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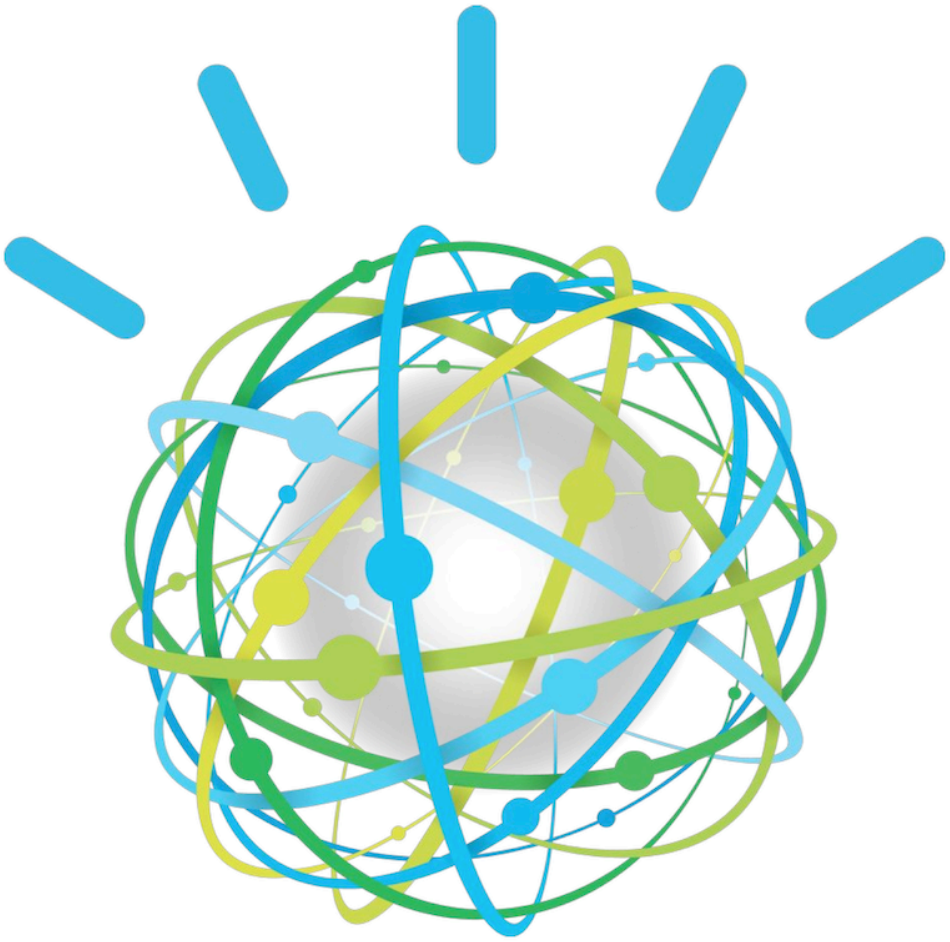

Build a Face Recognition App

Using AlchemyAPI and Node-RED

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Overview

What is Bluemix you ask? **Bluemix** is an implementation of IBM's Open Cloud Architecture, leveraging Cloud Foundry to enable developers to rapidly build, deploy, and manage their cloud applications, while tapping a growing ecosystem of available services and runtime frameworks. You can view a short introductory video here: **http://www.ibm.com/developerworks/cloud/library/cl-bluemix-dbarnes-ny/index.html**

The purpose of this guide is not to introduce you to Bluemix, that foundational knowledge is a prerequisite study on your part and you can obtain it from the links mentioned above.

This guide is more of an instructional approach to working with applications and services to publish a basic and hypothetical solution using AlchemyAPI Image Analysis service, where you can then expand on what you have learned and build complex solutions for your specific use cases.

AlchemyAPI is a service that analyses unstructured data (e.g. text in blogs, images, etc.) to discover meaning in this data. The natural language processing (i.e. semantic text analysis including sentiment analysis) and computer vision (i.e. face detection and recognition) analyze text and images identifying named entities (e.g. people, places, companies, etc.), facts and relationships, keywords, sentiments, taxonomies and more.

This lab will show you how to build a Bluemix application that uses the Alchemy Vision service analyzing the contents of an image and extract features from it. The Face Detection service is able to identify multiple faces within the image, and determine their gender and age with a confidence score, and identify celebrities. The application will be built using an Open Source tool called Node-RED.

