ROCK, PAPERS, SCISSORS GAME USING IBM TJBOT

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Abstract - Returning in grade school, Rock Paper Scissors was one of the popular games played in the playground. One may pick rock (a closed fist), paper (a flat hand), and scissors (a fist extended by the index and middle fingers, creating a V). The rules are simple: Rock beats scissors, paper beats rock, and paper beats scissors. Rock Paper Scissors Game Using TJBot -AI Based Robot is the attempt to practice same with a AI Based Robot. The robot uses Raspberry Pi Camera to Capture Hand Gesture as Input.Once the input is obtained a Raspberry Pi 3 + SD card preloaded with NOOBS is used to Translate gesture, Extract features, Match features, and Recognise gesture.At last when the robot is familiar to input gesture it reponds back with the help of a Mini Bluetooth Speaker and a LCD screen. The Robot uses IBM's AI-based services, i.e., Watson services to understand the input and produce the Results accordingly.

***Key Words*: IoT, IBM TjBot, Watson Services, Node Js, Raspberry Pi 3, Artificial Intelligence…**

- **INTRODUCTION**

With the aid of computer science robots are becoming more 'smarter' and more powerful. Artificial Intelligence has therefore played a very important role not only in increasing human comforts but also in raising industrial productivity which includes both quantitative and qualitative output and cost-efficiency. Artificial Intelligence is a computer program that focuses mainly on the creation and study of algorithms, In short we can say AI is a computer program that can construct a system with its own intelligence and actions[11].

A robot is a machine programmable by a computer which can automatically perform a complex series of actions. An external control device can guide the robots, or the control can be embedded inside. Robots can be constructed on the lines of human form, but most robots are machines programmed to perform a task regardless of aesthetics[12]. Yet TJBot uses AI-based services from IBM, i.e., Watson services that make him stronger from Mechanical Robots. TJBot can self analyse the input and produce the results accordingly. Just like Human Brain.

- **MOTIVATION**

AI Based Robot has multiple capabilities to make it come alive. Such features are due to the combination of the hardware used with Watson services, such as Raspberry Pi, LEDs, Servo motor, etc. Bot listening, for example, is a combo of microphone and speech to text service. Bot's diverse capabilities are why it gives a boost to complete this project and TJBot to be the strongest candidate to complete the project with the system proposed. Such qualities are:

- Analyzing Tone
- Listening
- Watching
- Blinking
- Speaking
- Translating
- Conversing
- Waving etc.

- **PROPOSED SYSTEM**

The Rock, Paper and Scissor game that we used to play for fun in our childhood days is familiar to all of us. The game used to be really fun and the game 's result would be either a victory, a defeat or a tie. This very same game is the project we wanted to create using IBM's TJBot. Through playing the proposed game with them, this artificially intelligent robot will be able to communicate with the user and will even be able to identify who won, the robot or the user. The proposed device would be able to detect the user's action from the camera, measure the results internally through Raspberry Pi, and relay the result to the user via text to speech software. Via motion controls and voice commands this method is called as human computer interaction. Human computer interaction has advanced since computers were born and evolved far away. For Example, It developed static keyboard keys, monitor path devices such as mouse, touch and multi-touch screens respectively. The next development in this would be that the user would be able to manipulate and communicate with machines without touching them physically. Therefore gesture recognition and motion detection for computers and mobile devices will be the next upgrade.

- **EXISTING SYSTEMS**

- ***JANKEN –***

It is a rock, paper, scissor playing robot with a winning rate of hundred percent against humans. The user plays one of the gestures that can be rock, paper or scissor at the timing of one, two, three and the robot analyzes the hand motion as fast as possible and plays the move against the human. The human hand's form, location, motion is captured by high speed vision and this is analyzed in a millisecond by the robot, and with a negligible delay in time.

