basic resources for any language. The centre has made available following dictionaries for free online usage:

English-Punjabi Topic Dictionary : A pictorial topic dictionary for Punjabi learners organized into more than eighty categories such as adjectives, nouns, food, fruits, animals, months etc. has been developed. The dictionary has around 3000 entries. Each word has an associated picture, Roman transliteration and English equivalent along with the pronunciation in Punjabi.

Multi media Punjabi-English Dictionary : The Punjabi-English paper dictionary developed by Punjabi University Patiala has been converted into electronic form. The Gurmukhi words are presented along with their English meanings, equivalent Shahmukhi transliteration and

pronunciation. Besides Gurmukhi, the user can also search for Shahmukhi and English words. For easy and flexible searching, fuzzy tools have been provided.

6. Grammar Checker

The first and only Grammar Checker for Punjabi has been developed at the Centre by Dr Mandeep Singh Gill under the guidance of Dr Gurpreet Singh Lehal. The grammar checker is available online on the Centre's website for checking the grammatical errors of simple Punjabi sentences and is useful for Punjabi learners.

7. Parts of Speech Tagging In Punjabi

Parts of speech tagging scheme tags a word with its parts of speech in a sentence. This is a necessary module in development of Natural Language Processing software such as machine translation, grammar checking etc. A rule based part of speech tagger for Punjabi has been developed at the centre and available for free online use. The parser is being enhanced by addition of a HMM based statistical POS tagger.

8. Morphological Analyzer

A Morphological analyzer is an essential and basic tool for building any language processing application for a natural language. The Morphological analyzer gives the morph analysis of a word i.e. for a given word a morphological analyzer will return its root word and word class along with other grammatical information depending upon its word class. A Punjabi Morphological Analyzer has been developed at the centre for online usage. The Morphological Analyzer is also being used by PARAS (Punjabi Assistant for Reading and Speaking) to display the meaning of any Punjabi word. It is worth mentioning

that PARAS is another landmark software being developed at the centre. The software takes as input Punjabi text or Punjabi website and makes available meaning of each and every word in the text or website. One just moves mouse over any word and its meaning will be displayed in text box. There is no need to type the word for dictionary lookup and one can also see meanings of all possible inflections of a word, which may not be even present in the dictionary by just moving mouse over the word.

9. Machine Translation

The centre has also been working for development of machine translation systems and two high quality systems for translation of Hindi text to Punjabi and Punjabi text to Hindi have already been developed. These systems are freely available at the centre's website.

10. Search Engine

A Google based search engine for Punjabi has been developed by the centre. The search engine provides the user the facility of easy typing of Gurmukhi search terms in different layouts and the queries can be searched in Gurmukhi, as well as in Hindi and Shahmukhi (Urdu) documents. Fuzzy and flexible search options are also provided by searching for mis-spelling and synonyms.

11. Optical Character Recognition (OCR)

An OCR is a software which enables a computer to translate character images into editable text. The advantage of OCR is that one can enter the printed document into the computer without retyping it, the OCR will automatically read and convert the document. For the first time, a high accuracy multi-font Gurmukhi OCR has been developed at the centre which can recognize

Gurmukhi text printed in any of the common Gurmukhi fonts with more than 97% recognition accuracy at character level. Over the period, the OCR has been enhanced to recognize both Gurmukhi and English text in same document, making it first bilingual OCR for any Indian language. The OCR is available both in online and offline mode. The OCR can run in batch mode too, which is very useful for converting PDF documents containing multiple pages into Unicode documents in a single run.

The centre is also currently developing the first OCR for Shahmukhi script, which will greatly ease digitization of Shahmukhi texts. This will result in huge saving of time and money for conversion of Gurmukhi and Shahmukhi documents from paper format to digital form.

12. Punjabi Text Summarization

The first automatic Punjabi summarization system has also been developed at the centre. The software can summarize any Punjabi document by reducing it upto one-tenth of its original size while retaining the most important points of the original document. The software is available for free use at the centre's website.

13. Speech Technology

Research for development of a Punjabi Text-to-speech synthesis (TTS) system, which can speak out Punjabi text, has been carried out at the Centre. A preliminary syllable based TTS system has already been developed, but the system is further being refined to improve the output quality before it will be made available online for free use.

In addition as discussed above, the Centre is also developing PARAS (Punjabi Assistant for Reading and Speaking), which can clearly pronounce any word from a text or a website.

GOVERNMENT AND COMMUNITY LEADERS CUT RIBBON

AT NEW QUEENS LIBRARY AT GLEN OAKS

GLEN OAKS, NY, September 3, 2013 – Thomas W. Galante, President and CEO of Queens Library, was joined by community and government leaders to ceremonially open the new Queens Library in Glen Oaks at 256-04 Union Turnpike today. Commissioner David Burney of the NYC Department of Design and Construction was among the attendees. The new library is expected to serve 250,000 library users a year with information, education and cultural enrichment. The new building was designed by Marble Fairbanks. It won awards for the design before construction even began.