The Alchemy Vision API can enhance the way businesses make decisions by integrating image cognition into their applications.

You can find more labs to perform by referring to Github: https://github.com/watson-developer-cloud/node-red-labs

About Node-RED

Node-RED is a visual tool for wiring the Internet of Things. It is easy to connect devices, data and APIs (services). It can also be used for other types of applications to quickly assemble flows of services. Node-RED is available as open source and has been implemented by the IBM Emerging Technology organization. Node-RED provides a browser-based flow editor that makes it easy to wire together flows using the wide range of nodes in the palette. Flows can be then deployed to the runtime in a single-click. While Node-Red is based on Node.js, JavaScript functions can be created within the editor using a rich text editor. A built-in library allows you to save useful functions, templates or flows for re-use.

Node-RED is included in the Node-RED starter application in Bluemix but you can also deploy it as a stand-alone Node.js application. Node-RED is not just used for IoT applications, but it is a generic event-processing engine. For example you can use it to listen to events from http, web sockets, TCP, Twitter and more and store this data in databases without having to program much if at all. You can also use it for example to implement simple REST APIs.

The following table explains some of the more common nodes that you will use in this lab.

Node name	Description

	The **http in** node provides an input node for http requests, allowing the creation of simple web services.
	The resulting message has the following properties:
	`msg.req : http request`
	`msg.res : http response`
	For POST/PUT requests, the body is available under
	`msg.req.body`
	This uses the Express bodyParser middleware to parse the content to a JSON object. By default, this expects the body of the request to be URL encoded:
	`foo=bar&this=that`
	To send JSON encoded data to the node, the content-type header of the request must be set to application/json.
	Note: This node does not send any response to the http request use a subsequent HTTP Response node.

	The **http response** node can send responses back to http requests received from an HTTP Input node. The response can be customized using the following message properties:
	`payload`
	is sent as the body of the response
	`StatusCode`
	if set, is used as the response status code (default: 200)
	`headers`
	if set, should be an object containing field/value pairs to be added as response headers.

	With the **change** node you can set, change or delete properties of a message. The node can specify multiple rules that will be applied to the message in turn. The available operations are:
	`Set`
	Sets a property. The to property can either be a string value, or reference another message property by name, for example: msg.topic.
	`Change`
	search & replace parts of the property. If regular expressions are enabled, the replace with property can include capture groups, for example $1
	`Delete`
	deletes a property.

	The **switch** node is a simple function node that routes messages based on its properties. When a message arrives, the selected property is evaluated against each of the defined rules. The message is then sent to the output of all rules that pass. Note: the otherwise rule applies as a "not any of" the rules preceding it.
	The Image Analysis node provides a very easy wrapper node that takes an image URL or binary stream as input, and produces an array of detected faces, age, bounding box, gender and name.

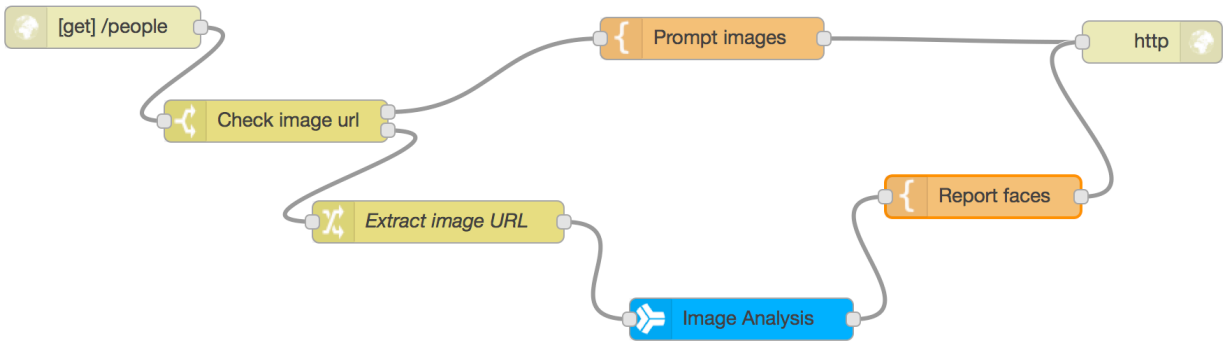
	The template node creates a new message based on the provided template. This uses the mustache format. For example, when a template of:
	`Hello {{name}}. Today is {{date}}`
	receives a message containing:
	`{ name: "Fred", date: "Monday" payload: ... }`
	The resulting payload will be:
	`Hello Fred. Today is Monday`

About your application

In this exercise, we will show how to simply generate the face recognition data from an image URL. The structure of the flow is very similar to the Watson Visual Recognition flow. The flow will present a simple Web page with a text field where to input the image's URL, then submit it to Alchemy Image Analysis, and output the faces that have been found on the reply Web page.

