



**Senior Design Project**

**Artificial Intelligence Smart Mirror with Raspberry Pi**

**Based on Object Detection, Human Activity**

**Recognition, and Emotion Detection**

<b>Mst. Ayesha Siddika</b>	<b>1712935042</b>
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<b>Md Salekur Rahaman</b>	<b>1713018042</b>
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**Faculty Advisor:**

**Dr. Riasat Khan**

**Assistant Professor**

**ECE Department**

**Fall, 2021**

# LETTER OF TRANSMITAL

July, 2023

To

Dr. Rajesh Palit

Chairman,

Department of Electrical and Computer Engineering

North South University, Dhaka

**Subject: Submission of Capstone Project Report on “Artificial Intelligence Smart Mirror with Raspberry Pi Based on Object Detection, Human Activity Recognition, and Emotion Detection”**

Dear Sir,

With due respect, we would like to submit our **Capstone Project Report** on “**Artificial Intelligence Smart Mirror with Raspberry Pi Based on Object Detection, Human Activity Recognition, and Emotion Detection**” as a part of our BSc program. The report deals with Multi Level Based Home Security System. This project was very much valuable to us as it helped us gain experience from practical field and apply 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 kindly receive this report and provide your valuable judgment. It would be our immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Sincerely Yours,

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Mst. Ayesha Siddika  
ECE Department  
North South University, Bangladesh

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Aminul Islam Joy  
ECE Department  
North South University, Bangladesh

.....  
Md Salekur Rahaman  
ECE Department  
North South University, Bangladesh

.....  
Ania Chowdhury  
ECE Department  
North South University, Bangladesh

## **APPROVAL**

Mst. Ayesha Siddika (ID # 1712935042 ), Aminul Islam Joy (ID # 1711867642), Md Salekur Rahaman (ID # 1713018042) and Ania Chowdhury (ID # 1721495042) from Electrical and Computer Engineering Department of North South University, have worked on the Senior Design Project titled “Artificial Intelligence Smart Mirror with Raspberry Pi Based on Object Detection, Human Activity Recognition, and Emotion Detection” under the supervision of Dr. Riasat Khan partial fulfillment of the requirement for the degree of Bachelors of Science in Engineering and has been accepted as satisfactory.

**Supervisor’s Signature**

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**Dr. Riasat Khan**

**Assistant Professor**

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

**Chairman’s Signature**

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**Dr. Rajesh Palit**

**Professor**

Department of Electrical and Computer Engineering

North South University

Dhaka, Bangladesh.

# 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' names & Signatures

**1. Mst. Ayesha Siddika**

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**2. Aminul Islam Joy**

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**3. Md Salekur Rahaman**

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**4. Ania Chowdhury**

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## **ACKNOWLEDGEMENTS**

By kindness of the Almighty we have successfully completed our capstone senior design project entitled “**Artificial Intelligence Smart Mirror with Raspberry Pi Based on Object Detection, Human Activity Recognition, and Emotion Detection**”

Our deep gratitude goes first to my faculty advisor Dr. Riasat Khan, who expertly guided us in our senior design project throughout the whole CSE/EEE499A and CSE/EEE499B. His guidance helped us in all type of research, writings and completing the project.

Our sincere thanks also goes to North South University, Dhaka, Bangladesh for giving us such a platform where we can have an industrial level experience as a part of our academics.

Last but not the least, we would like to thank our family as their inspiration and guidance kept us focused and motivated.

## **ABSTRACT**

# **Artificial Intelligence Smart Mirror with Raspberry Pi Based on Object Detection, Human Activity Recognition, and Emotion Detection**

In recent years, the smart home and advanced gadgets have been a common topic. Because of the rise of powerful smart gadgets, the development of these fields is increasing. Smart mirrors are a recent addition to the smart home family that has recently received much interest from people. In this work, we developed an artificial intelligence- based smart mirror to minimize people's workload and make life easier. We build a smart mirror that includes artificial intelligence. This paper describes how we can use low-cost hardware like Raspberry Pi to make a smart home. Using some default modules, this mirror can display various features that we use daily, such as a clock, live news, weather, and many more. It can not only detect its user but also can detect an intruder and alert the house owner. Hence, it contributes to the house's safety. Users can also control the magic mirror and update information on the Android application. It can also identify user's emotion through his facial movement and it also provides 75% accuracy on emotion detection. This mirror also has the ability to detect some objects as well.