TJBot Sees Objects and Speaks

TJBot Nodes in Node-RED

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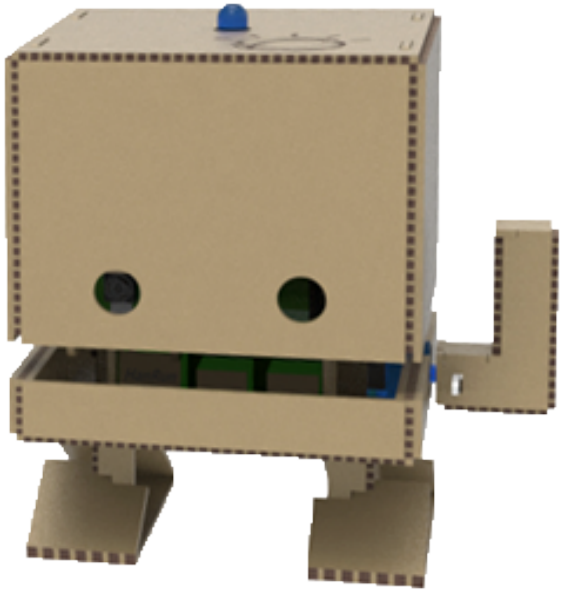
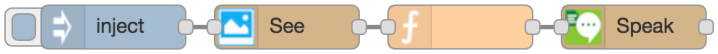
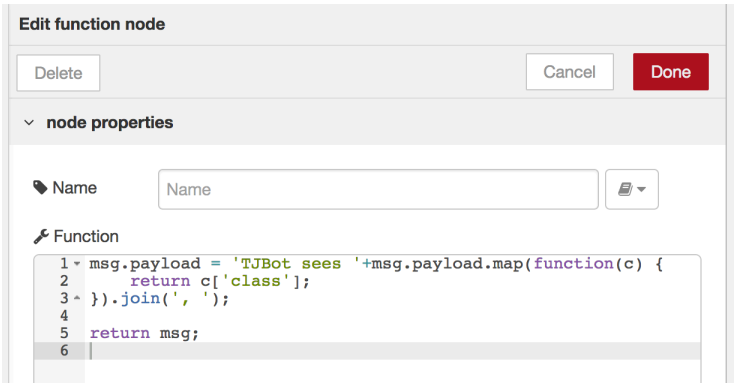




Train TJBot to take a picture using the Raspberry Pi camera, classify the image using the Watson Visual Recognition service, and then speak a list of the objects seen using the Watson Text to Speech service.

Use the function node to construct a list for TJBot to speak.



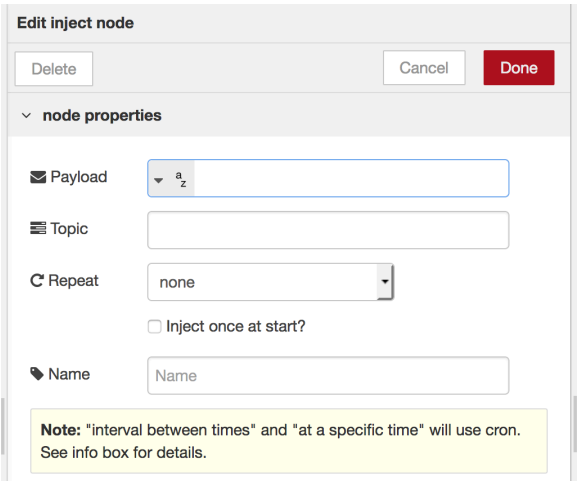
A digital copy of this lab and completed flow can be found at:
`http://ibm.biz/node-red-tjbot-say-what-i-see`

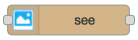
Train TJBot to See Objects and Speak

In this lab, we'll use the see and speak nodes to train TJBot to recognize objects and speak what is seen. You will need a Raspberry Pi camera and speaker connected to the TJBot for this lab.

1. In the Node-RED editor running on the Raspberry Pi, drag an 

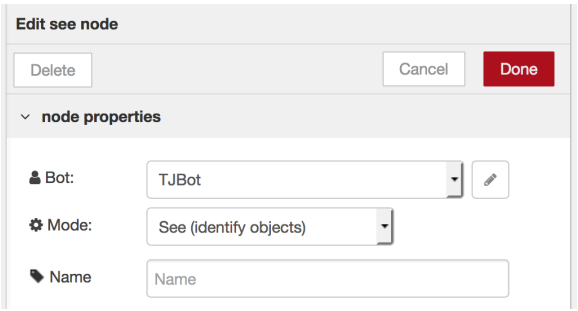
node onto the canvas. Double click on the node and configure as shown below.