Click this link to view an already built app: http://multiface.mybluemix.net/people

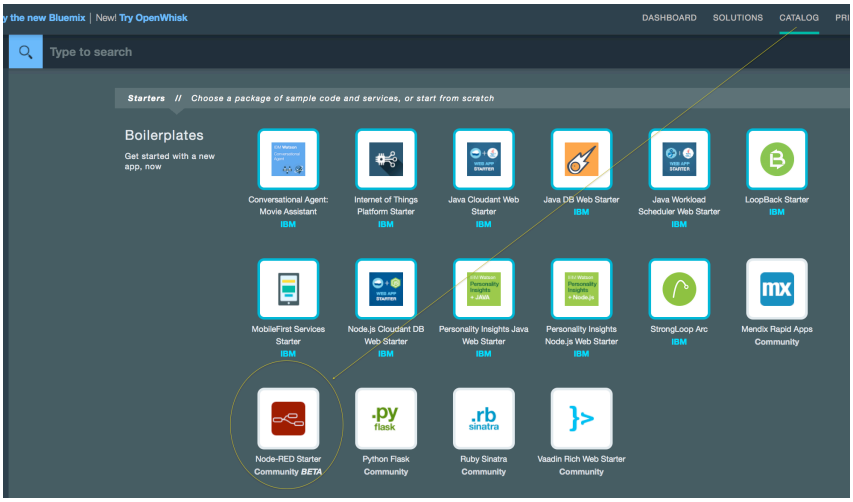
You will be building the multiface app from scratch using Node-RED as depicted in the image below:



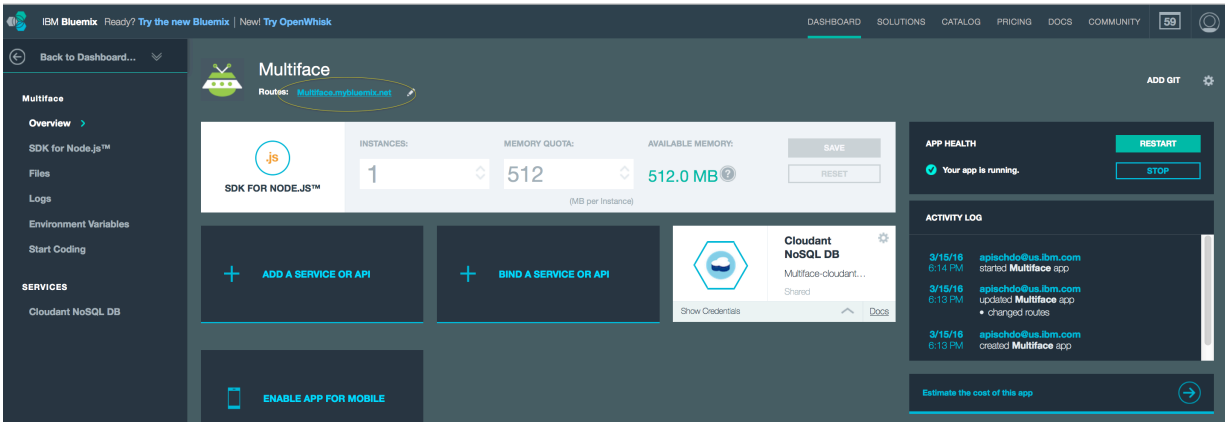
Build a Node-RED Starter Boilerplate

Let's begin with the first step, by creating a boilerplate app in Bluemix. This lab assumes that you have a Bluemix account and that you can sign in. You can register for Bluemix by clicking the **SIGN UP** button in the upper right corner of the page at console.ng.bluemix.net. After registering, you will receive an email message that requires you to confirm your registration. If you have a promo code, apply it at this time.

