# Topic Approval Sheet

It is here by informed that the topic selected by Ashim Pokharel , Jyoti Dangal and Renu Singh of bachelor of Computer Engineering VIII semester project has been found suitable as per the credit assigned by Purbanchal University, Biratnagar-Nepal.

The project Committee has approved the following topic and supervisor for the above- mentioned students.

Topic Approval : Nepali Sign Lanaguage Detection System

Date:2082-02-21

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# CERTIFICATE FROM SEPERVISOR

This is to certify that the project entitled ”Nepali Sign Language Detection System” submitted by the Ashim Pokharel, Jyoti Dangal, Renu Singh by the department of information technology, school of the science and technology at Kantipur city college , Kathmandu , Nepal toward the requirement of the BE computer viii semester of an original word carried out by them under my supervision and guidance.

……………………….

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# ABSTRACT

The Nepali Sign Language Detection System is a deep learning-powered solution developed to bridge the communication gap between the hearing-impaired and the general public in Nepal. It comprises two key modules: a character-level recognition model (ka\_to\_gyan\_model.h5) that detects static Nepali sign language alphabets (ka to gyan) from plain-background images, and a word-level recognition model (gesture\_model.h5) that leverages real-time webcam input and MediaPipe Hand Landmark Detection to recognize full-word signs like “Namaskar”, “ghar”, “ma”, and “Dhanyabaad'”. Each class was trained using approximately 1,000 images, ensuring a balanced and representative dataset. The system integrates a React frontend and a Django backend to manage CNN-based inference and Text-to-Speech (TTS) output, providing both visual and audible responses. To improve model generalization and prevent overfitting, dropout layers and early stopping were implemented during training, resulting in stable learning and performance. Both models achieved over 99% validation accuracy, as evidenced by the rapid convergence of accuracy and loss curves. Built with Python, TensorFlow, OpenCV, MediaPipe, and modern web technologies, the system offers a robust foundation for future enhancements such as dynamic gesture recognition, sentence-level translation, and multilingual voice support, ultimately promoting inclusive, real-time communication for Nepal’s deaf and hard-of-hearing community.

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**LIST OF ABBREVIATION**

* NSL: Nepali Sign Language
* AI: Artificial Intelligence
* CNN: Convolutional Neural Network
* GPU: Graphics processing Unit
* CV: Computer Vision
* GUI: Graphical User Interface
* SDLC: Software Development Life Cycle
* ASL: American Sign Language
* TTS: Text to Speech
* CSV: Comma seperated Values
* ROI: Region of Interest
* SSD: Solid State Drive

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