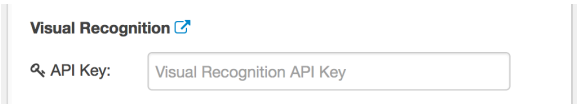
2. Add a 

node as shown below. The listen node has several modes: recognize text, recognize objects, and take a photo. Select **See (identify objects)** from the **Mode** dropdown menu.

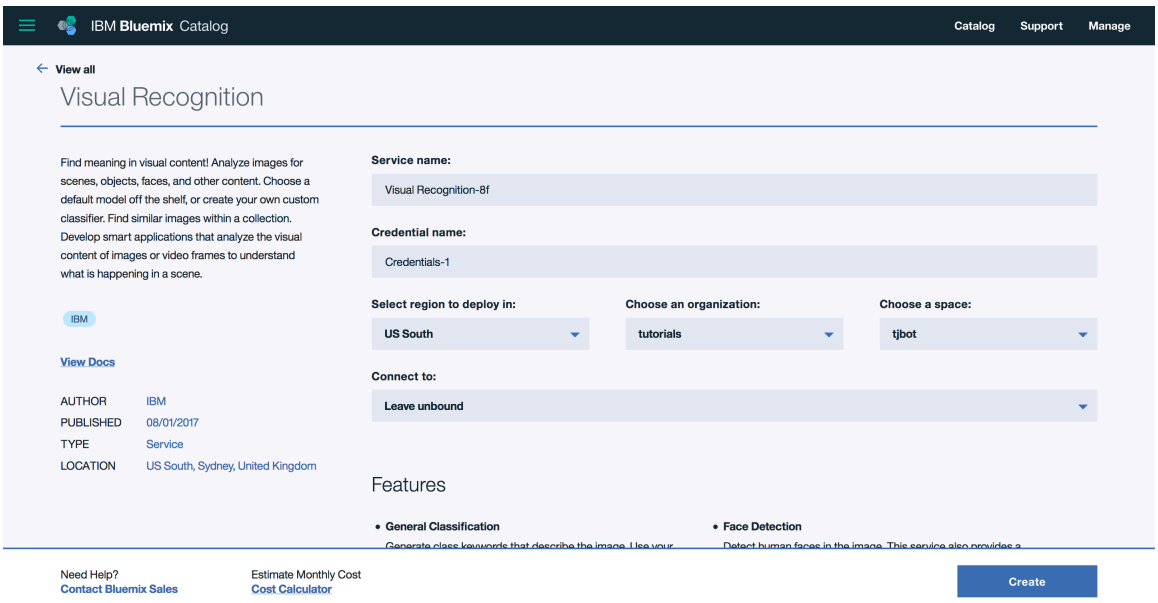
   The see node uses the Watson Visual Recognition service, which requires service credentials from IBM Bluemix. Click on the pencil icon to the right of the **Bot** dropdown menu.



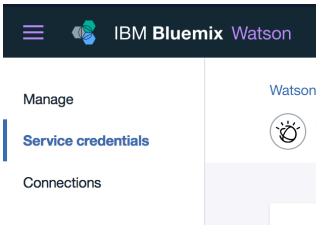
3. Click on the link icon next to the **Visual Recognition** heading to launch into the IBM Bluemix console and create a Watson Visual Recognition service instance.

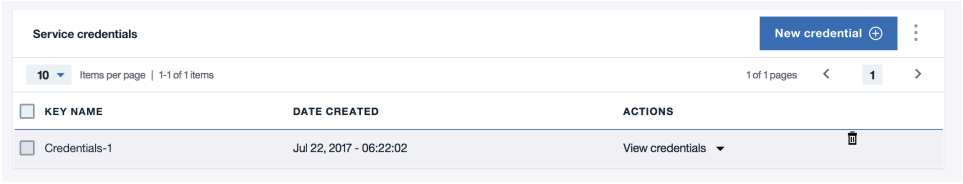


4. If you don't have an IBM account, sign up at bluemix.net. Sign into your account if prompted. Leave the service name as is and click **Create**.