1. Sign into Bluemix: console.ng.bluemix.net
2. You can work in the new Bluemix UI, or revert to the Classic UI by changing the URL to *exactly* this: `http://console.ng.bluemix.net` (this way, the screen captures in this doc will match what you see).
3. From the Bluemix console, access the **Catalog** tab and from the **Boilerplates** section, click **Node-RED Starter**.



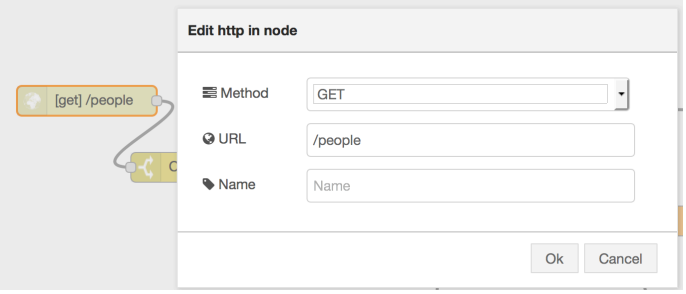
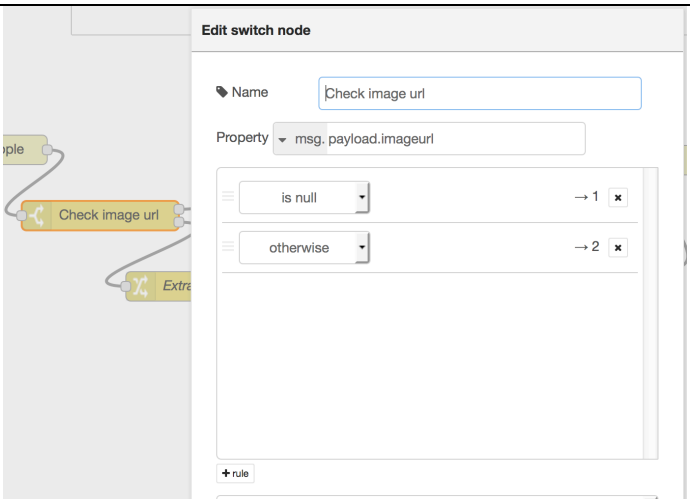
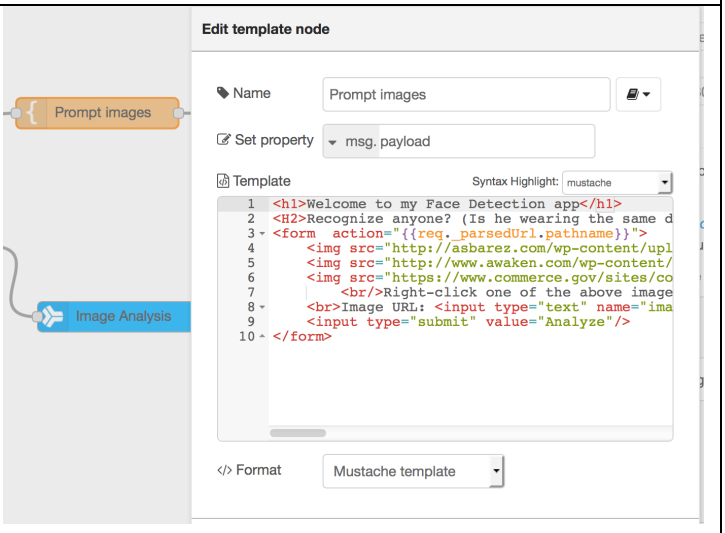
4. Specify a unique name for your app (in this example, **multiface**) and click **Create**. Allow enough time for the app to stage and start. This may take upwards of 5 minutes. If it seems to be running for more than 5 minutes, click another link, come back to the Dashboard and click **RESTART**.
5. Once the app is running, click the **Routes** link.



6. In the ensuing page, click **Go to your Node-RED** editor. This opens the canvas where you begin to drag and drop the nodes and enter code as instructed.