- ***AFINITI –***

Like Janken, who focuses on studying the human hand movement, Afiniti's deals with the human being's behavioral characteristic. It doesn't do anything to recognize the gesture the human will present, rather it learns the human behavior when the human chooses between rock, paper or scissor and records it in memory, which is later used to predict what the human could choose while playing the game with it. For perfect working of Afiniti light conditions and background should be Idle. It also needs a high speed cameras with almost Zero latencySuch high rig is not always possible and therefore very expensive, plus the latency to be nearly zero is impossible with the current technology.

- **SYSTEM ARCHITECTURE**

The proposed system makes use of Watson's Visual Recognition service to capture the user's gesture and uses speech-to -text service to deliver the output. At first, the visual recognition feature of the Watson is equipped with three training data sets, selecting a rock (A closed fist), paper (An open palm) or scissor (index and middle finger forming a V and other closed fingers). It is best to use at least 50 different photos for each and use different human hands to train the Watson to predict correctly.

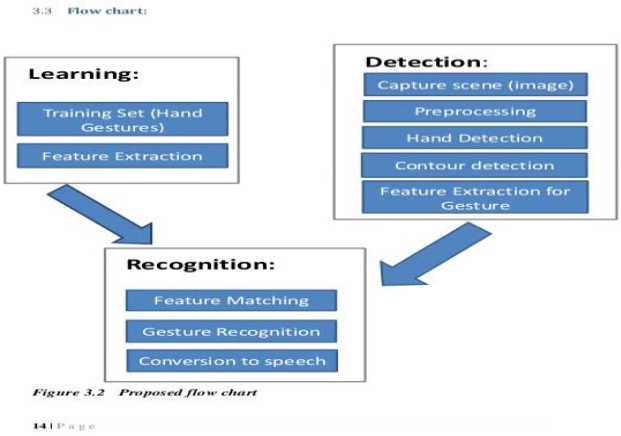


Fig – 1: System Design

The four components of this project are:

- Node-RED, running on IBM CLOUD.
- Node-RED, running on Raspberry pi.
- Watson Visual recognition service.
- Watson IoT Platform service.

Steps -

In IBM cloud we need to build a Node-RED program to view the scorecard, the picture taken and the controls used in the game. We create an IoT platform start application in the IBM Cloud catalogue. For the TJBot this code is for the front end.

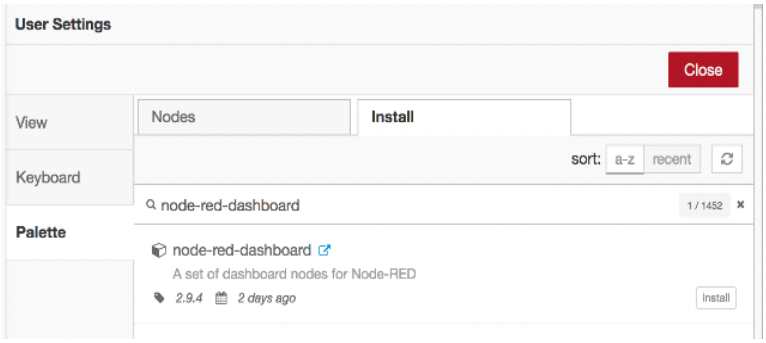


Fig – 2: User Settings

We register system type as tjbot on the Watson Internet of Things Network software. -- TJBot, for example, has specific gamer ids.

