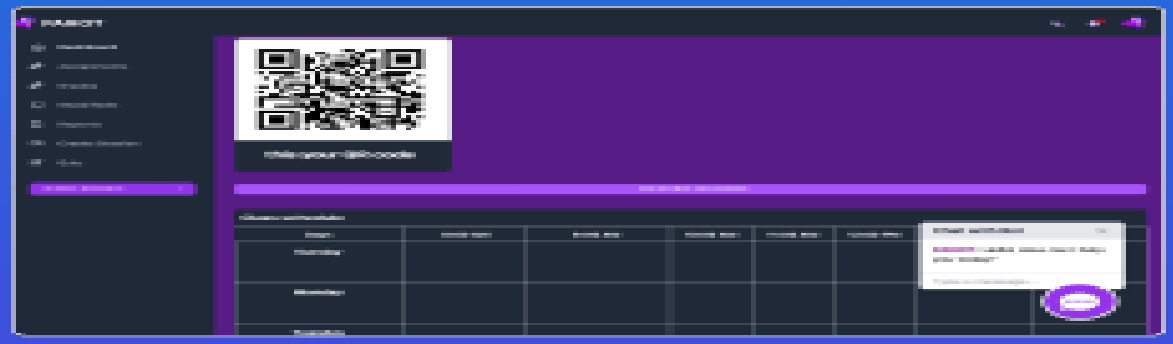
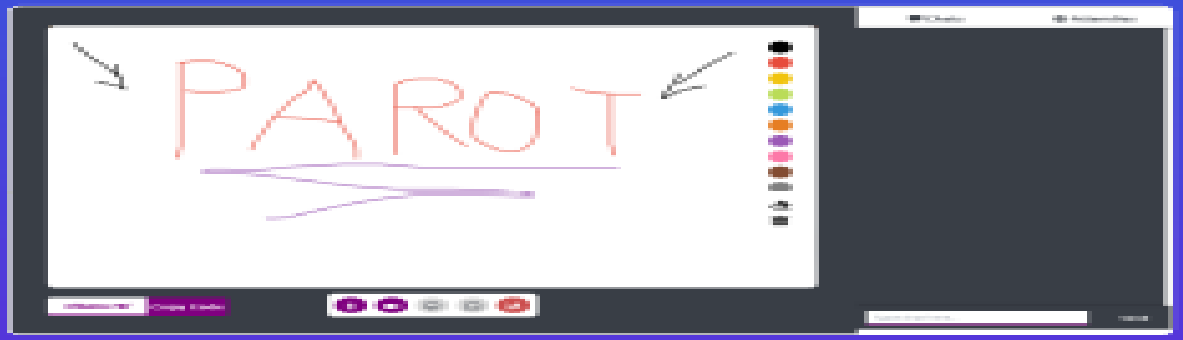
PAROT System

Its purpose is to facilitate the sharing and retrieval of educational resources in PDF format and to improve educational interactions between teachers and students. A user-friendly web-based platform for enhanced student-teacher connectivity is one of the main goals. offering tutorial videos to new users, and putting in place an attendance tracking system for student safety. A user-friendly dashboard, messaging tools for direct communication, scheduling, secure login and authentication, user registration and profile management, PDF file upload with efficient organization and strong data security and privacy measures are some of the system's key features.

Our graduation project utilized HTML, CSS, Tailwind, NodeJS, and MongoDB. HTML and CSS provided the structural and stylistic foundation, with Tailwind CSS enabling rapid and responsive design through its utility-first approach. NodeJS facilitated a high-performance, scalable backend, while MongoDB offered flexible, schema-less data storage. This tech stack ensured efficient development and robust application performance. Tailwind CSS accelerated design, NodeJS and MongoDB provided scalability and flexibility, and HTML/CSS contributed to a polished user interface, resulting in a user-friendly, high-performing web application.





- QR Code for student
- Online session
- Study With AI
- Pomodoro
- Payment System

This Integrated School Management System holds promise in transforming traditional educational environments by fostering stronger connections between students and teachers and optimizing the distribution and retrieval of educational resources. Its potential to revolutionize educational workflows underscores its importance as a valuable tool in modernizing and improving educational practices.