Populate the Node-RED canvas

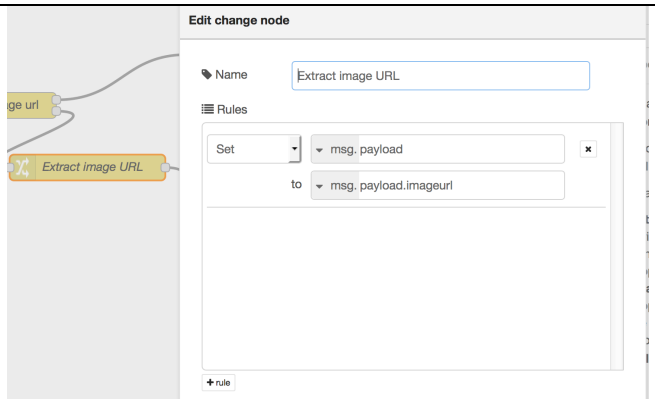
The remaining steps that pertain to building your node-RED canvas are outlined in the table below.

Steps	Example screen capture
7. Drag and drop an **http in** node. Keep an eye on the completed flow in the previous page as you add nodes. It can help you identify the nodes easily and roughly where to place them on the canvas. 8. For the Method, select **GET** and for the URL, specify any context name, in this example **/people** (ensure to place the / before the context name) 9. Click **OK.**	
10. Drag and drop a **switch** node, which will test for the presence of the **`imageurl`** query parameter. Use the search box to find these nodes easily. 11. For name, specify any value, in this example, **Check image url**. 12. In the property box, append **imageurl** after payload 13. Set two conditions from the drop down list, first **is null** and second is **otherwise**. 14. Click **OK**.	
15. Drag and drop the **template** node, configured to output an HTML input field and suggest a few selected images taken from official sources. 16. Specify a name, for example: **Prompt images** 17. Set the property to **msg.payload** (if does not appear as such by default. Use the drop down list instead of typing. 18. Type **payload** after the msg (no spaces, again if it does not appear as such by default). The Function node allows JavaScript code to run against the messages that are passed in and then return zero or more messages to continue the flow. The message is passed in as an object called `msg`. By convention it will have a `msg.payload` property containing the body of the message.	

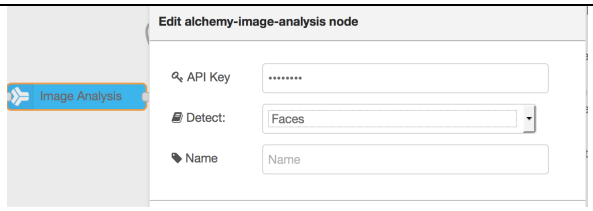
19. Copy/paste this code in the body of the template overriding the existing template line of code:

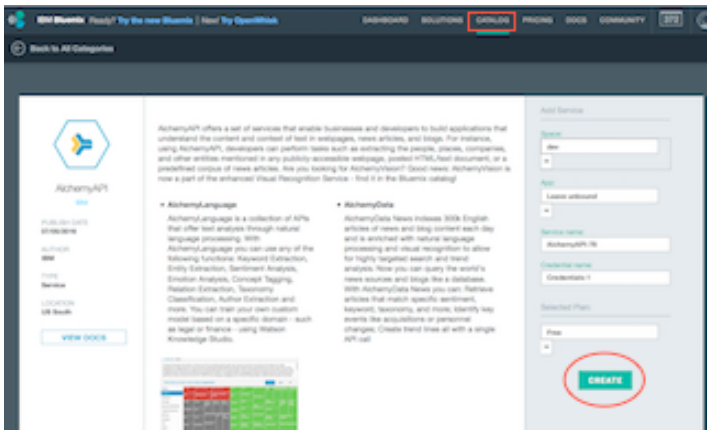
```
<h1>Welcome to my Face Detection app</h1>

<H2>Recognize anyone?</H2>

<form  action="{{req._parsedUrl.pathname}}">

    <img src="http://asbarez.com/wp-content/uploads/2016/02/ibmwatson.jpg" height='200'/>

    <img src="http://www.awaken.com/wp-content/uploads/2015/05/forbes.jpg" height='200'/>

    <img
src="https://www.commerce.gov/sites/commerce.gov/files/styles/scale_250w/public/media/images/profile/elizabethholmes.jpg?itok=DHmvdC-1" height='200'/>

        <br/>Right-click one of the above images and select Copy image location and paste the URL in the box below.<br>Do an image search for faces, try multiple faces. After you click on an image, to the right it usually says "View image" click that to get the URL.<br/>

    <br>Image URL: <input type="text" name="imageurl"/>

    <input type="submit" value="Analyze"/>

</form>
```

20. Drag and Drop a **change** node to extract the **`imageurl`** query parameter from the web request and assign it to the payload to be provided as input to the Alchemy Image Analysis node.
21. Specify a name.
22. Select **Set** for rule; the first rule is **msg.payload**, and the second rule is **msg.payload.imageurl** (use the drop down list to select the **msg** part and type the rest).

