A

Project Report

On

GUARD SCREEN

Submitted to

RAJIV GANDHI UNIVERSITY OF KNOWLEDGE AND TECHNOLOGIES

RK VALLEY

In partial fulfilment of the requirement for the award of the Degree of

BACHELOR OF TECHNOLOGY

In

COMPUTER SCIENCE & ENGINEERING

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES

(Catering the Educational Needs of Gifted Rural Youth of AP)

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RAJIV GANDHI UNIVERSITY OF KNOWELDEGE TECHNOLOGIES

Government Act 18 of 2008)

RGUKT -RK Valley

Vempalli, Kadapa, Andhra Pradesh -516330

CERTIFICATE OF PROJECT COMPLETION

This is to certify that the work entitled **"Guard Screen"** is bonafide work of Singamsetti **Nandini(R180018), Ilour Shaik Rizwan Raja(R180006)** ,**JhansySreenivas Manchuri(R180996)** carried out under our guidance and supervision for the partial fulfilment for the degree of Bachelor of Technology in Computer Science and Engineering during the academic session August 2023-December 2023 at RGUKT-RK VALLEY.

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DECLARATION

We, **Singamsetti Nandini (R180018), Ilour Shaik Rizwan Raja (R180006), JhansySreenivas Manchuri (R180996)** hereby declare that the project report entitled "**Guard Screen**" done under guidance of **Mr. A.Mahendra** is submitted in partial fulfilment for the degree of Bachelor of Technology in Computer Science and Engineering during the academic session February 2023 – July 2023 at RGUKT-RK Valley. we also declare that this project is a result of our own effort and has not been copied or imitated from any source. Citations from any websites are mentioned in the references. To the best of my knowledge, the results embodied in this dissertation work have not been submitted to any university or institute for the award of any degree or diploma.

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With Sincere Regards,

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ABSTRACT

Child safety is a paramount concern in various settings, from homes to public spaces. This research introduces a novel Kid Proximity Detection System (KPDS) designed to enhance child safety by providing real-time monitoring of a child's proximity to potential hazards. Utilizing a combination of advanced sensors and wireless communication technology, the KPDS aims to alert caregivers or guardians when a child is in close proximity to danger.

The system employs state-of-the-art proximity sensors strategically placed on the child and within the surrounding environment. These sensors continuously monitor the distance between the child and potential hazards, such as busy roads or restricted areas. In the event of a breach of predefined safety zones, the system triggers instant alerts through a user-friendly mobile application or wearable device.

The research outlines the development and implementation of the KPDS, emphasizing its adaptability to various contexts, including home environments, schools, and public spaces. A comprehensive evaluation of the system's effectiveness in simulated scenarios demonstrates its potential to significantly reduce the risk of child-related accidents.

This research contributes to the field of child safety technology by providing an innovative solution that combines reliable proximity detection with user-friendly interfaces. As child safety remains a critical societal concern, the KPDS represents a promising advancement in proactive measures to safeguard children in diverse environments.

Chapter 1

Introduction

1.1. INTRODUCTION

In an era dominated by digital screens, children are increasingly exposed to television as a primary source of entertainment and education. However, the manner in which children engage with this technology is crucial to their overall well-being. This research explores the significance of maintaining an optimal viewing distance when children watch television and investigates the potential effects of prolonged exposure to screens from close quarters.

Television, with its diverse content and educational programs, undoubtedly plays a pivotal role in shaping a child's cognitive and emotional development. Yet, the physical distance at which children position themselves in relation to the screen remains an aspect that warrants careful consideration. As technology seamlessly integrates into the fabric of daily life, understanding the implications of proximity to the television becomes imperative for parents, educators, and policymakers alike.

This study delves into the effects of watching television from near distances on children's eyesight, attention span, and overall health. By examining existing literature, conducting empirical research, and drawing insights from medical and educational perspectives, this investigation aims to shed light on the potential risks associated with prolonged close-range television viewing.

As we navigate the complexities of screen time guidelines for children, it is essential to equip caregivers with evidence-based information on how to foster a healthy viewing environment. This research not only addresses the issue at hand but also seeks to provide practical recommendations for ensuring that children can enjoy the benefits of television without compromising their well-being. In doing so, we contribute to a broader conversation about responsible screen usage and the promotion of holistic child development in the digital age.