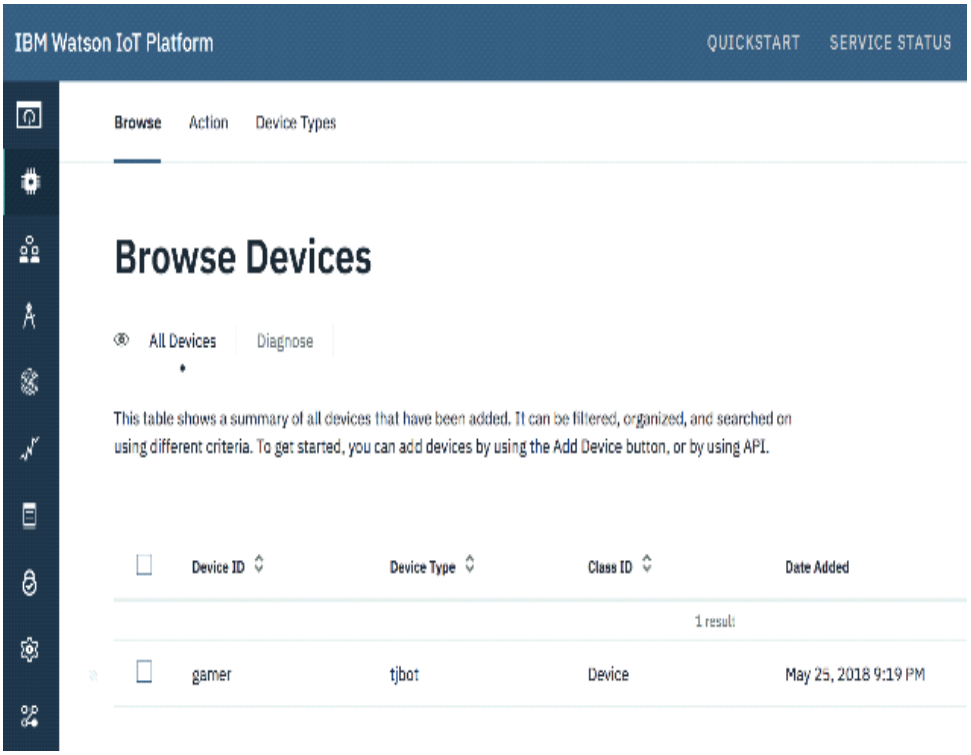


Fig – 3: Iot Platform

Next we have to import JSON into Node-RED. Then edit the ibmiot node and use the form of device as the user name. The user needs to click Play on the gui to give a play command to TJBot.

