Department of Electrical and Computer Engineering

North South University

Senior Design Project

Deep Learning Approach for Keypoint-Based Bangla Word Sign Detection for Videos

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Faculty Advisor:

Dr. Atiqur Rahman

Assistant Professor

Department of Electrical and Computer Engineering

Summer, 2023

LETTER OF TRANSMITTAL

November, 2023

To

Dr. Rajesh Palit

Chairman,

Department of Electrical and Computer Engineering

North South University, Dhaka

Subject: **Submission of Capstone Project Report on "Deep Learning Approach for Keypoint-Based Bangla Word Sign Detection for Videos"**

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on "Deep Learning Approach for Keypoint-Based Bangla Word Sign Detection for Videos" as a part of our BSc program. The report deals with Bangla Sign language detection. This project was very valuable to us as it helped us gain experience in the practical field and apply it in real life. We tried to the maximum competence to meet all the dimensions required from this report.

We will be highly obliged if you receive this report and provide your valuable judgment. It is our immense pleasure that you find this report helpful and informative to have an apparent perspective on the issue.

Sincerely Yours,

.....

Arnop Singh Durjoy

ECE Department

North South University, Bangladesh

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Md.Shahidul Islam

ECE Department

North South University, Bangladesh

.....

Mahidul Ismal Bhuiyan

ECE Department

North South University, Bangladesh

APPROVAL

Arnop Singh Durjoy (ID # 2011061042), Md. Shahidul Islam (ID # 2011703642) and Mahidul Islam Bhuiyan (ID # 2011111642) from the Electrical and Computer Engineering Department of North South University has worked on the Senior Design Project titled "Deep Learning Approach for Keypoint-Based Bangla Word Sign Detection for Videos" under the supervision of Dr. Atiqur Rahman, partial fulfilment of the requirement for the degree of Bachelor of Science in Engineering and has been accepted as satisfactory.

Supervisor's Signature

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Dr. Atiqur Rahman

Assistant Professor

Department of Electrical and Computer Engineering
North South University
Dhaka, Bangladesh.

Chairman's Signature

…….

Dr. Rajesh Palit

Professor

Department of Electrical and Computer Engineering
North South University

Dhaka, Bangladesh.

DECLARATION

This is to declare that this project is our original work. No part of this work has been submitted elsewhere, partially or fully, for the award of any other degree or diploma. All project related information will remain confidential and shall not be disclosed without the formal consent of the project supervisor. Relevant previous works presented in this report have been properly acknowledged and cited. The plagiarism policy, as stated by the supervisor, has been maintained.

Students' names & Signatures

1. Arnop Singh Durjoy

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2. Md. Shahidul Islam

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3. MAhidul Islam Bhuiyan

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ABSTRACT

Deep Learning Approach for Keypoint-Based Bangla Word Sign Detection for Videos

This research delves into the realm of Bangla sign language recognition, focusing on developing a robust system for interpreting and analyzing gestures depicted in videos. Employing a keypoint-based approach and leveraging deep learning technology, specifically a two-layer LSTM architecture, our methodology aims to interpret Bangla word signs accurately. The project's foundation lies in a meticulously curated custom dataset featuring 51 unique signs captured by two proficient signers, ensuring comprehensive coverage of articulation, speed, and style variations. Our system's tailored approach acknowledges a bridge to communication gaps and enhances accessibility for the Bangla-speaking Deaf community. Beyond technical advancements, this research aims to elevate societal awareness and foster employment opportunities for the Deaf population, ultimately contributing to a more inclusive world. The outcomes of this project have the potential to not only revolutionize Bangla sign language recognition but also pave the way for broader applications in accessibility and advancements in deep learning technology for diverse sign languages worldwide.