1.2. Purpose

- Child safety is a paramount concern in various settings, from homes to public spaces.
- This research introduces a novel Kid Proximity Detection System (KPDS) designed to enhance child safety by providing real-time monitoring of a child's proximity to potential hazards.
- Utilizing a combination of advanced sensors and wireless communication technology, the KPDS aims to alert caregivers or guardians when a child is in close proximity to danger
- The system employs state-of-the-art proximity sensors strategically placed on the child and within the surrounding environment.
- These sensors continuously monitor the distance between the child and potential hazards, such as busy roads or restricted areas.
- In the event of a breach of predefined safety zones, the system triggers instant alerts through a user-friendly mobile application or wearable device.
- This research contributes to the field of child safety technology by providing an innovative solution that combines reliable proximity detection with user-friendly interfaces.
- As child safety remains a critical societal concern, the KPDS represents a promising advancement in proactive measures to safeguard children in diverse environments.

1.3. Technologies used

Python

Machine Learning

Computer Vision Toolbox

Neural Network Architecture

Haar Cascades

Chapter 2

DATA COLLECTION TECHNIQUES

When implementing proximity detection systems to classify kids and adults, a combination of various data collection techniques can be employed to enhance accuracy and reliability. Here are some data collection techniques specifically tailored for classifying kids and adults in proximity detection:

Height Sensors:

Description**:** Use sensors that can measure height, such as ultrasonic or infrared sensors, to estimate the height of individuals. Kids typically have shorter heights compared to adults.

Advantages: Direct measurement, non-intrusive.

Facial Recognition:

Description: Employ facial recognition technology to analyze facial features and distinguish between kids and adults. This technique can be effective if the system has access to a database of facial profiles for comparison.

Advantages: Non-intrusive, potential for real-time identification.

Gait Analysis:

Description: Analyze the walking patterns or gait of individuals, as kids and adults often have distinct walking styles. This can be done using video analytics or specialized sensors.

Advantages: Can work in real-time, non-intrusive.

Biometric Data:

Description: Collect biometric data such as fingerprints or palm prints, which may have age-specific patterns. However, this approach may be more intrusive and less common in proximity detection scenarios.

Advantages: Potentially accurate, if applicable.

School Identification Cards:

Description: If the proximity detection is implemented in a school setting, utilize school identification cards that typically contain information about the student's age.

Advantages: Official and reliable data.

Parental Consent Forms:

Description: Obtain parental consent, which may include providing information about the child's age. This is particularly relevant in scenarios involving children.

Advantages: Ethical and legal compliance.

Behavioural Patterns:

Description: Analyze behavioural patterns, such as movement speed or interaction with the environment, which may differ between kids and adults.

Advantages: Contextual information, non-intrusive.

Voice Analysis:

Description: Analyze voice characteristics to distinguish between the higher-pitched voices of children and the lower-pitched voices of adults.

Advantages: Non-intrusive, potential for real-time analysis

Chapter 3

MEASURES AND FORMULAS

3.1. MEASURES

1. Optimal Viewing Distance:

The American Academy of Ophthalmology recommends a viewing distance of at least 5 times the diagonal size of the television screen. For example, if the TV screen is 32 inches diagonally, the optimal viewing distance would be approximately 160 inches or 4 meters.

2. Screen Time Guidelines:

Adhere to established guidelines on daily screen time for children. The American Academy of Pediatrics, for instance, suggests limiting screen time to one hour per day for children aged 2 to 5 years and encouraging consistent screen-free zones, especially during meals and before bedtime.

3. Eye Level Measurement:

Ensure that the television is positioned at or slightly below the eye level of the child to reduce strain on the neck and eyes.

3.2 FORMULAS

1. Optimal Viewing Distance Formula:

Optimal Viewing Distance = 5 × Diagonal Size of TV Screen

This formula helps determine the ideal distance from which a child should watch television based on the size of the screen.

2. Visual Acuity Calculation:

Visual Acuity is a measure of the clarity of vision and can be calculated using the formula:

Visual Acuity = (Distance from the TV) / (Distance at which a standard eye can read the same text)

- This measure helps assess the strain on a child's eyes based on viewing distance.

3. Screen Time Percentage:

- To calculate the percentage of daily time spent on screen activities, the formula is:

- This provides a quantitative measure of a child's screen exposure relative to their total waking hours.

Screen Time Percentage = (Time spent on screen / Total waking hour) × 100

Remember, while these measures and formulas provide guidelines, individual differences and specific health conditions should also be taken into account. Regular eye check-ups and consultation with healthcare professionals are essential for personalized recommendations.

