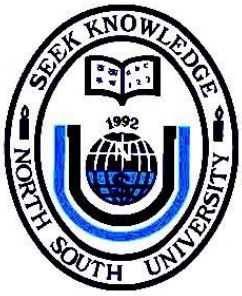
Department of Electrical and Computer Engineering
North South University



Senior Design Project

Virtual Responsive Learning Assistance- A Learning Aid for Primary Level Education

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Faculty Advisor

Dr. Md. Shahriar Karim

Assistant Professor

ECE Department

Spring, 2019

DECLARATION

This is to certify 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. Any material reproduced in this project has been properly acknowledged.

Students' Name & Signature

1. **Shimanto Haque**

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2. **Devasish Ghosh**

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3. **Mohammad Khurshed Alam**

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APPROVAL

The capstone project entitled "**Virtual Responsive Learning Assistance- A Learning Aid for Primary Level Education**" by **Shimanto Haque (ID#1331333042), Devasish Ghosh (ID#1431154642),** and **Mohammad Khurshed Alam (ID #1420799042)** is approved in partial fulfillment of the requirement of the Degree of Bachelor of Science in Computer Science and Engineering on May and has been accepted as satisfactory.

Supervisor's Signature

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Department Chair's Signature

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ACKNOWLEDGMENT

First of all, we wish to express our gratitude to the Almighty for giving us the strength to perform our responsibilities and complete the report.

The capstone project program is very helpful to bridge the gap between the theoretical knowledge and real life experience as part of Bachelor of Science (BSc) program. This report has been designed to have a practical experience through the theoretical understanding.

We also acknowledge our profound sense of gratitude to all the teachers who have been instrumental for providing us the technical knowledge and moral support to complete the project with full understanding.

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We thank our friends and family for their moral support to carve out this project and always offer their support.

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ABSTRACT

This paper deals with recognizing characters written on thin air. The aim of this project was to enhance the learning method of primary school education in learning alphabets and numbers and counting. Children of primary level can draw characters in thin air, and see three dimensional or two dimensional images of the characters they write on the screen as a means of Augmented Reality, and also see examples associated with the characters and numbers. This is done by identifying a certain gesture of the hand as a pointer and then tracking that pointer as a means of drawing a character. The detection of the pointer is done with one single-lens web camera and without the usage of any motion sensors or any other external devices. Google's Tensorflow module was used for training the pointer, and the entire project is done with simple python libraries such as OpenCV, numpy and others. The system requires the minimum manual involvement, and operates within three keystrokes.