Lab 7. The News Bot

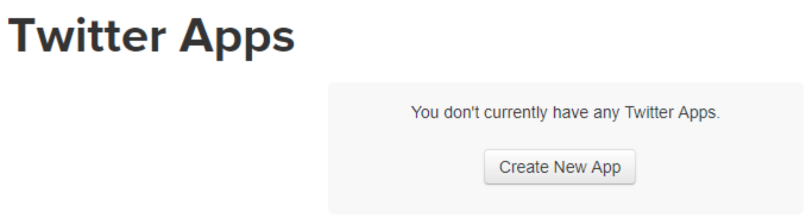
By the end of this lab, you will be able to:

- Understand the basics of the Twitter API
- Create a bot that listens to hashtags
- Build a Twitter bot that tweets and retweets
- Integrate NewsAPI and tweet top stories

Getting started with the Twitter app

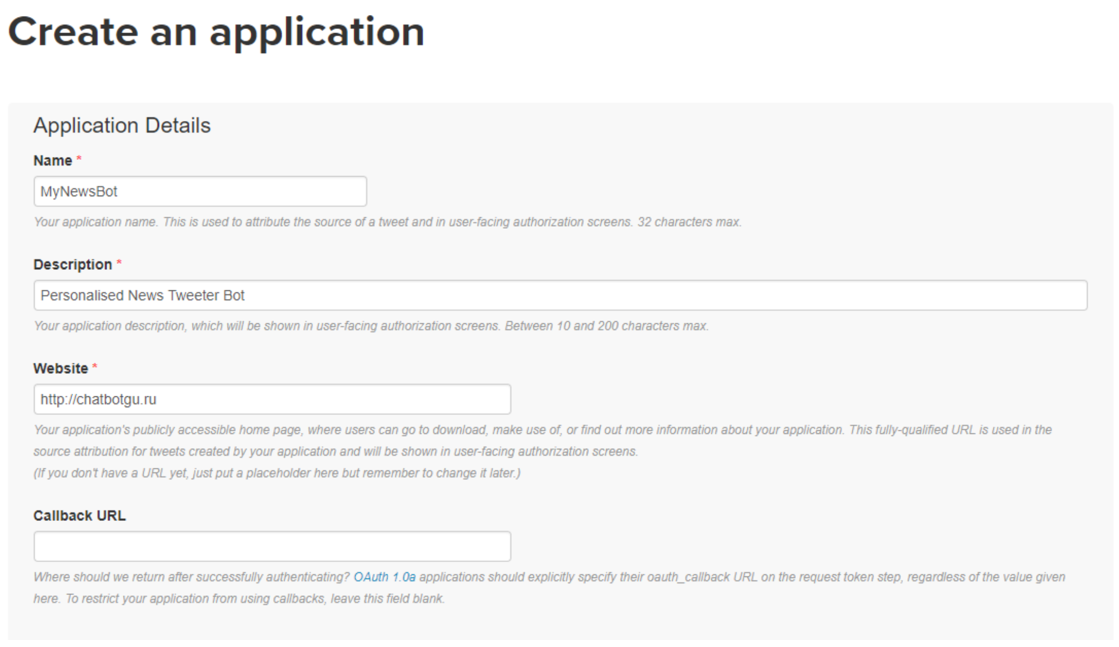
To get started, let us explore the Twitter developer platform. Let us begin by building a Twitter app and later explore how we can tweet news articles to followers based on their interests:

1. Log on to Twitter at www.twitter.com. If you don't have an account on Twitter, create one.
2. Go to https://apps.twitter.com/, which is Twitter's application management dashboard.
3. Click the `Create New App` button:


Twitter Apps

You don't currently have any Twitter Apps.