5. Click on **Service Credentials** in the menu on the left. Click on **View Credentials** to display the service credentials.

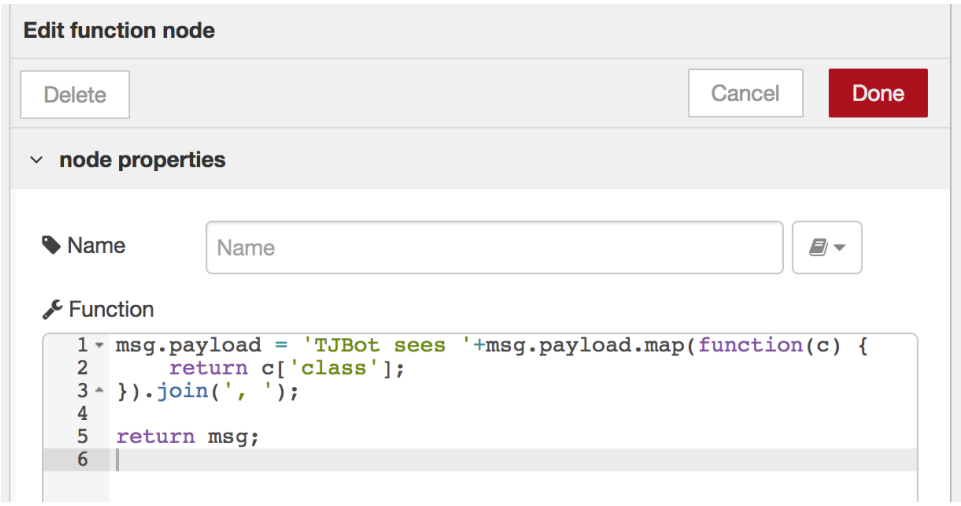


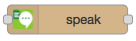


6. Copy the API key into the field back in the Node-RED editor under the **Visual Recognition** section.

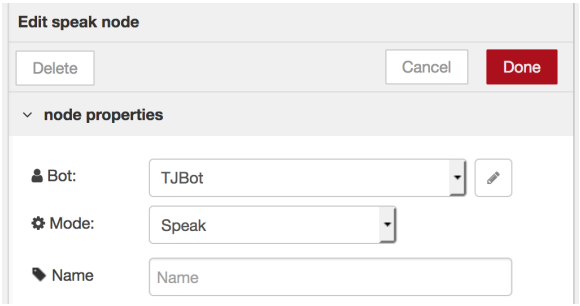
7. The see node produces a message with names of objects and colors in the photo captured, with the response being passed in the **msg.payload** property. Add a 

node to loop through the results and concatenate them into a new message.

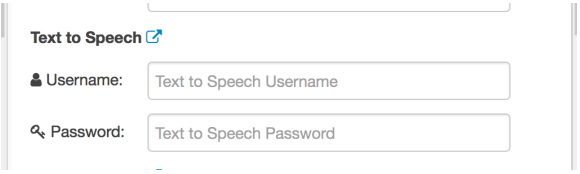


8. Add a 

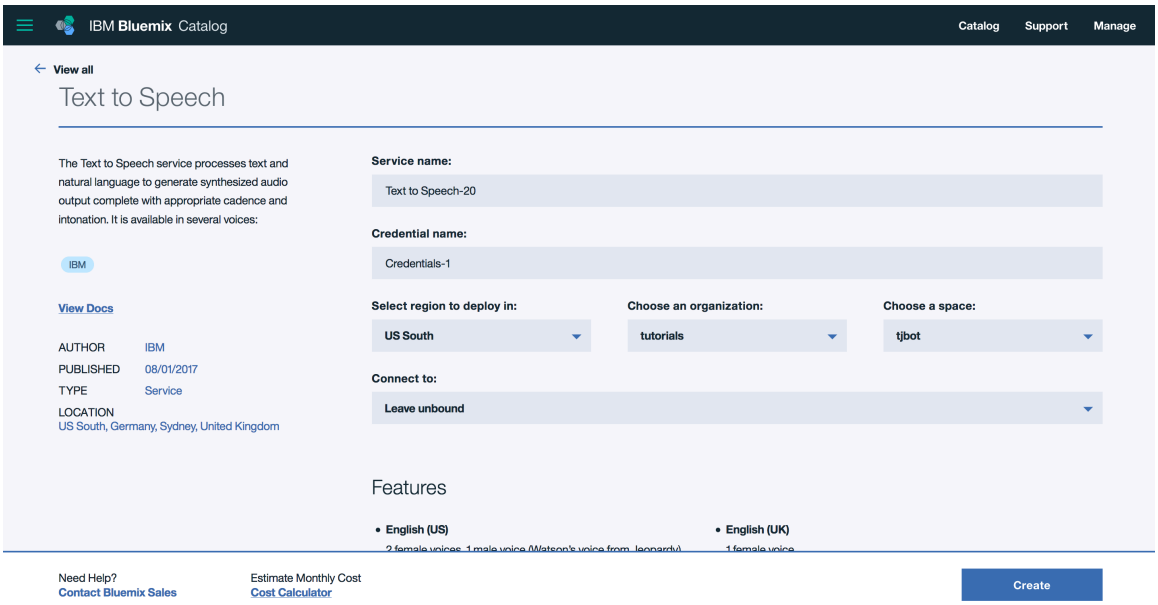
node as shown below. The speak node uses the Watson Text to Speech service, which requires service credentials from IBM Bluemix. Click on the pencil icon to the right of the **Bot** dropdown menu.



