BARBIE WITH BRAINS : AN INTERACTIVE ROBOT

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Abstract: The rapid growth of modern-day technology has paved way for innovative ideas, one of them is presented in this paper, which is "Barbie with Brains". This Barbie is contradictory to the other dolls which stays idle, perhaps interacts with humans especially kids, just like any typical person would do. This interactive Barbie becomes more charismatic with its breathtaking features, like Barbie itself being a knowledge hub for education purposes, which benefits children in their schooling and learning, where sometimes there is no need of any knowledge or teaching backup, while Barbie is around. Some of the fascinating physiognomy of it, is to make kids feel comfortable with their own toys by initiating conversation, its ability to recognize faces, detecting emotions, plays comforting songs and related messages. Detecting harmful objects and obstacles around the kid or anywhere to it, serves as a safety measure, not only that, it clicks a picture and emails as well as drops an alarming message to parents or concerned registered people about the emergencysituation.

Keywords: knowledge hub, recognize faces, detecting emotions, detecting harmful objects and obstacles., clicks a picture, drops an alarming message.

INTRODUCTION

This paper introduces the world-famous doll, Barbie, which served the purpose of just being trivial, but the improvised version of the Barbie, which is designed to provide kids with hours of entertainment, functionality and productivity enhancements. The older Barbie tried to fulfil a timeless dream convincing little children that she is a real friend and yes, this dream has finally come to life, especially for children who find playing with toys a fantasy. So this is a great way to incorporate and guide the kids to learn and to witness the beauty of technology right from their hand-held toys in ones childhood.

Fig 1. A kid with " Barbie with Brains"

The Barbie is designed to be a kid's teacher, comforter, guider, take carer, to be solicitous, observer and a good friend. One of the profitable applications of this Barbie, in the lives of childrenisfortheeducationpurposes.TheBarbieiscodedwith innumerable education related content and topics, when the kid needs help regarding his/her doubts in homework, they can completelydependonthebarbie'sbrainsfortheperfectanswer to be delivered. There is no limit for barbie's extraordinary memory, as it extends to leaps and bounds.

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This feature not only is limited to schooling, but also helps the children to identify and unveil their passion towards the subject, they can start diving deep into their favourite topics with the help of barbie's brains. Thus, finding new interesting path for their career. This feature comes handy anytime and anywhere as the kid wishes. This barbie is the perfect nurturer as it can say any number of rhymes and bed time stories to comfort the child. The ability that makes this barbie a real time natural human friend to children or any other person in a usual way, is it greets them politely, calls them out by their names and start conversations. Barbie can engage in some approaching conversations by listening to users and generating intelligent responses to their queries. This feature fills the opposite person who is interacting with the barbie with enthusiasm, making the listener feel more interested and appealing to the Barbie, developing a friendly relationship amongthem.

The humorous feature in the newer Barbie is Emotion recognition. This unique feature is processed with the help of the facial expressions. This feature can detect many emotions like happy, sad, anger, fear and surprise. Not only detecting emotions, but also tell comforting messages and play situation suited songs.

The imperative feature is Object and obstacle detection. It holds good for security purposes. The barbie

detects any dangerous objects in the hands of the child or anywhere near to the kid. The barbie clicks the picture of the object, sends the message which has the description of the object to the registered parents mobile number. Thus alerting the parents about the child's condition when the kid is unattended at home. Another security measures is that whenever the barbie recognises the faces and when it finds some unknown faces other than the family members, it will click the picture of unknown person, emails the picture of that unknown person to parents or to registered numbers.

I. LITERATURE SURVEY

The dolls were originated for playing purpose. But as the technologies advances, even the simple old doll, doesn't remain the same. In the previous work, the dolls were designed in such a way that it was mainly used just for interaction. This has allowed us to think and design a Barbie in such a way that it will completely take care of the child. The interaction perspective of this Barbie, which handles mainly the education part in a child's life, has made it widely acceptable among parents. In the older interactive dolls, there was no face recognition feature but this Barbie can recognize faces which is unusual in the case of a doll. In the existing system, it is designed to be as a child's companion, when

their parents are away at work. So in this project we are adding the instructions to the robot which will recognize the child's emotion and play concerned songs and comforting messages to make the childhappy.

The safety of the child is done by detecting any unknown person around the child, clicks the picture of it and emails to the concerned person's phone number. Another safety measure for this child is the harmful object detection. This is the basic requirement when no one is there at home to take care of the kid. This proposed system detects harmful objects around the kids and sends a message regarding the emergency situation to the registered number.

Maria D MannerJed Elison 2019 [1] Proposed and came up with experimenting with the idea of interaction with robots. The main communication process is discussed here.

Deju vanj, Liangli Ma 2019 [2], In this paper, the authors discussed the idea of establishing interaction with the lifeless robots and the humans. The working procedure is carried on a small sized computer called the Raspberry Pi.

Sunitha M R Fathima khan 2019 [3], with her crew shared the ideology of machines detecting not only humans, but also any objects which is of utmost importance topeople.

Nafis Mustakim in 2019 [4], along with other authors conducted experiments in the field of face recognition. A higher level of dealing with data is dealt in thispaper.