4. Create an application by filling in the form providing name, description, and a website (fully-qualified URL). Read and agree to the `Developer Agreement` and hit `Create your Twitter application`:


Create an application

Application Details

Name *

MyNewsBot

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

Description *

Personalised News Tweeter Bot

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

Website *

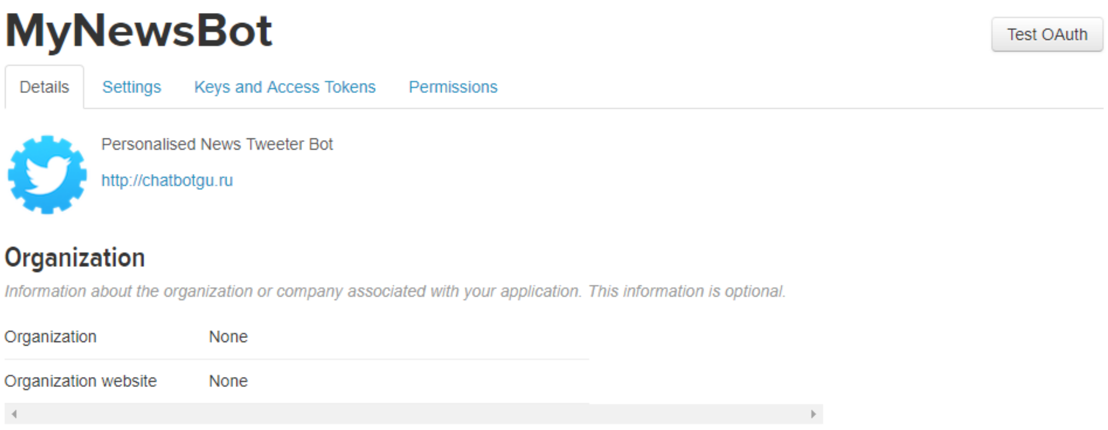
http://chatbotgu.ru

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens.
(If you don't have a URL yet, just put a placeholder here but remember to change it later.)

Callback URL

Where should we return after successfully authenticating? OAuth 1.0a applications should explicitly specify their oauth_callback URL on the request token step, regardless of the value given here. To restrict your application from using callbacks, leave this field blank.

5. You will now see your application dashboard. Explore the tabs:



Personalised News Tweeter Bot

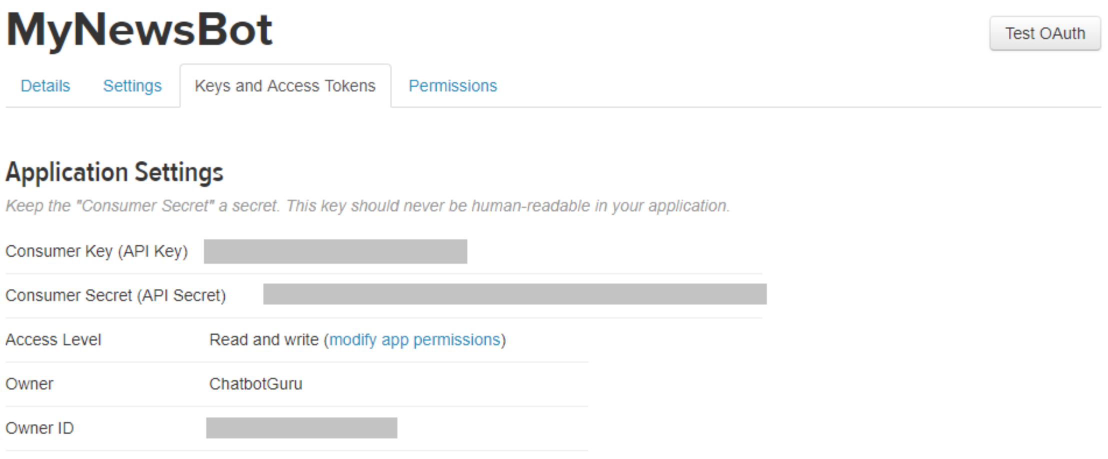
http://chatbotgu.ru

Organization

Information about the organization or company associated with your application. This information is optional.

