# Interactive Authorized Assessment System Gamification Quiz

Yanshee Robot

Ahmed Amin Algewily Ahmed Mohamed Hagag Islam Magdy Mira
ahmed 2211010@nmu.edu.eg Ahmed221101071@nmu.edu.eg
ESLAM221100473@nmu.edu.eg
New Mansoura University

## ABSTRACT

*In the pursuit of more engaging and effective learning experiences, technology has emerged as a powerful tool. Robotics, with its ability to simulate real-world scenarios and provide immediate feedback, offers a unique opportunity to enhance educational outcomes. This paper introduces a quiz game for a robot that uses facial recognition to identify specific individuals. The game only starts if the recognized person is present. Once identified, the robot prompts the user to choose from categories like animals, countries, general knowledge, and math. The user types their answers to the questions. Correct answers are rewarded with congratulations and an increased score, while incorrect answers result in the game restarting. This project showcases how combining robotics with educational tools can foster interactive learning experiences.*

# 1 INTRODUCTION

The integration of robotics into educational settings has transformed traditional learning methods, offering interactive and personalized experiences. Yanshee [1], a humanoid robot equipped with sensors, a camera, and a speech recognition system, provides a robust platform for developing educational applications. By utilizing YanAPI, This paper presents the development of a quiz game designed to engage users in an educational setting, leveraging Yanshee's ability to interact with users in real-time. The game not only serves as an example of how robotics can be used to make learning more engaging but also highlights the potential for such tools to adapt to individual learning styles and needs. The game leverages Yanshee's capabilities to provide a dynamic and engaging quiz experience. For example, Yanshee can: Present questions verbally, allowing for a more natural and interactive experience. Respond to user answers in real-time, providing immediate feedback and encouraging engagement. Adjust the difficulty level based on user performance, ensuring a personalized and challenging experience. Provide visual cues, using its camera and display to present questions and answer options. The growing interest in robotics for education is driven by the need for innovative methods to captivate and motivate learners, particularly in subjects like STEM. Robots like Yanshee can bridge the gap between education and entertainment, creating a dynamic environment where learning becomes an active process. This project aims to contribute to this field by demonstrating how Yanshee can be

used to facilitate learning through interaction, thereby enhancing the educational experience for users of all ages.

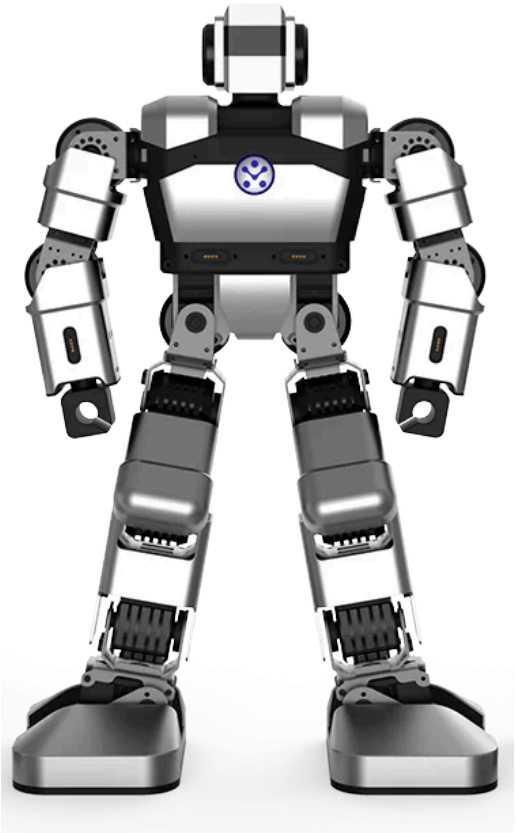

**Figure 1:** Yanshee Robot

## 2 RELATED WORKS

**A robot quizmaster that can localize, separate, and recognize simultaneous utterances for a fastest-voice-first quiz game-2014-IEEE:** This paper presents an interactive humanoid robot that can moderate a multi-player fastest-voice-first-type quiz game by leveraging state-of-the-art robot audition techniques such as sound source localization and separation and speech recognition. In this game, a player who says "Yes" first gets a right to answer a question, and players are allowed to barge in a questionary utterance of the quizmaster. The robot needs to identify which player says "Yes" first, even if multiple players respond at almost exactly the same time, and must judge the correctness of the answer given by the player. To enable natural human-robot interaction, we believe that the robot should use its own microphones (i.e., ears) embedded in the head, rather than having pin microphones attached to individual players. In this paper we use a robot audition system called HARK for separating the mixture of audio signals recorded by the ears into multiple source signals (i.e., almost the simultaneous utterances of "Yes" and the questionary utterance) and estimating the direction of each source. To judge the correctness of an answer, we use a speech recognizer called Julius. Experimental results showed that our robot can correctly identify

which player spoke first when the players' utterances differed by 60 msec.