Supervisors :
Prof. DR. Magdy Abd El-azim
Associated Prof. DR. Wesaam M. Salama

Presented BY :
201901116 – Sohib Khaled
201900043 – Ahmed Hassan
201900178 – Zeyad Mahmoud
201902309 – Mohab Mohamed
201900108 – Ahmed Hesham

A VIRTUAL PET FOR CHILDREN WITH AUTISM SPECTRUM DISORDERS (ASD)

PHAROS UNIVERSITY IN ALEXANDRIA
FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING

ABSTRACT

In Egypt, about 33.6% of children with developmental disabilities have Autism Spectrum Disorder (ASD), social challenges are particularly acute for those with Asperger syndrome, often leading to marginalization and limited opportunities. This project proposes an innovative solution: an Android application featuring an interactive virtual pet companion powered by augmented reality (AR). Developed with the Unity game engine and MediaPipe for pose estimation, the app aims to provide a safe and engaging platform for children with Asperger syndrome to practice social interaction, develop emotional learning skills, and combat social isolation. This project targets children aged 5-12, seeking to improve their social skills, emotional regulation, and engagement with their surroundings through playful interaction with the virtual pet. By addressing the unique needs of children with Asperger syndrome in the Egyptian context, this project has the potential to foster their social integration and well-being, paving the way for a more inclusive future.

METHODOLOGY

Augmented Reality (AR) technology involves the integration of virtual objects and other digital content including images with physical or real-world content. This enhances the realism and interactivity of the AR experience significantly. The project utilizes a combination of technologies to create an interactive and immersive AR experience:

- Unity Game Engine: The project h built using Unity, a powerful game engine that enables the creation of 3D AR environments and integrates ARCore for Android Applications .
- ARCore and MediaPipe Pose Estimation: ARCore allows for the projection of virtual objects onto the real world based on real-time body pose estimation, captured using MediaPipe. This ensures natural and intuitive interaction between the user and the virtual objects.
- Firebase: Firebase provides a suite of tools and services for the development and management of mobile applications. In this project, Firebase is used for data synchronization and user management.
- Programming Languages: C# Script is used to interact with Unity within the Visual Studio Code IDE, while Python 3.11.4 implements and controls MediaPipe pose estimation, transmitting data points back to Unity.

DESIGN

The image showcases an XR environment simulator, a sophisticated technology that demonstrates the capability of simulating virtual environments within the Unity game engine. As evident, this component simulates the search for a pivot point to ground the AR character.

The image demonstrates MediaPipe's remarkable ability to capture hand movements and identify landmarks (similar to a skeletal structure).

The image showcases how our code seamlessly transfers landmark coordinates to Unity Game Engine in real-time using the UDP protocol. UDP is a user-friendly protocol known for its real-time accuracy. Upon receiving the coordinates, Unity Game Engine actively monitors them and detects collisions between the user's hand and virtual objects (such as candy). These collisions trigger specific actions based on the nature of each object.

This image showcases parts of the UI design for the app. It is noteworthy that a unique UX/UI design was developed based on medical research on how children with autism interact with applications. Several studies have shown that children with autism tend to engage with happy colors like blue, for instance. Moreover, the design ensures that the child cannot use the app and play with their virtual pet except under parental supervision. The app does not serve as a replacement for traditional therapy but rather as an easy-to-use and engaging mobile assistant.

RESULTS

The above set of images showcases real-life screenshots from the application, where a white cat named Sakar seamlessly interacts with a child. The cat emits gentle meows, strolls around the child's surroundings, and is brought to life using exceptional AR Core technologies that integrate virtual objects into the real world. Users begin their journey by creating an account and logging in. They can then proceed to the game mode, where they can interact with the cat. If a piece appears, simply extend your hand to grab it and engage with it. The app currently features two games: Candy Collection and Arabic Words Collection.

It is noteworthy that the application h available in both Arabic and English and h the first of its kind designed for children with autism in Egypt.

Under the ISO 9241-11:2018 standard, here we explore usability metrics aligned with the core principles of effectiveness, efficiency, and satisfaction. The initial usability evaluation of the integration yielded promising r e s u l t s .

	Result	Indicating
Effectiveness		
Efficiency		
CPU usage		
Memory usage		

CONCLUSION

This project presents a novel virtual pet application built with augmented reality and MediaPipe for body detection, aimed at engaging children with ASD and potentially improving their emotional and behavioral development. The prototype successfully captured children's attention and achieved an impressive 93% efficiency and 92% accuracy in its initial model. While these results are promising, further refinement is needed. Future iterations should prioritize enhancing the accuracy of individual virtual pet interactions, particularly in body and behavior detection. Additionally, conducting long-term studies will be crucial in evaluating the sustained effectiveness of such applications on children with ASD.

