

Getting Started with IBM Watson

Project: Sentiment analysis of text data using IBM Watson's Natural language understanding and Tone analyzer

- **Step 1:** Create an IBM Watson account for free (trial)
- **Step 2:** Create a Natural Language understanding service by verifying the autofill details and choosing the pricing plan as per your requirement (I chose free one)

The screenshot shows the IBM Cloud console for creating a new Natural Language Understanding service. The page has a dark header with the IBM Cloud logo and navigation links (Catalog, Docs, Support, Manage). Below the header, there's a 'View all' link and the service title 'Natural Language Understanding'. A descriptive paragraph explains the service's capabilities. To the right, there are input fields for 'Service name' (pre-filled with 'Natural Language Understanding-k3'), 'Choose a region/location to deploy in:' (dropdown with 'US South' selected), 'Choose an organization:' (pre-filled with 'priyankajoshiaj@gmail.com'), and 'Choose a space:' (pre-filled with 'dev'). Below these are 'Features' listed in two columns: Concepts, Keywords, Sentiment, Entities, Categories, and Emotion. At the bottom left, there are links for 'View Docs', 'Terms', 'AUTHOR', 'PUBLISHED', and 'Estimate Monthly Cost'. A red box highlights the 'Create' button at the bottom right.

Analyze text to extract meta-data from content such as concepts, entities, keywords, categories, sentiment, emotion, relations, semantic roles, using natural language understanding. With custom annotation models developed using Watson Knowledge Studio, identify industry/domain specific entities and relations in unstructured text.

Service name: Natural Language Understanding-k3

Choose a region/location to deploy in: US South

Choose an organization: priyankajoshiaj@gmail.com

Choose a space: dev

Features

- Concepts
- Keywords
- Sentiment
- Entities
- Categories
- Emotion

Need Help? [Contact IBM Cloud Sales](#)

Estimate Monthly Cost [Cost Calculator](#)

[Create](#)

- Note down your Username and password to access the service later

The screenshot shows the IBM Cloud console for a newly created Natural Language Understanding service. The left sidebar has 'Manage' selected, with sub-links for 'Service credentials', 'Plan', and 'Connections'. The main area shows the service name 'Natural Language Understanding : Natural Langua...', location 'US South', organization 'priyankajoshiaj@gmail.com', and space 'dev'. A progress bar indicates '29.17% Used' and '21250 Nlu item available'. Below this, there's a 'Get started with the service.' section with links to 'Getting started tutorial' and 'API reference'. A 'Credentials' section is expanded, showing a JSON object with 'url', 'username', and 'password' fields. A red box highlights the 'Credentials' section.

Manage

- Service credentials
- Plan
- Connections

Watson /

Natural Language Understanding : Natural Langua...

Location: US South Org: priyankajoshiaj@gmail.com Space: dev

29.17% Used | 21250 Nlu item available

Plan: free [Upgrade](#)

Get started with the service.

[Getting started tutorial](#) [API reference](#)

Credentials [Show](#) [Configure credentials](#)

```
{
  "url": "https://gateway.watsonplatform.net/natural-language-understanding/api",
  "username": ".....",
  "password": "....."
}
```

- **Step 3:** Create Tone analyzer service just like NLU and note the credentials of that as well
- **Step 4:** From IBM Cloud Menu select Functions to create Actions, Actions contain the function code and are invoked by events or REST API calls.
- **Step 5:** Create an action as Sentiment and Emotion Analyzer and save it to a package (folder) using the below instructions

The screenshot shows the IBM Cloud Functions console. The left sidebar has a 'Functions' section with a 'Create' button highlighted in a red box. The main area shows a list of actions under the 'hello-world' package. The 'SentimentAnalysis' action is highlighted in a red box. Below it, a table lists actions: 'new' and 'SentimentAndEmotionAnalyzer', both using Python 3.6.4 runtime, enabled, with 256 MB memory and 60 s timeout.

