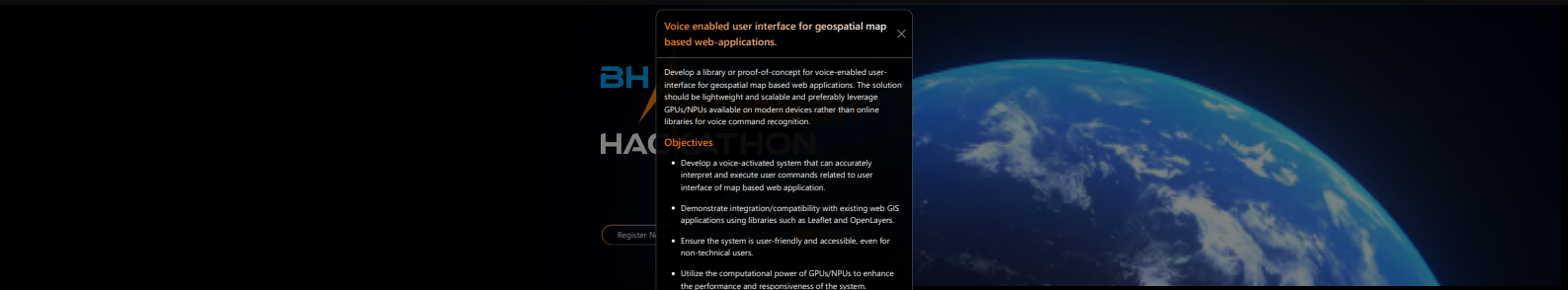

Voice enabled user interface for geospatial map based web-applications.

Develop a library or proof-of-concept for voice-enabled user-interface for geospatial map based web applications. The solution should be lightweight and scalable and preferably leverage GPUs/NPUs available on modern devices rather than online libraries for voice command recognition.

Objectives

- Develop a voice-activated system that can accurately interpret and execute user commands related to user interface of map based web application.
- Demonstrate integration/compatibility with existing web GIS applications using libraries such as Leaflet and OpenLayers.
- Ensure the system is user-friendly and accessible, even for non-technical users.
- Utilize the computational power of GPUs/NPUs to enhance the performance and responsiveness of the system. (preferable but not mandatory)

Expected Outcomes

- A fully functional prototype of a voice-activated geospatial web GIS system.
- Demonstration of the system's ability to process voice commands and execute geospatial queries. For e.g. Please zoom to Ahmedabad, please show me the road layer, please show me the highways.
- An evaluation report detailing the system's performance, including speed, accuracy.

Dataset Required:

- Open access WMS services and their descriptions for e.g. OSM layers, WMS Services from Bhoonidhi/Bhuvan, NASA Worldview. Copernicus e.t.c

Suggested Tools/Technologies:

- Programming languages: Python, JavaScript
- Machine Learning frameworks: Tensorflow/TensorFlow.js (lightweight.js port of tensorflow)
- Voice recognition APIs: Google Speech-to-Text, Microsoft Azure Speech Service
- GIS libraries: Leaflet, OpenLayers
- NPU/WebGL libraries and SDKs.

Expected Solution / Steps to be followed to achieve the objectives:

- Prepare commands for iterating and benchmarking during development.
- Identify and evaluate voice recognition models online/offline
- Integrate the voice recognition model with a web GIS application using Leaflet or OpenLayers.
- Implement features for real-time geospatial data interaction based on voice commands, such as:
  - Navigating to a specific location on the map
  - Showing or hiding specific layers (e.g., satellite view, terrain view)
  - Zooming in and out