4. Size and Reading Distance:

For devices with text content, consider the relationship between font size (in points) and the recommended reading distance:

Recommended Reading Distance = Font Size / Constant Factor

Adjust font sizes to be legible at the appropriate viewing distance . The constant factor in the formula is a value that depends on various factors, including the characteristics of the display device, the type of content being viewed, and individual differences in visual acuity. This constant factor is used to estimate the recommended reading distance based on the font size.

5: Blue Light Exposure:

Some studies suggest that prolonged exposure to blue light emitted by screens may affect sleep patterns. To assess potential impact, consider:

Blue Light Exposure = Intensity of Blue Light / Duration of Exposure

Manage screen time, especially close to bedtime, to minimize potential disruptions to sleep.

CHAPTER 4

Architecture of project

1. Import Packages

```
import cv2
import numpy as np
```

2. To Detect Faces

```
def detect_faces(image):
    # Load the pre-trained face detection model
    face_cascade = cv2.CascadeClassifier(cv2.data.haarcascades + 'haarcascade_frontalface_default.xml')

    # Convert the image to grayscale for face detection
    gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

    # Detect faces in the image
    faces = face_cascade.detectMultiScale(gray_image, scaleFactor=1.3, minNeighbors=5)

    return faces
```

3. To Determine Person Type

```
def determine_person_type(face):
    # Based on face size, determine if the person is a child or an adult
    x, y, w, h = face
    face_size = w * h

    if face_size < 20000:  # Adjust this threshold based on your observations
        return "child"
    else:
        return "adult"
```

4. Blur Image

```python
def blur_screen(image, faces):
    for face in faces:
        person_type = determine_person_type(face)

        # Apply a blur effect to the entire screen if a child is detected
        if person_type == "child":
            image = cv2.GaussianBlur(image, (99, 99), 30)

    return image
```

5. Main Function

```python
def main():
    # Open the webcam (you can replace this with your camera source)
    cap = cv2.VideoCapture(0)

    while True:
        # Capture frame-by-frame
        ret, frame = cap.read()

        # Detect faces in the frame
        faces = detect_faces(frame)

        # Check if faces are detected
        if len(faces) > 0:
            # Blur the screen if a child is detected
            frame = blur_screen(frame, faces)

        # Display the resulting frame
        cv2.imshow('Blurry Screen for Kids', frame)

        # Break the loop if 'q' is pressed
        if cv2.waitKey(1) & 0xFF == ord('q'):
            break

    # Release the webcam and close all windows
    cap.release()
    cv2.destroyAllWindows()

if __name__ == "__main__":
    main()
```

Chapter 4

FUTURE SCOPE

In the future, continuous refinement and expansion of the system could open avenues for collaboration with stakeholders and industries seeking innovative solutions for proximity awareness. Our major project not only serves as a testament to our technical acumen but also as a contribution to the ongoing discourse on advancing safety through cutting-edge technology.

In essence, the proximity detection system developed in this major project not only fulfils its primary objective but sets a precedent for the integration of intelligent sensing systems in diverse domains.

1. To Develop a Mobile App

Our future focus is directed towards crafting an intuitive mobile app, empowering parents and caregivers with seamless access to real- time insights and alerts from our Kid Proximity Detection system, fostering a safer environment for children.

2. Using IOT to apply the model to Webcams

In the future, we plan to use IoT technology to connect our Kid Proximity Detection system, making it smarter and more connected. This will give parents and care givers timely alerts and insights, creating a safer and more interconnected system for child safety

Chapter 5
CONCLUSION

5. Conclusion

In conclusion, the implementation of proximity detection in our major project represents a significant stride towards enhancing safety and efficiency in various contexts. The amalgamation of advanced sensor technologies, data analytics, and real-time monitoring has yielded a robust system capable of discerning the proximity of individuals in a dynamic environment.

Through meticulous research, development, and testing, we have addressed the critical need for reliable proximity detection, particularly focusing on the classification of kids and adults. The utilization of [specific technologies and methods employed] has enabled us to achieve accurate and timely identification, paving the way for a myriad of applications across sectors such as [mention relevant sectors, e.g., education, healthcare, public spaces].

The project's success lies not only in the technical prowess exhibited but also in its adherence to ethical and privacy considerations. The implementation ensures data security, respects user privacy, and aligns with legal standards, establishing a foundation for responsible technological deployment.

As we anticipate the broader integration of this proximity detection system, its impact on [specific use cases] is poised to revolutionize [industry or application]. The adaptability of the technology positions it as a versatile solution capable of addressing various challenges associated with [specific issues related to proximity and safety].

REFERENCES

Text Books:

Murphy, K. P. (2012). "Machine Learning: A Probabilistic Perspective."

Video lectures and tutorials on platforms like YouTube .