NAME	RUNTIME	WEB ACTION	MEMORY	TIMEOUT
new	Python 3.6.4	Enabled ✓	256 MB	60 s
SentimentAndEmotionAnalyzer	Python 3.6.4	Enabled ✓	256 MB	60 s

- Choose the create Action option if you want to write the function from scratch or choose from an available template

The screenshot shows the IBM Cloud Functions console with the 'Create Action' option highlighted in a red box. The console displays three main options: 'Quickstart Templates', 'Create Action', and 'Create Sequence'. The 'Create Action' option is described as 'Actions contain your function code and are invoked by events or REST API calls.' The 'Create Trigger' option is described as 'Triggers receive events from outside IBM Cloud Functions and invoke all connected Actions.' The 'Create Sequence' option is described as 'Sequences invoke Actions in a linear order, passing parameters from one to the next.'

- Choose the language you want, give your function a name and select an existing package or create one

IBM Cloud

Functions

REGION: US South | CLOUD FOUNDRY ORG: priyankajoshiaj@gmail.com | CLOUD FOUNDRY SPACE: dev

Create Action

Actions contain your function code and are invoked by events or REST API calls.

[Learn more about Actions](#)

[Learn more about Packages](#)

Action Name
SentimentAndEmotionAnalyzer1

Enclosing Package
SentimentAnalysis [Create Package](#)

Runtime
Python 3

Looking for Java or Docker? [Java](#) and [Docker](#) Actions can be created with the [CLI](#)

[Cancel](#) [Previous](#) [Create](#)

- Step 6:** Write the code to access the NLU and Tone analyzer service and test that by giving text input in JSON format

IBM Cloud

Functions / Actions / SentimentAndEmotionAnalyzer

Region: US South | Org: priyankajoshiaj@gmail.com | Space: dev

SentimentAnalysis/SentimentAndEmo... [Web Action](#)

Code Python 3.6.4

[Change Input](#) [Invoke](#)

```

1 #
2 #
3 # main() will be run when you invoke this action
4 #
5 # @param Cloud Functions actions accept a single parameter, which must be a JSON object.
6 #
7 # @return The output of this action, which must be a JSON object.
8 #
9 #
10 import sys
11
12 def main(dict):
13
14     # coding: utf-8
15
16
17     import json
18     import os
19     from watson_developer_cloud import NaturalLanguageUnderstandingV1
20     from watson_developer_cloud.natural_language_understanding_v1 import Features, EntitiesOptions, KeywordsOptions
21     from watson_developer_cloud import ToneAnalyzerV3
22
23
24     # Using NLU to check sentiment score
25
26
27     natural_language_understanding = NaturalLanguageUnderstandingV1(
28
29

```

- **Step 7:** Change the input using Change Input (after opening the Action in Manage Action Mode)

The screenshot shows the IBM Cloud Functions console for the 'SentimentAndEmotionAnalyzer' function. A modal dialog titled 'Change Action Input' is open, allowing the user to edit the function's input. The dialog contains a text area with the following content:

```
1 |
2 | "text": "I do not understand what you are telling me. Earlier you said that I
3 | }
```

The dialog also includes a 'Cancel' button and an 'Apply' button. In the background, the function's code is visible, showing imports for 'NaturalLanguageUnderstandingV1' and 'ToneAnalyzerV3'.