Organization	None
Organization website	None

6. Click `Keys and Access Tokens`:

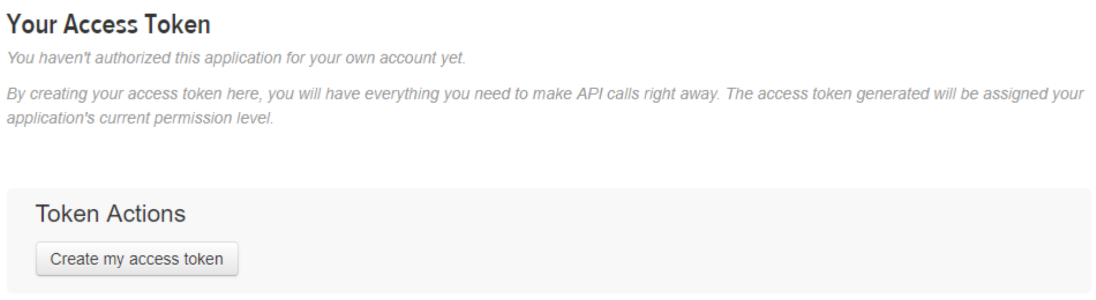


Application Settings

Keep the "Consumer Secret" a secret. This key should never be human-readable in your application.

Consumer Key (API Key)	[redacted]
Consumer Secret (API Secret)	[redacted]
Access Level	Read and write (modify app permissions)
Owner	ChatbotGuru
Owner ID	[redacted]

7. Copy [*consumer key] and [consumer secret*] and hang on to them.
8. Scroll down to `Your Access Token`:



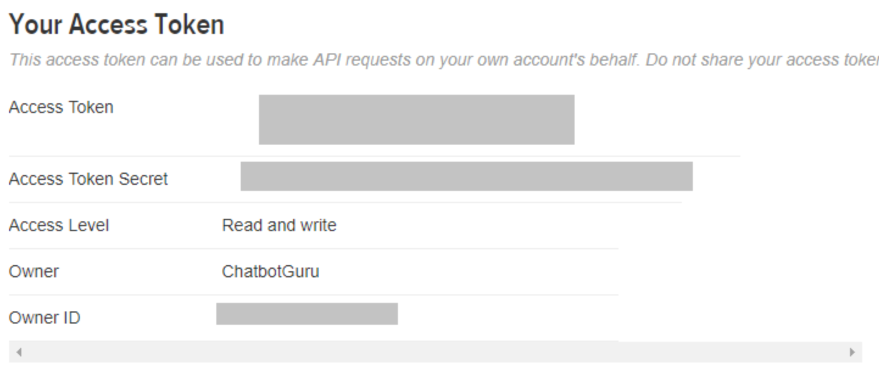
Your Access Token

You haven't authorized this application for your own account yet.

By creating your access token here, you will have everything you need to make API calls right away. The access token generated will be assigned your application's current permission level.

Token Actions

9. Click `Create my access token` to create a new token for your app:



Your Access Token

This access token can be used to make API requests on your own account's behalf. Do not share your access token secret with anyone.

Access Token	[redacted]
Access Token Secret	[redacted]
Access Level	Read and write
Owner	ChatbotGuru
Owner ID	[redacted]

