SANGYAN
Sanskrit Speech Comprehension

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Problem Statement:

Two major stakeholders:

1) Researcher - The Indian culture has a large repository of Sanskrit manuscripts with ancient knowledge about technology in various fields like agriculture, construction, etc. These manuscripts number in thousands and can be very relevant in the current time as well. But unfortunately, most of these have never been read or translated for usage by researchers and scientists. Researchers want to be able to quickly transcribe and comprehend these Sanskrit texts without the need for deep Sanskrit knowledge itself.

2) Sanskrit scholars - A tool for learning and easily searching Sanskrit text directly through voice would be very useful for scholars. A major hurdle in the wide usage of Sanskrit nowadays is the difficulty in typing Devanagari text, which also means searching Sanskrit text on the internet becomes very difficult.

The lack of a tool that can help these stakeholders prevents the rich knowledge of ancient manuscripts from being discovered and used in building efficient methods and technologies, which would be highly beneficial for India.

Our Target: To connect the abilities of both researchers and Sanskrit scholars to discover the hidden possibilities of bringing in efficient technology as well as to solve present and upcoming future problems in India and the world in general

The impact we can achieve by solving this Problem Statement

- Protection of the Sanskrit language, which is an ancient language belonging to the rich heritage of India
- Increasing the use of the Sanskrit language
- Both teachers and students can use it to learn Sanskrit in a faster manner
- It can be used by research scholars for finding the Sanskrit text faster

Our Solution:

संज्ञान **(Sangyan)** - A browser extension for transcribing Sanskrit speech to text and its integration with the Google Search Engine

Functionalities it can offer:
1) Searching Sanskrit text on the Internet
2) Audio-to-text conversion of Sanskrit
3) Finding the synonyms of a particular word
4) Finding occurrences of a word in a large document or web page

Why this?
- It can convert long and short sentences to text and has additional features like showing synsets (पर्यायवाची) of the spoken words and finding in a page
- The browser extension is fast and easy to use. The main motivation for developing it was to help engineers and scientists who don't have much knowledge of Sanskrit in transcribing thousands of lost Sanskrit manuscripts that contain a lot of study and research done by our ancestors and can be very relevant even in the current age.
- This can help Indian scientists discover a lot of ancient knowledge lost in thousands of manuscripts that are yet to be read with proper understanding. It makes searching the text on the internet easy and facilitates research.
- It will also promote the usage of Sanskrit among students and people who have the curiosity but not the resources and knowledge to understand the Sanskrit language properly

Proposed Architecture:

- In order to integrate the Sanskrit voice-to-text program with the Google Search Engine, we will create a browser extension that is easy to install and use and a step toward our main motivation.
- The extension will be built with vanilla HTML, CSS, and Javascript.
- We will build an Automatic Speech recognition model with Transformers as a base using the PyTorch library.
- The extension uses Javascript, which cannot be used for training or running a PyTorch model that uses transformers.
- Thus we need to build an API in Python, with the help of Django REST Framework, that can run a PyTorch model and return its output to the browser extension written in Javascript.

Advantages of having this solution:
- **Saving time** in searching texts from the huge dataset

- **Increase convenience** for transcribing and understanding the meaning of words
- **Increasing the concentration** of beginners in the Sanskrit language by helping them tackle difficult words
- **Decrease the burden** of manually typing Devanagri text

Possible limitations:
- Possibility of improper audio recognition leading to wrong words getting displayed in text

Target Audience:

<u>For researchers:</u> For finding Sanskrit texts, they desire a large repository of Sanskrit texts

<u>For Students and General Users</u>: A Chrome Extension would significantly increase the accessibility of this ancient language and increase interest in learning it.

<u>For Pandits and common people</u>: We can develop a mobile app that uses the proposed model to make it more user-friendly. Pandits can use this app for transcribing Sanskrit slokas while citation during pujas.

Initial understanding of market:

Survey: An initial survey was conducted by us among researchers in our social network

Insights gained:
- More than 60% of people find it difficult to search Sanskrit texts online
- People have shown positive responses to utilizing the product
- Development cost is minimal
- The market price for the product needs to be researched more, according to further surveys with a larger audience

Competition:
A possible major competitor would be **Google Translate**. They have a global user base and thus do not support niche languages like Sanskrit, which is rarely used. So, the possibility of it entering the Indian markets is less.
Currently, there are no other competitors in the Indian Market itself that targets this problem.