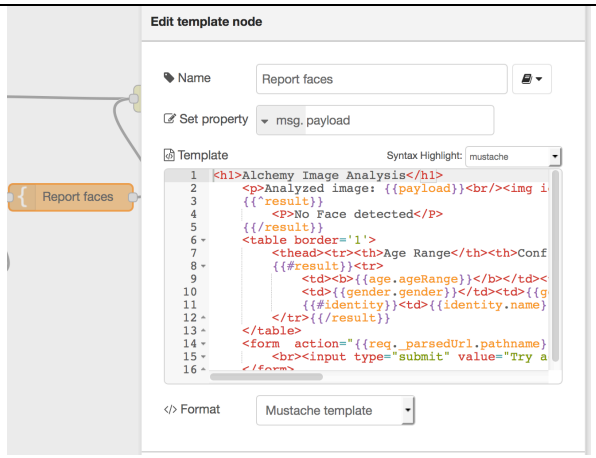


23. Drag and drop an **Image Analysis** node.
24. To obtain an API key, go to Bluemix and click the CATALOG tab on the top left of the Bluemix web site.
25. Scroll down and under Watson services, click the **AlchemyAPI** service.
26. Accept all defaults and click **CREATE**.
27. Click **Service Credentials** in the left panel.
28. Copy the **apikey** (and save a copy in a text editor).
29. Back to the Node-RED canvas, paste the AlchemyAPI key in the API Key field.
30. For the Detect annotators, select **Faces**.
31. Click **OK**.





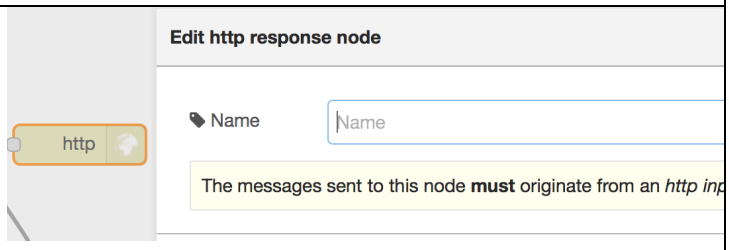
32. Drag and drop a **template** node with the following content, which will format the output returned from the Image Analysis node into an HTML table for easier reading. Override the existing line of code.



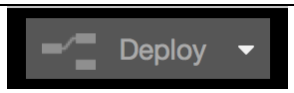
33. Copy/paste this code inside the template frame.

```
<h1>Alchemy Image Analysis</h1>
<p>Analyzed image: {{payload}}<br/><img id="alchemy_image" src="{{payload}}" height="200"/></p>
{{^result}}
    <P>No Face detected</P>
{{/result}}
<table border='1'>
    <thead><tr><th>Age Range</th><th>Confidence</th><th>Gender</th><th>Confidence</th><th>Name</th></tr></thead>
    {{#result}}<tr>
        <td><b>{{age.ageRange}}</b></td><td><i>{{age.score}}</i></td>
        <td>{{gender.gender}}</td><td>{{gender.score}}</td>
        {{#identity}}<td>{{identity.name}} ({{identity.score}})</td>{{/identity}}
    </tr>{{/result}}
</table>
<form  action="{{req._parsedUrl.pathname}}">
    <br><input type="submit" value="Try again or go back to the home page"/>
</form>
```

34. End the flow with the **http response** node and connect the nodes as you see depicted on page 4.



35. Click **Deploy**.



36. To run the web page, point your browser to `http://multiface.mybluemix.net/people`
37. See Step 4 for your host name and the Get node, Step 8 for the context name (/people in this example)
38. From Google Images, select a person or group of people. Note: Click **View image** to obtain the exact link to that image.

Congratulation, you have just built a face recognition app and now, take your time and edit the front page of your app to depict your words and your images, or just a single image. Hint, that is the template node, Step 19.