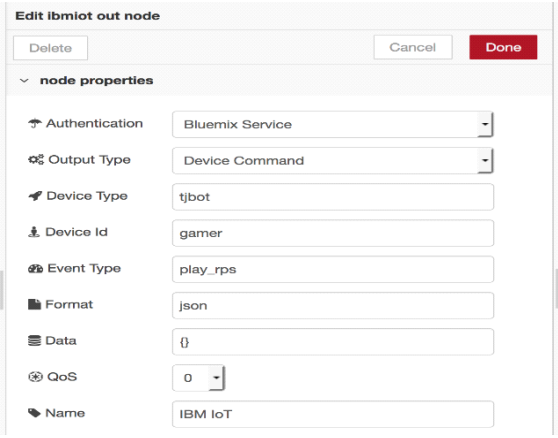


Fig – 4: IMB IOT out node

For the Raspberry pi, TJBot uses 2 tools to do most game play,

- Watson Text to Speech Facilities
- Watson Visual Recognition service

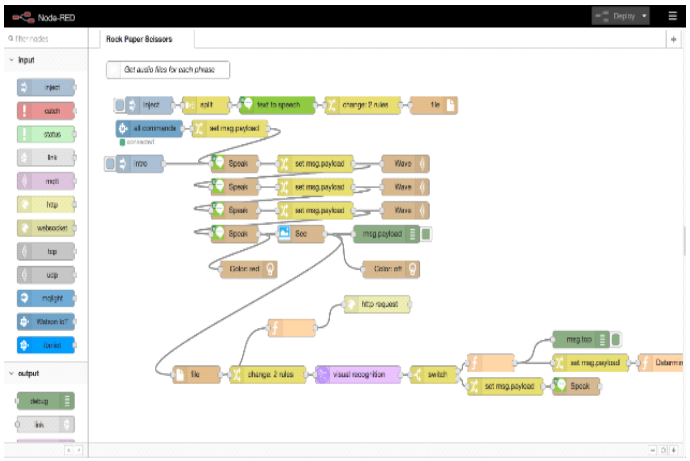
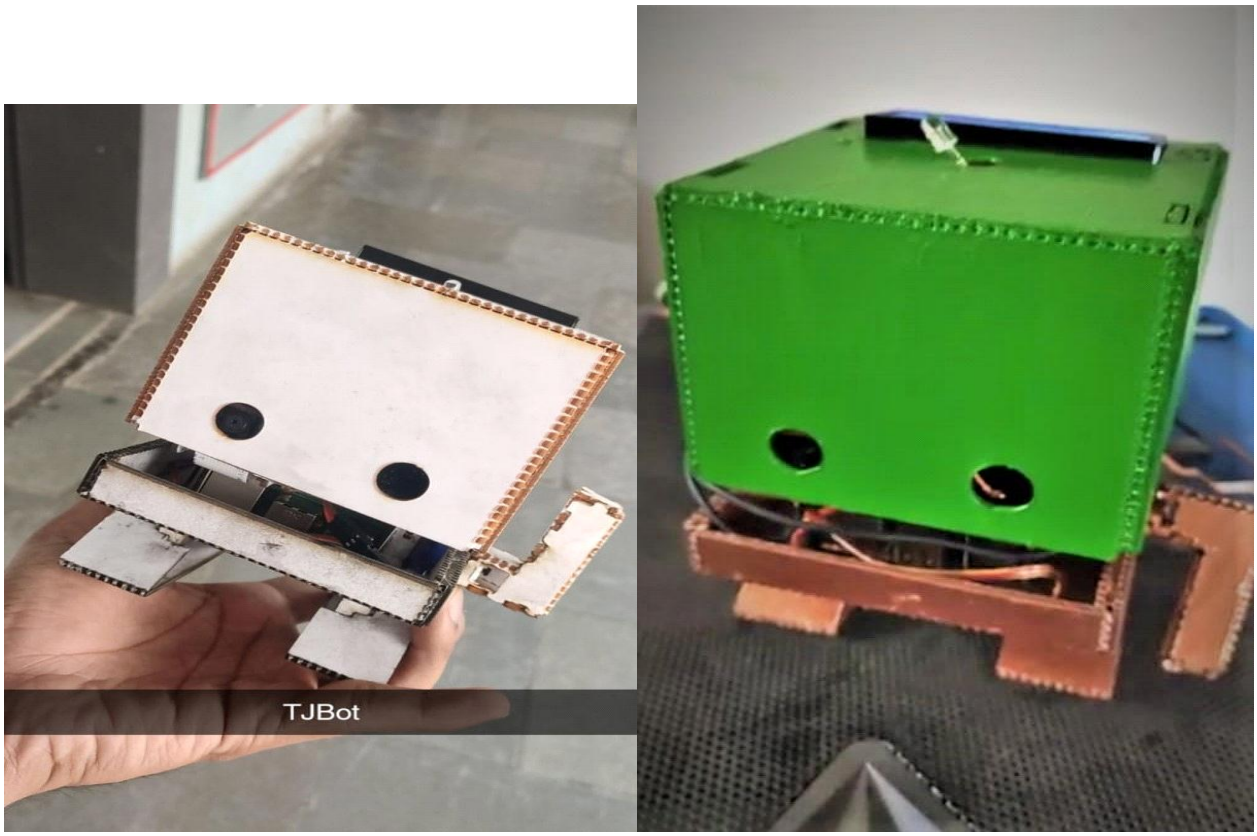


Fig – 5: Node-RED RPC

Fig – 6: Node-RED Text to Speech

- **RESULTS**



- **CONCLUSION**

This artificial intelligence work is interesting and enjoyable in itself, giving multiple ways to create a better framework for human robot interactions.All the details of this project has been explained briefly and clarified thoroughly. After the user interface is visually illustrated, the goal of the final product is clearer and more apparent. This paper will provide a detailed explanation of how things work inside out and will give the reader a comprehensive ability to understand the project proposed. The Bot is expected to perform:

- Wave at the user mechanically.
- Choose between ROCK, PAPER and SCISSOR.
- Blink Led lights.
- Speech to text and vice versa.
- Output its result via speech.

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