**Development of Robotic Quiz Games for Self-Regulated Learning of Primary School Children-2020:** The progressive development of information technology has provided multiple learning modes. The rich content and innovative applications available allow pupils to improve their skills through self-regulated learning (SRL), which has become an important education goal. Intelligent robots can be used in a wide range of applications, from programmed movements for learning activities, to the combination of artificial intelligence and sensor technology for human life and education. A robot's dynamic and interesting interface is more suitable for children's self-regulated learning. This study used a Zenbo robot as the development tool and Zenbo Scratch platform programming to develop an AI robot math quiz game for primary school students. Two elementary school math teachers, and a parent and a 5th grade primary school student were involved in the development of the game. This study used the parent's and student's continuous interaction with the robot to adjust the code and achieve the best human-computer interaction in robotic mathematics problem solving. Moreover, this study developed a companion robot for a math quiz game, which can be used for reviewing what has been learned in class. The robot can be used for self-regulated learning by
young children to increase student learning outcomes.

# 3 METHODOLOGY

The development of the Yanshee quiz game followed a structured approach, beginning with the initialization of the robot through YanAPI. The API

facilitated communication with Yanshee's various components, such as the camera for user detection, and the speaker for verbal interaction [2].

**3.1 Initialization and Setup:** Yanshee was initialized using YanAPI, ensuring all necessary modules, like speech recognition and camera detection, were active. This setup phase also involved configuring Yanshee's network connection and calibrating sensors to accurately detect and interact with users.

**3.2 User Detection:** The camera module was programmed to continuously scan for a user's presence. Upon detecting a user, Yanshee executed a greeting sequence. This involved a combination of verbal greetings and a physical gesture, such as waving, to create a welcoming environment.