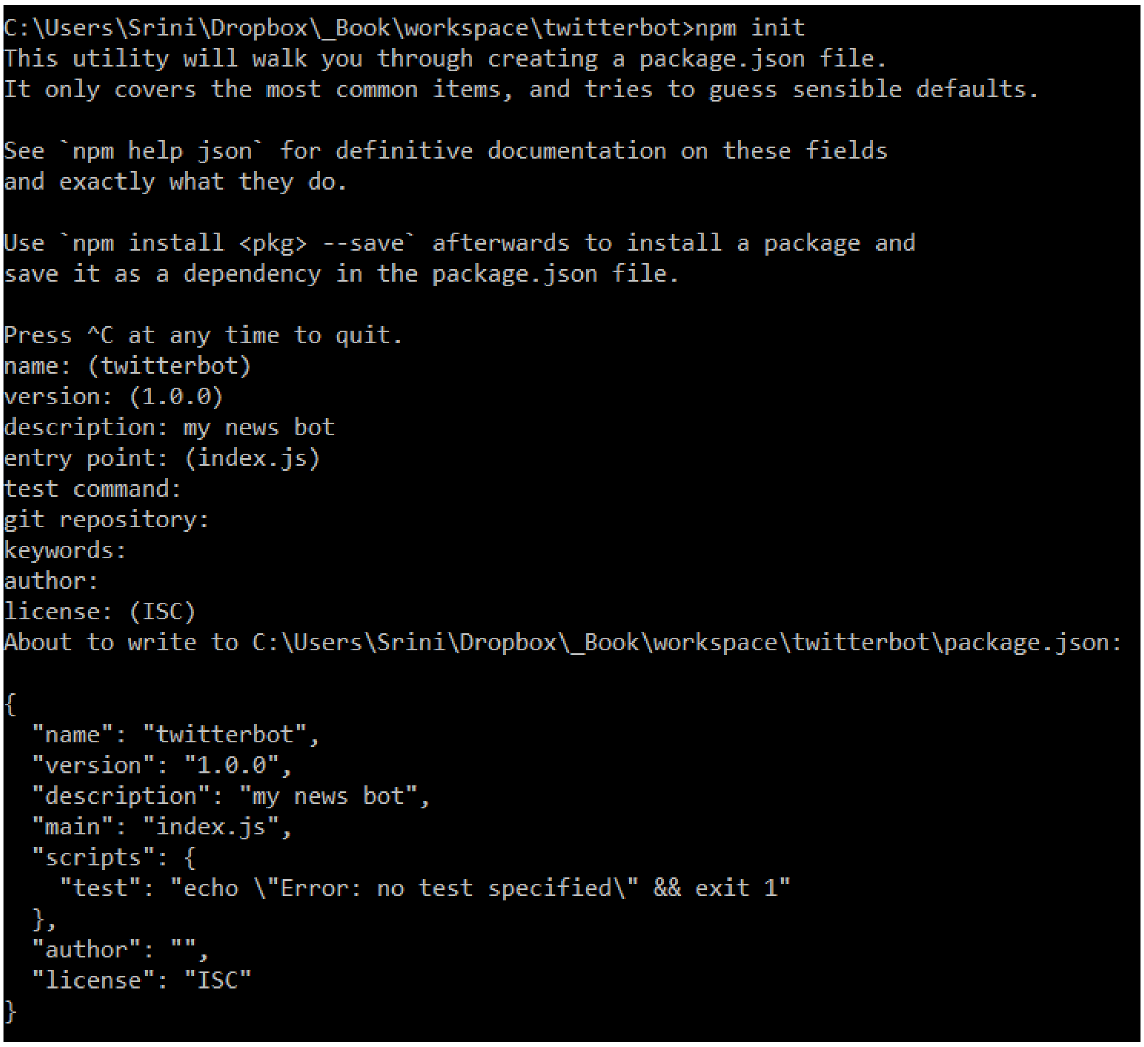
10. Copy the **`Access Token`** and **`Access Token Secret`** and hang on to them.

Now, we have all the keys and tokens we need to create a Twitter app.

Building your first Twitter bot

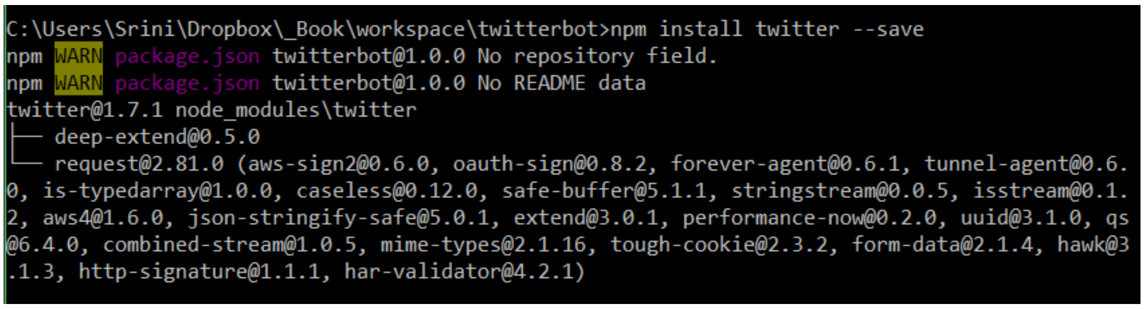
Let's build a simple Twitter bot. This bot will listen to tweets and pick out those that have a particular hashtag. All the tweets with a given hashtag will be printed on the console. This is a very simple bot to help us get started. In the following sections, we will explore more complex bots.

1. Go to the root directory and create a new Node.js program using `npm init`:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot>npm init
This utility will walk you through creating a package.json file.
It only covers the most common items, and tries to guess sensible defaults.

See `npm help json` for definitive documentation on these fields
and exactly what they do.

