POLITEKNIK MELAKA

DEVELOPMENT OF VISIONGUARD: CHILD-SAFE TV VIEWING DISTANCE SYSTEM WITH ESP32

NAME	REGISTRATION NO
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JABATAN KEJURUTERAAN ELEKTRIK

NOVEMBER 2025

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This report submitted to the Electrical Engineering Department in fulfillment of the requirement for a Diploma in Electronic Engineering (Control)

JABATAN KEJURUTERAAN ELEKTRIK

NOVEMBER 2025

CONFIRMATION OF THE PROJECT

The project report titled " DEVELOPMENT OF VISIONGUARD: CHILD-SAFE TV VIEWING DISTANCE SYSTEM WITH ESP32 " has been submitted, reviewed, and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

Checked by:

Supervisor's name : SAIFFUL BAHARI BIN OMAR

Supervisor's signature:

Date : 14 NOVEMBER 2025

Verified by:

Project Coordinator name : DR. ROSNANI BINTI AFFANDI

Signature of Coordinator :

Date : 14 NOVEMBER 2025

“I acknowledge this work is my own work except the excerpts I have already explained to our source”

1. Signature :

Name : HEMEN RAJ A/L KALITHASAN

Registration Number : 11DJK23F1004

Date :14 NOVEMBER 2025

DECLARATION OF ORIGINALITY AND OWNERSHIP

TITLE : DEVELOPMENT OF VISIONGUARD: CHILD-SAFE TV VIEWING DISTANCE SYSTEM WITH ESP32

SESSION: I: 2025/2026

1. I, **1. HEMEN RAJ A/L KALITHASAN 11DJK23F1004**

   is a final year student of **Diploma in Electronic Engineering (Control), Department of Electrical, Politeknik Melaka**, which is located at **No 2 Jalan PPM 10, Plaza Pandan Malim , 75250, Melaka**. (Hereinafter referred to as 'the Polytechnic').

2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation /creations without taking or impersonating any intellectual property from the other parties.

3. I agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the **Diploma in Electronic Engineering (Control)** to me.

Made and in truth that is recognized by;

a) HEMEN RAJ A/L KALITHASAN)

(Identification card No: [redacted]) .....

) **HEMEN RAJ A/L KALITHASAN**

In front of me, **SAIFFUL BAHARI BIN OMAR**) .....

(Click here to enter text.)) **SAIFFUL BAHARI BIN OMAR**

As a project supervisor, on the date:

ACKNOWLEDGEMENTS

I have taken efforts in this project. However, it would not have been possible without the kind support and help of many individuals and organizations. I would like to extend my sincere thanks to all of them. I am highly indebted to SAIFFUL BAHARI BIN OMAR for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project.

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My thanks and appreciations also go to my colleague in developing the project and people who have willingly helped me out with their abilities.

ABSTRACT

Children nowadays likes to sit close to television, which may cause eye strain, discomfort, and even contribute to vision issues such as myopia. For parents, maintaining a safe viewing distance can be difficult without constant supervision, this let us know need for an automated approach.This Project introduces a Child Distance Monitoring System utilizing an ESP32 microcontroller and ultrasonic sensors to measure how close the child is sitting and buzzer sounds when distance is too close. The target of this project is to encourage healthier screen habits by providing real-time feedback through sensor- based detection.This research examines the effects of viewing distance on children's eye health and evaluates the feasibility of using electronic systems to help control and maintain a safe distance from television.