- **Step 8:** Invoke the function to test

The screenshot shows the IBM Cloud Functions console for the 'SentimentAndEmotionAnalyzer' function. The 'Activations' panel is open, displaying the results of a function invocation. The activation details are as follows:

- Activation ID:** f7a205fada3440aa205fada3f40adf
- Results:**

```
{
  "message": "Sentiment score for the text is -0.7
264025000000001. The Sentiment seems to be Negative.
Also, Anger scoring 0.632235 Sadness scoring 0.
553318 and Tentative writing tone of score 0.75598
8 has been found after further analysis."
}
```
- Logs:**

```
[
  "2018-06-21T20:10:21.227586911Z stdout: I do not
understand what you are telling me. Earlier you sa
id that I could fix the problem by doing one thin
g, now you're saying that I have to do something e
lse? Am I ever going to be able to get my data bac
k? Do you actually know what you're talking abou
t? Let me talk to your supervisor or someone who
UNDERSTANDS HOW FRUSTRATING THIS IS AND HOW IMPOR"
```

- **Input:**
 - `{"text": "I do not understand what you are telling me. Earlier you said that I could fix the problem by doing one thing, now you're saying that I have to do something else? Am I ever going to be able to get my data back? Do you actually know what you're talking about!? Let me talk to your supervisor or someone who UNDERSTANDS HOW FRUSTRATING THIS IS AND HOW IMPORTANT MY INFORMATION THAT I LOST WAS. This needs to be fixed NOW."}`
- **Output:**
 - **Activation ID:**
f7a205fadaf3440aa205fadaf3f40adf
 - **Results:**

```
{
  "message": "Sentiment score for the text is -0.7264025000000001. The Sentiment seems to be Negative. Also, Anger scoring 0.632235 Sadness scoring 0.553318 and Tentative writing tone of score 0.755988 has been found after further analysis."
}
```
 - **Logs:**
[]
- **Step 9:**
 - **USING REST API call:**
 - Select Endpoints and enable as web action and save. Copy the URL for Rest API

The screenshot shows the IBM Cloud Functions console interface. The top navigation bar includes the IBM Cloud logo and links for Catalog, Docs, Support, and Manage. The breadcrumb trail indicates the current location: Functions / Actions / SentimentAndEmotionAnalyzer. The function name is SentimentAnalysis/SentimentAndEmo..., and it is a Web Action. The region is US South, the organization is priyankajoshiaj@gmail.com, and the space is dev.

On the left sidebar, the 'Endpoints' tab is selected. The main content area shows the 'Web Action' configuration. A red box highlights the 'Enable as Web Action' checkbox, which is checked. Another red box highlights the 'Reset' and 'Save' buttons. Below this, there is a table for the 'Web Action' configuration:

HTTP METHOD	AUTH	URL
ANY	Public	https://openwhisk.ng.bluemix.net/api/v1/web/priyankajoshiaj%40gmail.com_dev/SentimentAnalysis/SentimentAndEmotionAnalyzer.json

Below the 'Web Action' table, there is a 'REST API' section. A red box highlights the 'API-KEY' field, which is currently empty. The 'HTTP METHOD' is set to 'POST', and the 'URL' is https://openwhisk.ng.bluemix.net/api/v1/namespaces/priyankajoshiaj%40gmail.com_dev/actions/SentimentAnalysis/SentimentAndEmotionAnalyzer.

- Click on the API-Key link to get the UserName and Password for API authentication

API Key

CURRENT NAMESPACE	HOST	KEY
priyankajoshiaj@gmail.com_dev	openwhisk.ng.bluemix.net

- Copy the key (the username and password are separated by ':' in the key)
 - USING API Gateway**
 - Go to the function menu , select APIs and click on create managed API

IBM Cloud

Catalog Docs Support Manage

Search for resource...

Avaya

Functions

Getting Started

Actions

Triggers

Monitor

Logs

APIs

REGION

CLOUD FOUNDRY ORG

CLOUD FOUNDRY SPACE

US South

kothapallis@avaya.com

dev

Cloud Functions APIs

Create Managed API

Name	Route
SentimentAnalyzer	https://service.us.apiconnect.ibmcloud.com/gws/apigateway/api/63a0650af0d9081b34bfcbe9e7844699491ff1fbec11e5af8385fcb003b5e7a7/14e7eb41-066e-4fe7-a260-8f33ef51faa5

- Select APIs and click IBM cloud Functions

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REGION

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US South

kothapallis@avaya.com

dev

Create API for Cloud Functions

API Info

API definition

API definition

API Basics *

First, specify a descriptive name for this API.