The new library cost \$17.1 million. It was funded by Mayor Michael R. Bloomberg and New York City Council Member Mark Weprin.

"The new Glen Oaks library offers state of the art architecture, the latest

technology, and a host of impressive resources for our vibrant and diverse community," said Council Member Mark Weprin (D-Oakland Gardens).

"This new three-story branch library doubles the square footage of the original building," said DDC Commissioner David J. Burney, FAIA. The open design of the exterior channel glass facade and skylights in the outdoor plaza draw natural light into the lower levels. Sustainable elements of the design by Marble Fairbanks Architects, including the planted roof and the landscaping woven between the benches minimizes storm water runoff, qualifying the library for a LEED Silver rating."

Assemblyman David I. Weprin (D-Fresh Meadows) stated, "I'm delighted that the Glen Oaks Library is officially reopening its doors with a new beautiful and spacious facility. When I served as the Councilmember in the

area, helping the libraries renovation was one of my top priorities. The residents of Queens can now explore all of the new features of the library and enjoy an academically enriching environment that promotes creativity, community engagement and learning."

City Council Member Vincent Gentile, chairman of the Council's Select Committee on Libraries, said: "With the new Glen Oaks Library, Queens Library has once again shown how to transform a library for the 21st Century. Congratulations to Tom Galante and his entire team on creating a space that truly responds to how New Yorkers are using libraries today."

"Please use, use, use this library," said Deputy Queens Borough President Barry Grodenchik. "It is a wonderful resource and, judging by the size of the crowd here today, it will be embraced by the community."

"The new library is an asset that will enrich the Glen Oaks community for many decades to come. We are grateful to Mayor Bloomberg and Council

Member Weprin for their support. We would like to thank the NYC Department of Design and Construction for bringing the extraordinary talents of Marble Fairbanks to the project. They have created a very special environment," said Thomas W. Galante, Queens Library President and CEO.

The new Queens Library at Glen Oaks measures 18,000 sq. ft. on three levels. It is double the library space of the previous building. It is flooded with natural light on every level and loaded with books, videos, computer workstations. There are two program/meeting rooms. The adult area has a sky-lit reading lounge. There is 24/7 exterior self-service check in and self-service check out and an outdoor program area. The word "search" is used as a design theme. On bright days, the word "search" appears above the window on the north façade, moving across the glass surface as the sun moves across the sky. The pattern of movement reflects how the sun's path changes throughout the seasons and over the course of a

day. The graphic pattern on the glass curtain wall at the street level also includes the word "search" translated into the many languages spoken in Glen Oaks, reflecting the diversity of the neighborhood. The project has so far received the Art Commission Award for Excellence in Design, and the Merit Award, New York City Chapter American Institute of Architects.

Architects Scott Marble and Karen Fairbanks said, "The Glen Oaks Library is designed as a beacon for the community. It was our hope to provide a building that would engage those passing by and encourage them to come inside and explore their library. We have been thrilled to see the heavy usage of the building from the day it opened." "We were interested in connecting this building to its site and to its community through the scale of the building, the integration of landscaped exterior spaces in the design of the library, and through the use of information about the demographics of the community as part of the design of the glass curtain wall."



An art installation on the ceiling above the Children's Room is by Janet Zweig. It is called "North of the North Pole." It exhibits a mesmerizing path of LED lights that sometimes display random patterns, and sometimes form words that ask "unanswerable questions" derived from dozens of philosophers and writers. It was commissioned by the City of New York, Department of Cultural Affairs through the Percent for Art Program.

Queens Library is an independent, not-for-profit corporation and is not affiliated with any other library. Queens Library serves a population of 2.3 million in one of the most ethnically diverse counties in the U.S. and has among the highest circulations of any public library system in the

world. For more information about programs, services, locations, events and news, visit the Queens Library web site at www.queenslibrary.org or phone 718-990-0700. Queens Library. Enrich your life®.

Marble Fairbanks is an architecture, design and research office located in Brooklyn, New York, and founded in 1990 by Scott Marble and Karen Fairbanks. The office is committed to highly innovative design through research and analysis of the core issues surrounding each project. Recent work has focused on cultural and institutional projects for public and private clients including Princeton University, New York Public Library, Queens Library, Hunter College, Haverford



College, Columbia University, The Museum of Modern Art, The New School, and New York University. The research-based practice is at the forefront of discussions concerning digital technology, integrated design processes, and education. Marble Fairbanks is the recipient of numerous local, national, and international design awards. The work of Marble Fairbanks is published regularly in books and journals and has been exhibited in galleries and museums around the world including the Museum of Modern Art in New York where their drawings are part of the museum's permanent collection