روبوكسين®: تصميم و تنفيذ روبوت متقدم للاستخدام داخل البيت الذكي.

RoboXeen ®: Design of an Advanced Mobile Robot for the Smart Home

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INTRODUCTION

- تحت ضوء تطوّر التقنية المستمر، سوف تصل إلى منازلنا العديد من الروبوتات بمختلف الإمكانيات والأحجام والأسعار، لقد تمّ تطوير الروبوتات ذات البنية البشرية لتقوم بوظائف الإنسان كمساعد شخصي؛ كأن يحل الروبوت محل الممرض في مساعدة المرضى وكبار السّن، أو يقوم ببعض المهام التي تشكّل خطرًا على البشر.
- يهدف هذا المشروع إلى تصميم وتنفيذ روبوت اقتصادي ذو طبيعة بشرية كإضافة مهمة للمنزل الذكي.
- هناك العديد من مشاريع الروبوتات التي تمت في المملكة العربية السعودية ولكن لحد علمنا أنه لم يسبق لأحد القيام بتصميم وإنشاء روبوت ذو طبيعة بشرية.
- ولكي نحقق هذا الهدف - بإذن الله تعالى- سوف نستغل التطوّرات الأخيرة التي حدثت في عالم الطابعات ثلاثية الأبعاد والتطوّر الهائل في الأجهزة والقطع الإلكترونية وإمكانية تسخيرها لغرض معين وباستغلال البرامج مفتوحة المصدر والدراسة العميقة في الذكاء الاصطناعي وبتوفّر الأجهزة الذكيّة خفيفة الوزن كالهواتف النقالة والأجهزة اللوحية.
- هذا المشروع سوف يهدف لتحقيق الرؤية الوطنية 2030 بناءً على ما يحتويه من التقنيات الحديثة والإقتصاد القائم على المعرفة.

VISION رؤيـــة 2030 المملكة العربية السعودية KINGDOM OF SAUDI ARABIA

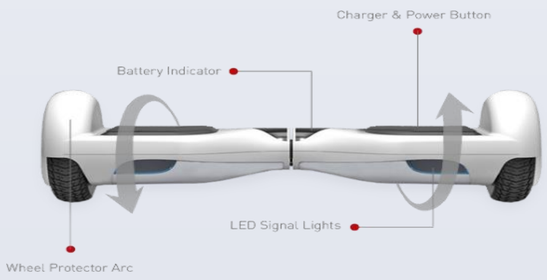
- In a society of high-end technology that is continually developing, more personal robots, with different capabilities, sizes, and prices, will arrive in our homes.
- Humanoid robots are being developed to perform human tasks like personal assistance, where they should be able to assist ill people and elderly, and do some dangerous tasks.
- In this project we will design and implement a low cost humanoid robot to be used as an important addition to a smart home.
- There are many robotic projects that have been carried out in the kingdom, but as far as we know, our project is unprecedented locally.
- To accomplish our goal, we will exploit recent advances in 3D printers, Off-the-shelf electronics, open source software, deep learning machine intelligence, and light computing platforms such as tablets and mobile phones.
- This project is consistent with the kingdom's 2030 economic vision due to its strong technical content and relevance to the knowledge-based economy.

OBJECTIVES

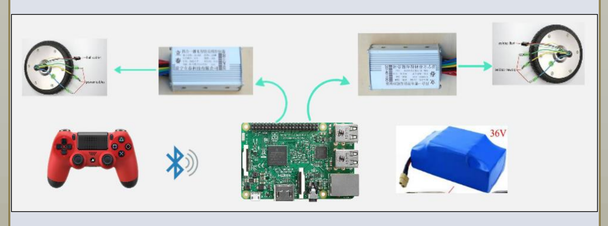
- Design and build a mobile robot for the smart home.
- Implement software applications to control the robot.
- Implement novel software applications for object and speech recognition and other human-like tasks based recent advances in pattern analysis and machine intelligence.

DESIGN METHOD

- Our innovative plan is to use a self-balancing scooter a base for the robot.
- We will modify the self-balancing scooter so that we can control it using a computer program.



- We have programmed a Play Station (PS4) joystick to control the robot.
- To do that, we have installed a package called "pyGame" on the Raspberry PI card.
- PyGame allows the PI to connect to the PS4 joystick using Bluetooth and receive signals when the joystick buttons are pressed.



Preliminary cad models Design with SolidWorks design softwzre

IMPLEMENTATION

- As a first step we have built a simple design in MODEL 1.
- The main battery and control cards are all at the base of the robot. We have also fitted a plastic box at the base to house the Raspberry Pi card and its power bank.
- For this project, we will design a torso and head part, but we will not worry about the hand structure for the time being.

MODEL 1

MODEL 2

CONCLUSIONS

- We have designed and implemented the robots body.
- We have successfully integrated all the necessary hardware and software.
- We can now control the robot using a PS4 joystick or through python programs on the Raspberry PI.
- The next steps, include adding other hardware like the arms, head, and many electronic sensors.
- Finally, we plan to include intelligent software in the tablet for navigation, face recognition, speech recognition, and other useful tasks.
- The goal is to have a final version that looks like the model below.

THE TEAM

ACKNOWLEDGMENT

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