Next, accept the default domain for this API or select a custom domain. As a prerequisite, you will need to register a custom domain with IBM Cloud. This can be done from your organization settings page. For more information, please reference the

API name *

Descriptive name for API

Domain for API

- Enter API Name, select domain and create operation

SentimentAnalyzer Expose Managed API

API Info

API definition
Optionally import an Open API definition file that includes the required API configuration. The imported settings will replace any existing settings. You can export the current API definition to file. It is also possible to open the API definition in API Connect. IBM's premier API management platform. If API Connect is not present within your IBM Cloud space, we will first provision the service with the free Lite plan.

API Basics *
First, specify a descriptive name for this API.

Next, accept the default domain for this API or select a custom domain. As a prerequisite, you will need to register a custom domain with IBM Cloud. This can be done from your organization settings page. For more information, please reference the documentation.

Finally, specify a base path for this API.

API name *
SentimentAnalyzer

Domain for API
Default domain

Base path for API *
/14e7eb41-000e-4fe7-a200-9f33ef51faa5

Operations *
Create API operations that invoke OpenWhisk actions.

Create operation

- Specify the action path, select the http option , select folder and action information and give Response type as application/json

Create operation

Path *
/action/SentimentAnalysis/SentimentAndEmotionAnalyze

Verb
POST

Package containing action
Sentiment Analysis

Action
SentimentAndEmotionAnalyzer

Response content type
application/json

Cancel **Create**

- Click on save & expose to create the api

REGION

US South

CLOUD FOUNDRY ORG

kothapalli@avaya.com

CLOUD FOUNDRY SPACE

dev

Parameter name of API key

X-IBM-Client-Id

Parameter name of API secret

X-IBM-Client-Secret

Rate limiting

When rate limiting is enabled, API calls falling outside of the limit will be rejected and response code 429 will be returned. Given that rate limiting is on a per-key basis, application authentication must be enabled.

The leaky bucket algorithm is used to prevent sudden bursts of invocations of your API. For example, if you set your limit as 10 calls per minute, users will be restricted to 1 call every 6 seconds (60/10 = 6).

OAuth user authentication

You can control access to your API through the OAuth 2.0 standard. First require an end user to log in via IBM Cloud App ID, Facebook, GitHub, or Google. Then include the corresponding OAuth token in the Authorization header of each API request. The authenticity of the token will be validated with the specified token provider. If the token is invalid, the request will be rejected and response code 401 will be returned.

CORS

Enabling cross-origin resource sharing (CORS) will allow embedded scripts in a web page to call the API across domain boundaries.

Limit API call rate on a per-key basis

Maximum calls

1000

Unit of time

Second

Require users to authenticate via OAuth social login

Provider

IBM Cloud App ID

App ID service

Create an App ID service

Create

Edit

Enable CORS so that browser-based applications can call this API

Cancel

Save & expose

- After saving successfully, test it in the API Explorer, copy the API link for testing it further using Postman
- You can also test it in the Explorer itself by clicking on Try it and giving the payload in the Body section and then clicking the call operation button

IBM Cloud

Catalog Docs Support Manage

Search for resource...

Avaya

All Cloud Functions APIs

Summary

Definition

Sharing

API Explorer

SentimentAnalyzer

SentimentAnalyzer 1.0

REST

postActionSentimentAnalysisSentimentandemotionanalyzer

Parameters

Accept

In header

application/json

Content-Type

In header

application/json

Body

body

object optional in body

Request body

schema

Responses

Expose Managed API

Examples

Try it

POST https://service.us.apiconnect.ibmcloud.com/gws/apigateway/api/63e0650ef0d9081b34fb0be9e7542699491ff1fbec11e5ef308fb00305ef7/14e7eb41-066e-4fe7-a260-8f33ef91fa8/action/SentimentAnalysisSentimentandEmotionAnalyzer