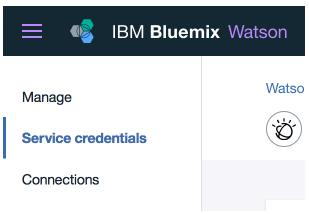
9. Click on the link icon next to the **Text to Speech** heading to launch into the IBM Bluemix console and create a Watson Text to Speech service instance.

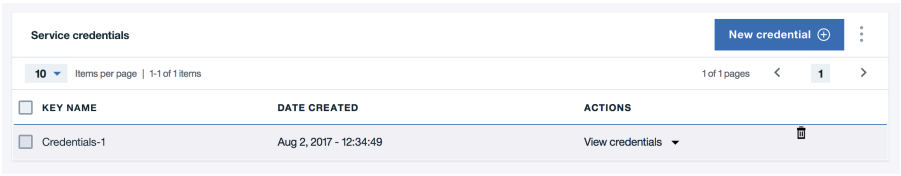


10. Leave the service name as is and click **Create**.



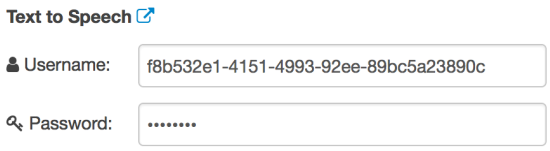
11. Click on **Service Credentials** in the menu on the left. Click on **View Credentials** to display the service credentials.



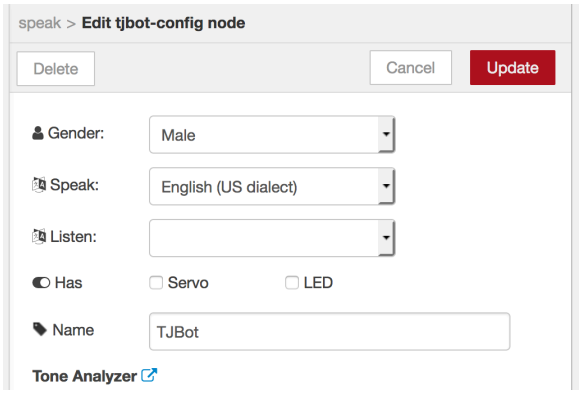


12. Copy the username and password into the fields back in the Node-RED editor under the **Text to Speech** section.

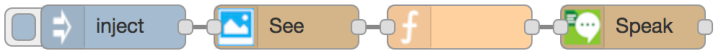
```
{
  "url": "https://stream.watsonplatform.net/text-to-speech/api",
  "username": "f8b532e1-4151-4993-92ee-89bc5a23890c",
  "password": "f4GlM3B5onrP"
}
```



13. At the top of the configuration window, select **English (US dialect)** from the **Speak** dropdown menu.



14. Connect the nodes together as shown below.



15. Click on the 

button in the top-right corner of the Node-RED editor to save and deploy the changes.

16. Click on the tab to the left of the inject node to take a picture with TJBot's camera. When the photo is analyzed with the Watson Visual Recognition service, a message is constructed with the objects and colors recognized, and is spoken out via the speaker.

    An example is:

    TJBot sees earphone, person, face, people, maroon color