Use `npm install <pkg> --save` afterwards to install a package and
save it as a dependency in the package.json file.

Press ^C at any time to quit.
name: (twitterbot)
version: (1.0.0)
description: my news bot
entry point: (index.js)
test command:
git repository:
keywords:
author:
license: (ISC)
About to write to C:\Users\Srini\Dropbox\_Book\workspace\twitterbot\package.json:

{
  "name": "twitterbot",
  "version": "1.0.0",
  "description": "my news bot",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC"
}
```

2. Execute the `npm install twitter --save` command to install the Twitter Node.js library:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot>npm install twitter --save
npm WARN package.json twitterbot@1.0.0 No repository field.
npm WARN package.json twitterbot@1.0.0 No README data
twitter@1.7.1 node_modules\twitter
├── deep-extend@0.5.0
└── request@2.81.0 (aws-sign2@0.6.0, oauth-sign@0.8.2, forever-agent@0.6.1, tunnel-agent@0.6.
0, is-typedarray@1.0.0, caseless@0.12.0, safe-buffer@5.1.1, stringstream@0.0.5, isstream@0.1.
2, aws4@1.6.0, json-stringify-safe@5.0.1, extend@3.0.1, performance-now@0.2.0, uuid@3.1.0, qs
@6.4.0, combined-stream@1.0.5, mime-types@2.1.16, tough-cookie@2.3.2, form-data@2.1.4, hawk@3
.1.3, http-signature@1.1.1, har-validator@4.2.1)
```

Run `npm install request --save` to install the Request library as well. We will use this in the future to make HTTP `GET` requests to a news data source.

3. Explore your `package.json` file in the root directory:

```
{
  "name": "twitterbot",
  "version": "1.0.0",
  "description": "my news bot",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC",
  "dependencies": {
    "request": "^2.81.0",
    "twitter": "^1.7.1"
  }
}
```

4. Create an `index.js` file with the following code:

```
//index.js

var TwitterPackage = require('twitter');
var request = require('request');

console.log("Hello World! I am a twitter bot!");

var secret = {
 consumer_key: 'YOUR_CONSUMER_KEY',
 consumer_secret: 'YOUR_CONSUMER_SECRET',
 access_token_key: 'YOUR_ACCESS_TOKEN_KEY',
 access_token_secret: 'YOUR_ACCESS_TOKEN_SECRET'
}

var Twitter = new TwitterPackage(secret);
```

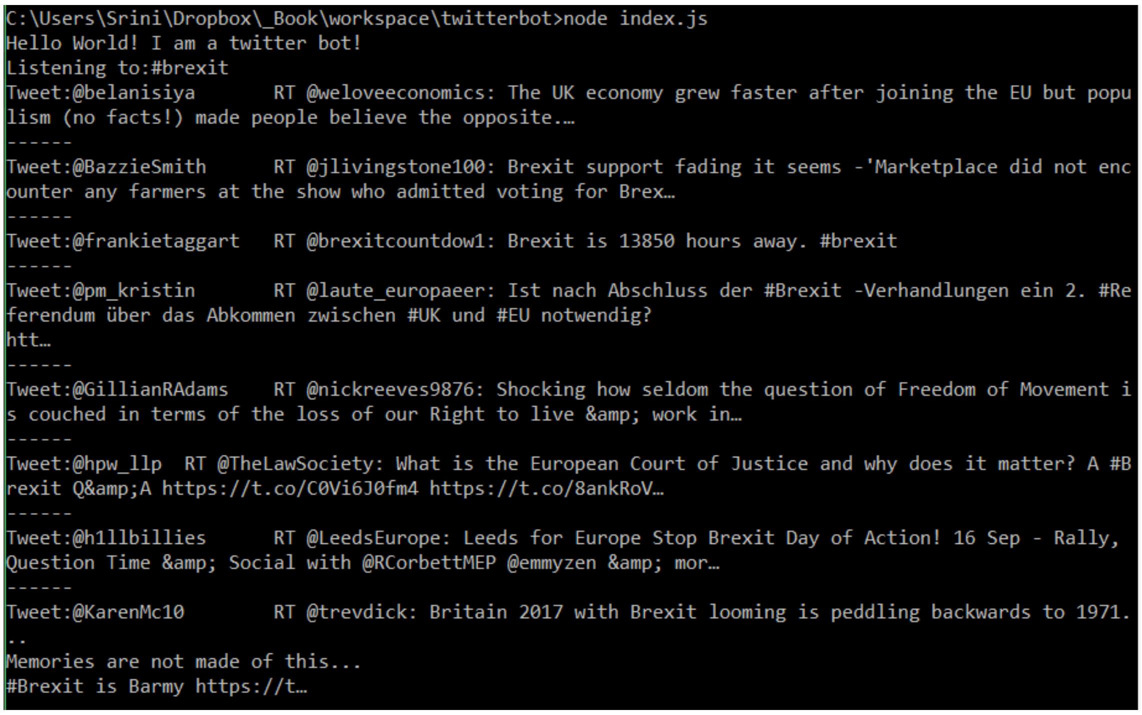
In the preceding code, put the keys and tokens you saved in their appropriate variables. We don't need the `request` package just yet, but we will later.