Type Headers

Content-Type

application/json

Accept

application/json

Parameters

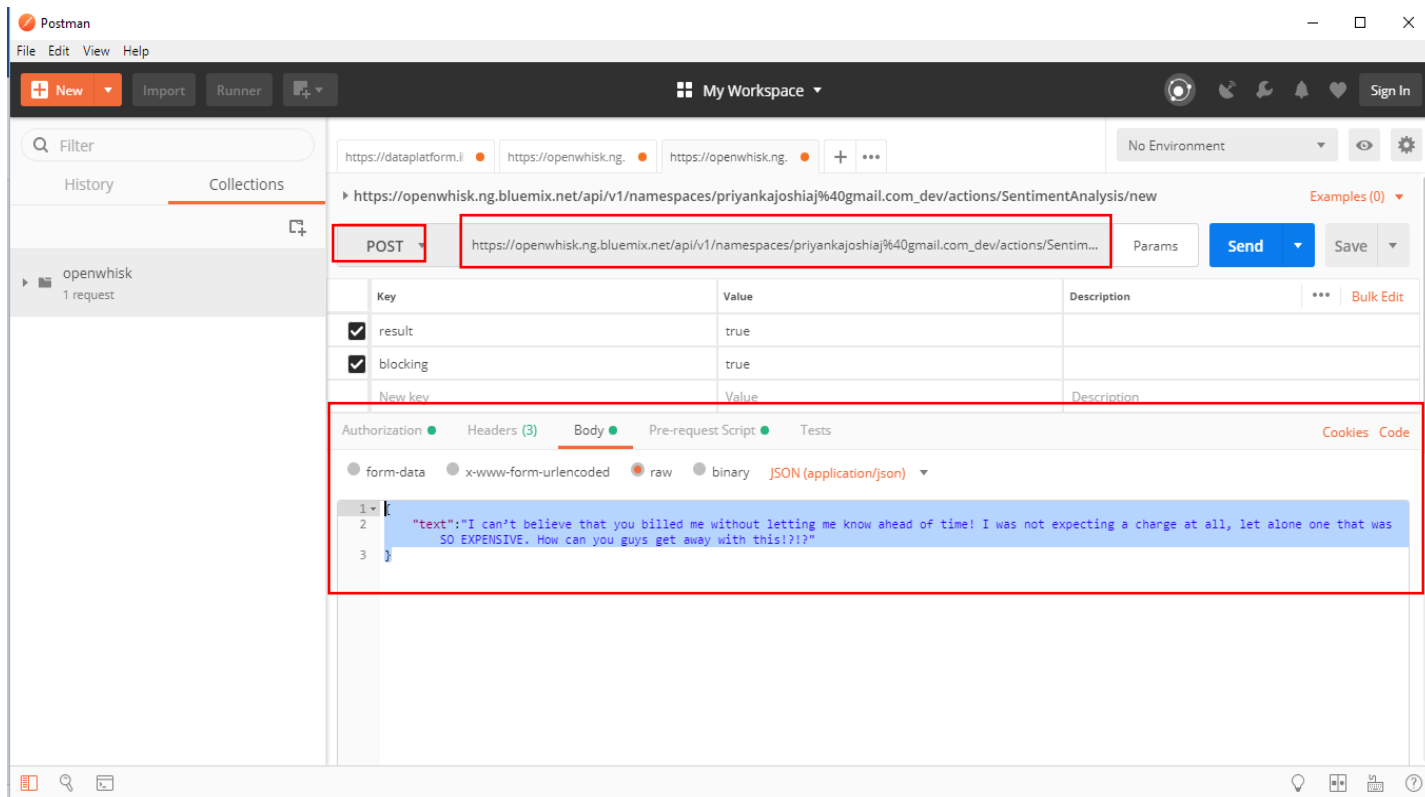
body

Request body