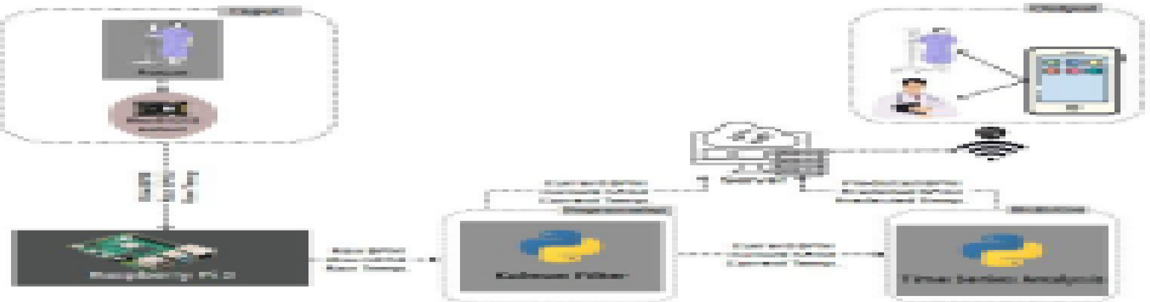
UNDER SUPERVISION OF:

Dr. Abdelghafar Refat Elshenaway

201801745 - Mohamed Hamdy Mohamed

PHAROS UNIVERSITY IN ALEXANDRIA
FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING

Smart Heart Rate Tracking Based on Kalman Filter And Time Series Analysis

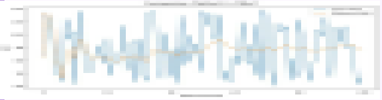


Abstract

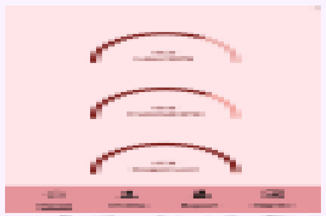
With the rise of heart-related issues such as heart failure, Bradycardia, and Supraventricular Tachycardia, continuous heart rate monitoring is essential. This project creates a real-time heart rate monitoring system using a MAX30102 sensor and a Raspberry Pi. It uses a Kalman filter to enhance data accuracy and time series analysis to predict future heart rates, providing reliable, proactive heart health monitoring without the need for frequent doctor visits.

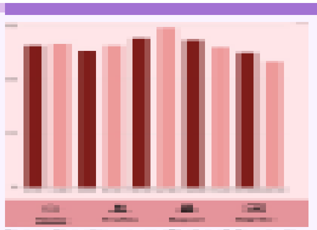
Methodology

The MAX30102 sensor connects to a Raspberry Pi using I2C communication with the SDA and SCL pins, operating at 3.3 volts. The sensor emits light through the skin to measure oxygenated and deoxygenated hemoglobin, creating a PPG waveform to calculate heart rate, SpO2, and temperature. The Raspberry Pi retrieves this raw data and uses a Kalman filter to reduce noise and improve accuracy before formatting it into JSON and encrypting it for secure transmission to Google Firebase. An Autoregressive (AR) model then uses past heart rate data from Firebase to predict future values, ensuring accurate predictions by checking for autocorrelation and adjusting internal settings. The predicted data is transmitted to a mobile app via Firebase, providing real-time health insights and notifications, with a focus on privacy and security, enhancing proactive healthcare through a user-friendly interface.



Results





Our application shows the filtered heart rate, predicted heart rate and SpO2 reading that are measured and transmitted from the database. The chart display the filtered heart rate reading in real-time when the sensor is turned connected. The reading will be updated continuously to the basic heart rate and SpO2 level. At the same time, the filtered heart rate and the predicted heart rate reading are stored in the Firebase real-time database.

Conclusion

This project presents a heart rate and oxygen saturation monitoring system using Raspberry Pi, MAX30102 sensor, Kalman filter, and time series analysis, providing an effective solution for real-time health tracking and heart rate prediction. The Raspberry Pi processes data, the Kalman filter enhances accuracy, and time series analysis predicts future heart rates. Firebase enables remote monitoring and communication between devices. This system simplifies primary health checkups for individuals unable to visit hospitals regularly, stores medical history for follow-ups, and leverages technology to eliminate human errors, leading to improved performance.