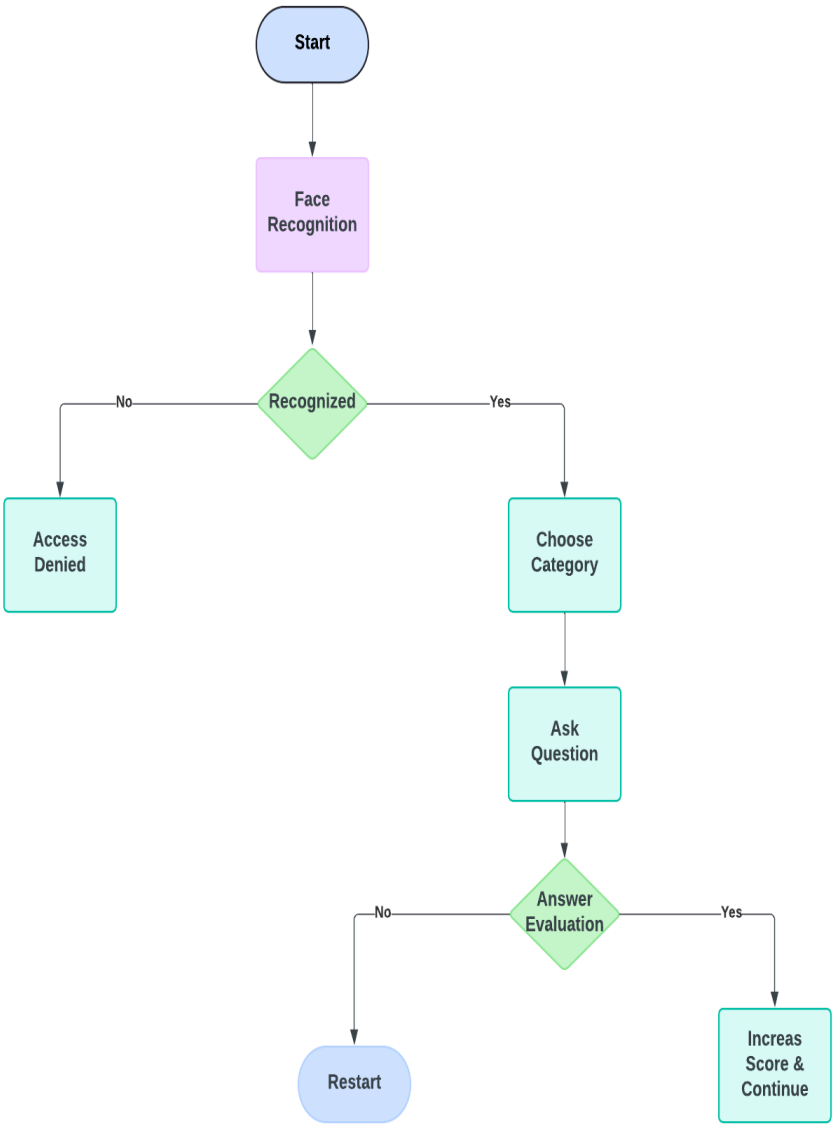


**Figure 2:** Quiz Game FlowChart

**3.3 Quiz Interaction Design:** The quiz game was designed to be interactive, with Yanshee presenting questions from different categories. Categories included subjects like animals, math, and general

knowledge. Yanshee used its speech synthesis capability to ask questions and then waiting for the user's written response. The YanAPI was employed to process and evaluate the user's answers in real-time.

**3.4 Answer Evaluation:** User responses were processed. The system then compared the user's answer against the correct answer stored in the program. Depending on the result, Yanshee either congratulated the user or informed them of an incorrect response. The game was designed to restart upon a wrong answer, creating a loop that encouraged users to try again.

**3.5 Feedback and Looping Mechanism:** To keep the user engaged, Yanshee provided immediate feedback. If the answer was correct, Yanshee congratulated the user and optionally increased a score, though this was kept simple in the initial version. If the answer was incorrect, Yanshee gently informed the user and prompted a restart, ensuring the interaction remained positive and encouraging.

**3.6 Programming and Testing:** The entire system was developed in Python, utilizing YanAPI for all robot-specific functions. Extensive testing was carried out to ensure smooth interaction, correct detection, and appropriate responses. Edge cases, such as unclear user responses or low detection accuracy, were addressed by preprocessing the text and camera sensitivity settings.

# 4 CONCLUSION

The development of the Yanshee quiz game highlights the significant potential of integrating robotics into educational settings. The project successfully demonstrates how Yanshee can be used to create an engaging and interactive

learning experience, utilizing its natural language understanding, camera detection, and response capabilities. The game provides a dynamic platform for users to test their knowledge across various subjects while interacting with a humanoid robot, making learning both enjoyable and effective. This project showcases the benefits of combining educational content with advanced robotics, contributing to the growing field of technology-enhanced learning.

## 5 FUTURE WORKS

The current version of the Yanshee quiz game provides a basic framework for user interaction and education. Future enhancements could include the implementation of a dynamic question bank that adapts to the user's learning progress, incorporating different difficulty levels to challenge users as they improve. Additionally, the game could be expanded to support multi-user interactions, allowing for collaborative or competitive learning experiences. Integrating more advanced AI techniques, such as natural language processing (NLP) for better text preprocessing and response generation, could further enhance the game's interactivity and educational value. Finally, future iterations could explore the integration of additional sensors and machine learning algorithms to personalize the learning experience based on user behavior and preferences.

# REFERENCES

[1] Ting-Sheng Weng, Chien-Kuo Li, Meng-Hui Hsu. Development of Robotic Quiz Games for Self-Regulated Learning of Primary School Children, 15 March 2021

[2] Izaya Nishimuta, Naoki Hirayama, Katsutoshi Itoyama. A robot quizmaster that can localize, separate, and recognize simultaneous

utterances for a fastest-voice-first quiz game. 18-20 November 2014.
[3] Kathrin Pollmann, Daniel Ziegler. Personal quizmaster: a pattern approach to personalized interaction experiences with the MiRo robot. 06 September 2020
[4] Izaya Nishimuto,  Itoyama, Katsutoshi, Okuno, Hiroshi G. Toward a quizmaster robot for speech-based multiparty interaction. 23 Sep 2015
[5] R. Tutul1 , A. Jakob1 , I. Buchem1 , N. Pinkwart2. Sound Recognition with a Humanoid Robot for a Quiz Game in an Educational Environment. April 2023
[6] Heriberto Cuayahuitl, Ivana Kruijff-Korbayova. An Interactive Humanoid Robot Exhibiting Flexible Sub-Dialogues. 3 Aug 2012
[7] Harya Bima Dirgantara, Nur Choiriyati. Development of Interactive Quiz Game Prototype as A Learning Evaluation Media. 9 Dec 2022
[8] Rainer Stiefelhagen; Hazim Kemal Ekenel; Christian Fugen; Petra Gieselmann; Hartwig Holzapfel; Florian Kraft. Enabling Multimodal Human-Robot Interaction for the Karlsruhe Humanoid Robot
. 8 Oct 2007