Generate

Call operation

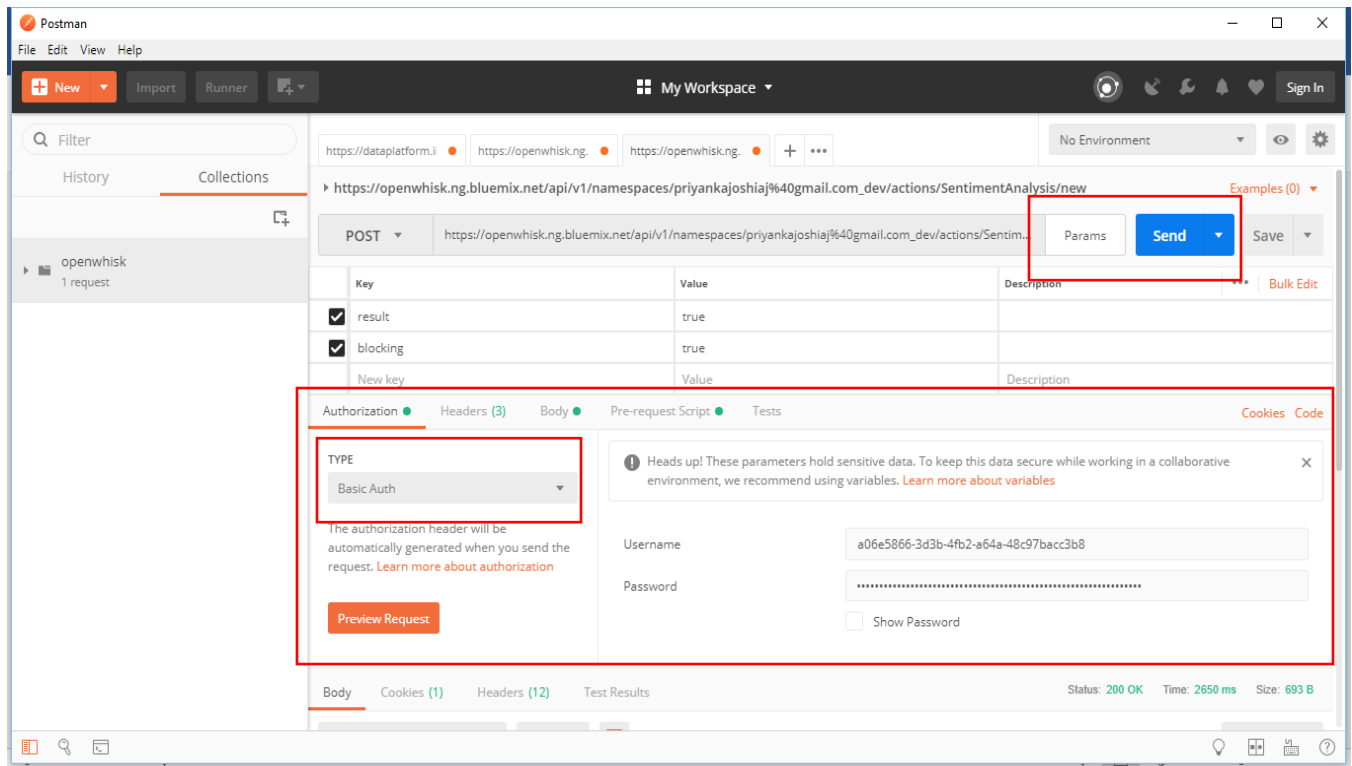
- **Step 10:** Use postman to send the input text dynamically using Rest API call