5. Now let's create a [*hashtag listener*] to listen to the tweets on a specific hashtag:

```
//Twitter stream

var hashtag = '#brexit'; //put any hashtag to listen e.g. #brexit
console.log('Listening to:' + hashtag);

Twitter.stream('statuses/filter', {track: hashtag}, function(stream) {
  stream.on('data', function(tweet) {
    console.log('Tweet:@' + tweet.user.screen_name +
                '\t' + tweet.text);
    console.log('------')
  });

  stream.on('error', function(error) {
    console.log(error);
  });
});
```

Replace `#brexit` with the hashtag you want to listen to. Use a popular one so that you can see the code in action.

6. Run the `index.js` file with the `node index.js` command.
7. You will see a stream of tweets from Twitter users all over the globe who used the hashtag:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot>node index.js
Hello World! I am a twitter bot!
Listening to:#brexit
Tweet:@belanisiya       RT @weloveeconomics: The UK economy grew faster after joining the EU but popu
lism (no facts!) made people believe the opposite.…
------
Tweet:@BazzieSmith      RT @jlivingstone100: Brexit support fading it seems -'Marketplace did not enc
ounter any farmers at the show who admitted voting for Brex…
------
Tweet:@frankietaggart   RT @brexitcountdow1: Brexit is 13850 hours away. #brexit
------
Tweet:@pm_kristin       RT @laute_europaeer: Ist nach Abschluss der #Brexit -Verhandlungen ein 2. #Re
ferendum über das Abkommen zwischen #UK und #EU notwendig?
htt…
------
Tweet:@GillianRAdams    RT @nickreeves9876: Shocking how seldom the question of Freedom of Movement i
s couched in terms of the loss of our Right to live &amp; work in…
------
Tweet:@hpw_llp  RT @TheLawSociety: What is the European Court of Justice and why does it matter? A #B
rexit Q&amp;A https://t.co/C0Vi6J0fm4 https://t.co/8ankRoV…
------
Tweet:@h1llbillies      RT @LeedsEurope: Leeds for Europe Stop Brexit Day of Action! 16 Sep - Rally,
Question Time &amp; Social with @RCorbettMEP @emmyzen &amp; mor…
------
Tweet:@KarenMc10        RT @trevdick: Britain 2017 with Brexit looming is peddling backwards to 1971.
..
Memories are not made of this...
#Brexit is Barmy https://t…
```

Congratulations! You have built your first Twitter bot. We will use the hashtag listening module later in this lab to build a more complex bot.

Exploring the Twitter SDK

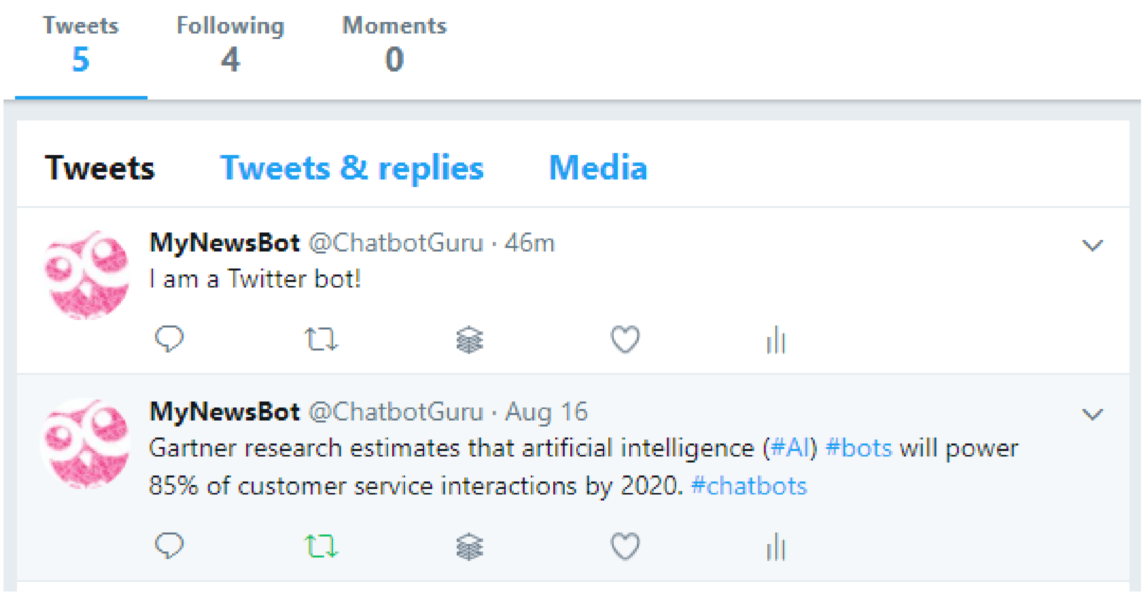
In the previous section, we explored how to listen to tweets based on hashtags. Let's now explore the Twitter SDK to understand the capabilities that we can bestow upon our Twitter bot.

Updating your status

You can also update your status on your Twitter timeline by using the following s[*tatus update*] module code:

```
tweet ('I am a Twitter Bot!', null, null);

function tweet(statusMsg, screen_name, status_id){

    console.log('Sending tweet to: ' + screen_name);
    console.log('In response to:' + status_id);
    var msg = statusMsg;
    if (screen_name != null){
        msg = '@' + screen_name + ' ' + statusMsg;
    }
    console.log('Tweet:' + msg);
    Twitter.post('statuses/update', {
            status: msg
        }, function(err, response) {
            // if there was an error while tweeting
            if (err) {
                console.log('Something went wrong while TWEETING...');
                console.log(err);
            }
            else if (response) {
                console.log('Tweeted!!!');
                console.log(response)
            }
    });
}
```

Comment out the hashtag listener code and instead add the preceding status update code and run it. When run, your bot will post a tweet on your timeline:



MyNewsBot @ChatbotGuru · 46m
I am a Twitter bot!

MyNewsBot @ChatbotGuru · Aug 16
Gartner research estimates that artificial intelligence (#AI) #bots will power 85% of customer service interactions by 2020. #chatbots

In addition to tweeting on your timeline, you can also tweet in response to another tweet (or status update). The `screen_name` argument is used to create a response. `tweet. screen_name` is the name of the user who posted the tweet. We will explore this a bit later.

Retweet to your followers

You can retweet a tweet to your followers using the following r[*etweet status*] code:

```
var retweetId = '899681279343570944';
retweet(retweetId);

function retweet(retweetId){
    Twitter.post('statuses/retweet/', {
        id: retweetId
    }, function(err, response) {
        if (err) {
            console.log('Something went wrong while RETWEETING...');
            console.log(err);
        }
        else if (response) {
            console.log('Retweeted!!!');
            console.log(response)
        }
    });
}
```

Searching for tweets

You can also search for recent or popular tweets with hashtags using the following s[*earch hashtags*] code:

```
search('#brexit', 'popular')
function search(hashtag, resultType){
    var params = {
        q: hashtag, // REQUIRED
        result_type: resultType,
        lang: 'en'
    }