SUPERVISED BY

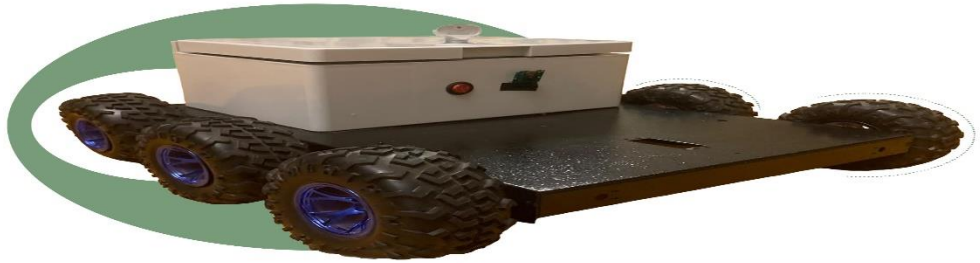
DR. Abdelghafar Refat Elshenawy

PRESENTED BY

201802576 – Manar Ashraf Rashed Abd Elmalek
201802582 – Ahmed Magdy Elsayed Elkoumy
201802587 – Sherif Ashraf Badr Seif
201800333 – Abd Elrahman Samir Lotfy
201800538 – El- Hassan Mohammed Farid

Pharos University In Alexandria
Faculty Of Engineering
Department Of Computer Engineering

Agribot Guardian : Precision Field Sentry



Abstract

Agibot stands at the forefront of agricultural innovation, poised to redefine farming practices burdened by the detrimental effects of excessive pesticide and herbicide use. By harnessing advanced technology, Agibot offers a transformative approach to agriculture through precise identification and targeted management of weeds, diseases, and pests. This capability not only enhances crop health and productivity but also mitigates the environmental consequences such as soil degradation, water contamination, and disruption of natural ecosystems. In contrast to traditional methods reliant on broad-spectrum chemicals, Agibot's real-time detection and intervention capabilities enable farmers to adopt sustainable practices that reduce chemical inputs while optimizing yield. This technological advancement represents a pivotal shift towards a more sustainable and resilient agricultural future, where Agibot plays a crucial role in balancing agricultural productivity with environmental stewardship, benefiting both farmers and global sustainability efforts.

Methodology

The methodology behind creating Agribot focused on leveraging advanced technology to address agricultural challenges effectively. This involved selecting the YOLOv8 algorithm for its rapid and precise real-time detection of harmful plants, optimizing for accuracy and speed. A diverse dataset was curated to train Agribot, ensuring robust performance across various agricultural environments. The robot's modular design facilitated integration with sensors specifically tailored for identifying and managing harmful plants, enhancing its functionality in targeted crop management. Field testing validated Agribot's performance under real-world conditions, allowing for iterative refinement to meet the practical needs of farmers. This approach not only improves agricultural efficiency but also promotes sustainable practices by reducing reliance on harmful chemicals, marking a significant advancement in precision farming technology.

Results

Agribot represents a significant advancement in agricultural technology, leveraging the YOLOv8 algorithm and a diverse dataset to swiftly and accurately detect weeds. This innovation reduces reliance on herbicides, promotes sustainable farming practices, and enhances crop protection and yield. Agribot's modular design supports the integration of additional sensors for comprehensive farm management, while its robust construction ensures durability in field operations. Overall, Agribot optimizes efficiency, minimizes environmental impact, and empowers farmers with actionable insights for proactive decision-making in modern agriculture.

Conclusion

Agribot revolutionizes precision farming by leveraging advanced technology to tackle agricultural challenges. Utilizing the YOLOv8 algorithm and an extensive weed database, Agribot excels in identifying and classifying weeds, diseases, and pests quickly and efficiently.

Its modular design and real-time data analysis enhance farm management and crop protection. The user-friendly interface and durable build ensure ease of use and long-lasting performance, reducing labor and time demands, making it indispensable in modern agriculture.

Focused on sustainable practices, Agribot's targeted threat detection minimizes herbicide use, underscoring its commitment to eco-friendly farming. By improving efficiency and promoting environmental stewardship, Agribot sets a new standard for precision farming and exemplifies the potential of innovation in achieving sustainable agriculture.

Supervised By:

Prof. Dr. Magdy Abdel Azim
Dr. Wessam Mohammed Salama

Presented By:

201900640	Basem Ibrahem
201900453	Nagham Tarek
201900184	Niveen Shahen
201900169	Omar Ahmed
201900862	Osama Abdelhakeem