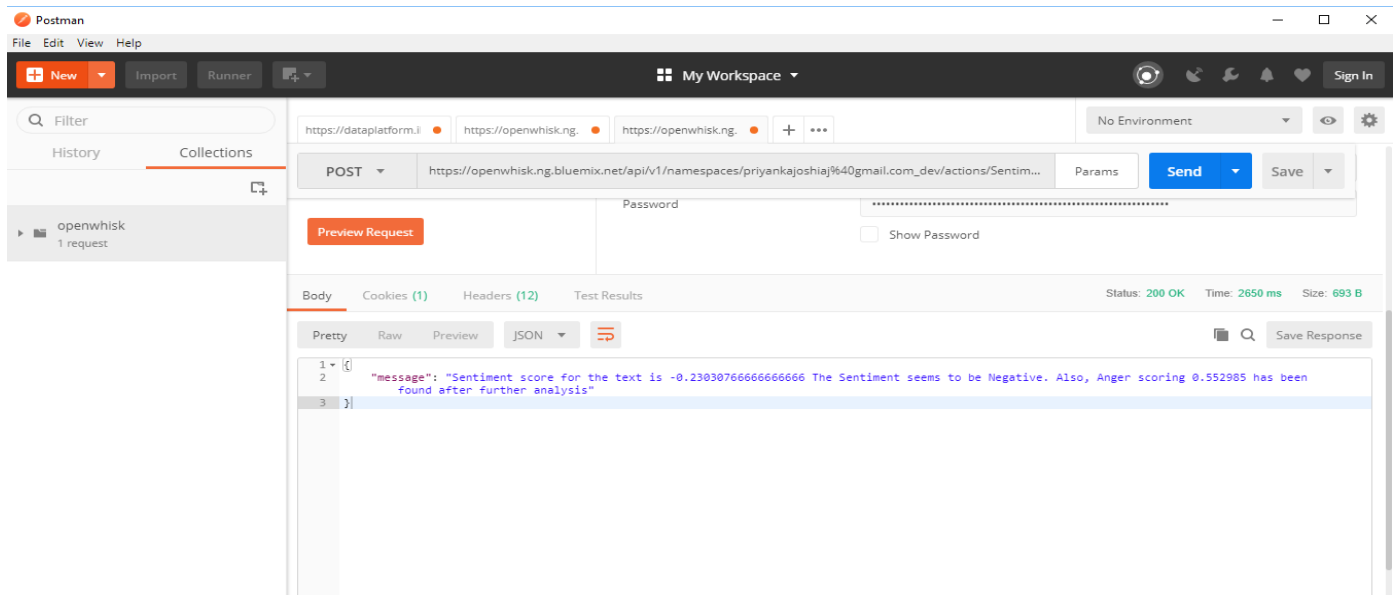
Use the POST option from the dropdown to give input from Postman

- Paste the URL copied earlier and put result as true and blocking as true in key value pair
- Set the input text in JSON format by selecting raw datatype in body and selecting JSON(application/JSON) from the drop down.
 - {"text": "I can't believe that you billed me without letting me know ahead of time! I was not expecting a charge at all, let alone one that was SO EXPENSIVE. How can you guys get away with this!?!?"}
- Paste the input in console

- Set the Authorization as Basic Authentication and give the username and password you got from the Key in Step 9.



- The output would be like this



In case of API gateway no authentication is required

- Paste the URL copied from the API Section above
- Set the input text in JSON format by selecting raw datatype in body and selecting JSON(application/json) from the drop down.
- { "text": "I would be happy to help you, I see what the problem might be and we can easily can it resolved. Can you please try pressing the Reset switch on the bottom right of the device and try restarting it again for me." }
i.e {"text": "<your text here>"}
- Paste the input in console, hit send to view the output as shown below.



• Result:

```
{
  "Sentiment_label": "Negative",
  "Sentiment_score": 0.51,
  "social_tone": {
    "Agreeableness": 0.63,
    "Conscientiousness": 0.83,
    "Emotional Range": 0.74,
    "Openness": 0.45
  },
  "writing_tone": {
    "Analytical": 0.65,
    "Tentative": 0.89
  }
}
```