ABSTRAK

Kanak-kanak pada masa kini suka duduk berdekatan dengan televisyen, yang boleh menyebabkan ketegangan mata, ketidakselesaan, dan juga menyumbang kepada masalah penglihatan seperti rabun. Bagi ibu bapa, mengekalkan jarak tontonan yang selamat boleh menjadi sukar tanpa pengawasan berterusan, ini memberitahu kami keperluan untuk pendekatan automatik.Projek ini memperkenalkan Sistem Pemantauan Jarak Kanak-kanak menggunakan mikropengawal ESP32 dan penderia ultrasonik untuk mengukur jarak dekat kanak-kanak itu duduk dan buzzer berbunyi apabila jarak terlalu dekat. Sasaran projek ini adalah untuk menggalakkan tabiat skrin yang lebih sihat dengan menyediakan maklum balas masa nyata melalui pengesanan berasaskan sensor. Penyiasatan ini melihat bagaimana jarak tontonan mempengaruhi kesihatan mata kanak-kanak dan menilai kepraktisan menggunakan sistem elektronik untuk membantu mengurus dan mengekalkan jarak selamat dari televisyen.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays, children are exposed to too much screen time, especially television for watch cartoons. All children have a habit, that is sitting too close to television, will cause eye pain, feel uncomfortable and hard to sleep if do it for long term. Keep a good distance from television is must for children. But parents not always there for monitoring and instruct the children.

The **DEVELOPMENT OF VISIONGUARD: CHILD-SAFE TV VIEWING DISTANCE SYSTEM WITH ESP32** will be the solution for the problem. The project needs ESP32, three ultrasonic sensor, a buzzer, and a 0.9 inch OLED display. The system works by continuously measuring the distance between the child and the television. When its too close a buzzer will alert their parent, a display will always indicate the distance.

The motive of the project is to promote a healthy screen viewing distance and reduce the risk of eye problem. The project is simple to build with basic electronic components and some programming, this will made the price affordable and great solution for children's vision.

1.2 Background Research

The research, published in *Jama Network Open*, found a one-hour daily increment of digital screen time increased the risk of myopia—or nearsightedness—by 21%.[1] The risk increases with more time spent each day on screens. The researchers, including Young Kook Kim, suggest spending less than one hour per day on screens.

This new study follows previous research which shows a jump in the rates of myopia, a condition that usually starts in childhood. Rates are up 42% from 25% in the 1970s, and almost 50% of people are expected to have nearsightedness by 2050.

1.3 Problem Statement

When children sit too close to television, can cause eye strain and vision problem in long term. Parent not always around children to monitor or advice them to sit far away. Naturally children feels better watching television in close range. Children don't have enough knowledge to realize that watch television that close will harm their vision.

1.4 Research Objectives

This project focuses on developing a **Children Distancing Control System** using an **ESP32 and an ultrasonic sensor** to detect the distance between television and children. The system will make a sound or alert when the children sit too close to the television, this gives a safe distance for children. The project includes designing, development, testing, and make sure its effectiveness. The system design is to use this device in indoor only.

1. **To design** a children safe distance control system from television using ESP32, ultrasonic sensors, buzzer, and OLED display.
2. **To test** the functionality of the system in detecting viewing distance and triggering appropriate alerts when the child is too close.
3. **To analyse** the performance and effectiveness of the system in maintaining a safe distance, and its potential to reduce the negative effects of blue light exposure on children's eyes.

1.5 Scope of Research

1 This project is focusing to make sure children not watching television for long period , that can harm their vision.

2 The emphasis is the project will be completed within 3 months, including hardware setup, coding, testing and report writing.

3 Using ESP32 as main controller, three ultrasonic sensor HC-SR04, a buzzer, a OLED and two tactile button.

1.6 Project Significance

Helps parents to maintain the safe distance to watch television and reduce the risk of eye vision problems for children. Can be used in school or day care center, teach children a safe viewing distance, this will become a habit if they follow for sometime. Encourage a responsible technology user to use technology wisely and reduce long-term impact to children. The design is simple and easy to build. Using basic electronic components, this make the project low on cost. The system can be upgraded to add voice command or artificial intelligence.

1.7 Chapter Summary

In this chapter, the basic idea and motive for the project have been introduced. Had been discussed about children sitting too close to television and its effect to their eye was discussed. The main objective is to create a device that measures the distance between a child and the television using HC-SR04 ultrasonic sensor and alerts with sound from buzzer when the distance is too close. Background research explain the negative impact to eyes. The signifinance give view of the low cost project and encourage healty screen time habits in this generation that full of technology. The design of the project is simple and help parent to monitor their children.