Tony Belpaeme James Kennedy 2018 [5], discussed in his paper, the usage of machines, technology and the robots for a nobel cause. He proposed the usage of immense memory of robots for the education purpose.

Ma xiaoxi, Lin weisi and others 2017 [7] explained Emotion recognition, which is the sub division of face recognition

feature. This paved way for the reality that could be found in robots, which usually don't understand any emotions or feelings exhibited by humans.

II. PROPOSEDWORK

Technology based creations should communicate just like any other human beings and Barbie is not an exception. The hardware used in this project are Raspberry Pi, a camera, speakers with power supply. The dynamic outputs are being processed by using python programming language.

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Fig 2. Raspberry pi model

The main objective of this Barbie is for the education purpose which is done through interaction. So, any questions asked to the Barbie, it should come up with the right appropriate answer. The robot will listen to the speech from the kid or other people records in the microphone and it will convert that speech into text and it will process the text. It will split the sentence into some decent blocks and it will perform pattern and string matching. After encountering certain similarities in the questions asked with the answers database, it will decide what it should respond back with.
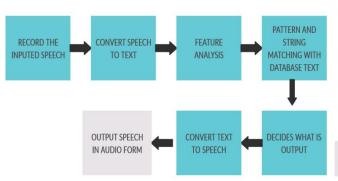

Fig 3. Speech Interaction block diagram

The face recognition is one of the important aspects of human robot interaction. The robot captures the images with

the help of webcam used for this project. After this, face detection takes place. Face detection uses an algorithm called Haar Cascaded Frontal face algorithm. This algorithm takes the picture in pixels format by analyzing the pixel points all over the face of a person. These points vary for each individual, thus extracting some unique traits in each person which serves as a base for face recognition. Once the face ID is matched, the desired output will be given either as known person or unknown person. It also gives audio output which recognizes face and outputs the matching names for their faces. Pygame is used for outputting the audio sound.
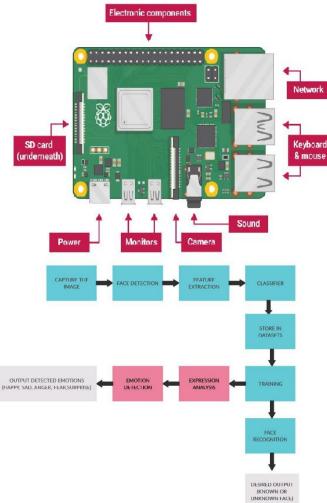

Fig 4. Face recognition and emotion recognition block diagram

As the title suggests, its main moto is for child's safety and feature holding good for their safety is object detection. To detect object, a module using python opencv is used. The camera grabs the video footage and the duration of it can be specifiedaswishedbytheuser.Asthevideocapturingresumes, it clicks individual image frames from the video and it stops the video when it reaches the final limit. The obtained images will be converted to gray scale images. Some of the images will be prestored in the database. It compares the captured image with their ID to the stored object images with respective ID's in the database. Once the ID is matched with the similar features in both the frames, it will respond the object's name with an audio play. After detecting the object, the Barbie clicks a picture of it and messages concerned parents about the emergency situation with the object's name clearly. The

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messaging facility is done byusingTwilio,whichisacloud-basedsoftwareusedforSMS, voice and messagingfacilities.

One of the security measures added to this feature is when face recognition process is going on, if it encounters any unfamiliar face then automatically it capture the image using the webcam and sends the clicked image to parent's email address. Parents will receive the email in less than a minute so that the parents can take timely actions.
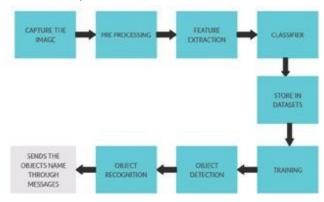

Fig 6. Face Recognition.

Fig 5. Object detection block diagram

III.   EXPERIMENTING RESULTS

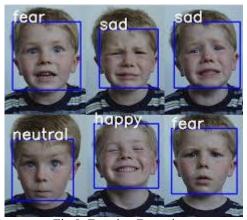Fig 7. Object Recognition.

Fig 8. Emotion Detection.

IV.   FUTUREENHANCEMENT

This Barbie in future has lot more realistic things to do, the hand movements, body movements, which moves from one place to another as the child commands. And it will take
away the harmful objects from the child, thus no need of parents to come and stop from the disaster when Barbie alone can stop the trouble and save the child.

V.   CONCLUSION

Robotictechnologyisrapidlyevolvingintothe21stcentury . The usage and its wide applications have become a part of day to day lives of the society. Robotic technology can be found in stores, hospitals, shopping malls, homes, restaurants, work places and battle fields. But this "Barbie with Brains" is a breathtaking breakthrough where the kids as younger generation get to see the future world with a simple, cute, little doll making wonderous action which is more than what a humancoulddo.ThisBarbiecantremendouslyindulgeinkid's life starting from education purpose to child's safety. Robots like this strike the mindsof
children pushing the innovation world to limitless heights and performing impossible creations.

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