    Twitter.get('search/tweets', params, function(err, data) {
        if (!err) {
            console.log('Found tweets: ' + data.statuses.length);
            console.log('First one: ' + data.statuses[1].text);
        }
        else {
          console.log('Something went wrong while SEARCHING...');
        }
    });
}
```

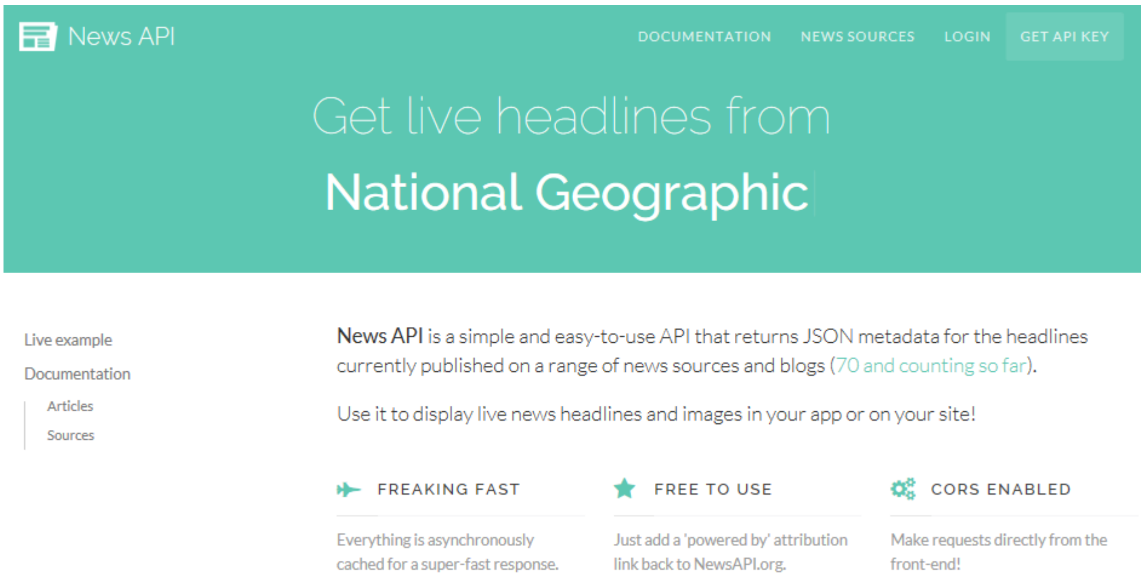
Exploring a news data service

Let's now build a bot that will tweet news articles to its followers at regular intervals. We will then extend it to be personalized by users through a conversation that happens over direct messaging with the bot. In order to build a news bot, we need a source where we can get news articles. We are going to explore a news service called NewsAPI.org in this section. NewsAPI is a service that aggregates news articles from roughly 70 newspapers around the globe.

Setting up NewsAPI

Let us set up an account with the NewsAPI data service and get the API key:

1. Go to newsapi.org:



News API is a simple and easy-to-use API that returns JSON metadata for the headlines currently published on a range of news sources and blogs (70 and counting so far).

Use it to display live news headlines and images in your app or on your site!

FREAKING FAST

Everything is asynchronously cached for a super-fast response.

FREE TO USE

Just add a 'powered by' attribution link back to NewsAPI.org.

CORS ENABLED

Make requests directly from the front-end!

2. Click **`Get API key`**.
3. Register using your email.
4. Get your API key.
5. Explore the sources: `https://newsapi.org/v1/sources?apiKey=YOUR_API_KEY`.

There are about 70 sources from across the globe including popular ones such as BBC News, Associated Press, Bloomberg, and CNN. You might notice that each source has a category tag attached. The possible options are: business, entertainment, gaming, general, music, politics, science-and-nature, sport, and technology. You might also notice that each source also has language (`en`, `de`, `fr`) and country (`au`, `de`, `gb`, `in`, `it`, `us`) tags. The following is the information on the BBC-News source:

```
{
    "id": "bbc-news",
    "name": "BBC News",
    "description": "Use BBC News for up-to-the-minute news,
    breaking news, video, audio and feature stories.
    BBC News provides trusted World and UK news as well as
    local and regional perspectives. Also entertainment,
    business, science, technology and health news.",
    "url": "http://www.bbc.co.uk/news",
    "category": "general",
    "language": "en",
    "country": "gb",
    "urlsToLogos": {
        "small": "",
        "medium": "",
        "large": ""
    },
    "sortBysAvailable": [
        "top"
        ]
}
```

6. Get sources for a specific category, language, or country using:

`https://newsapi.org/v1/sources?category=business&apiKey=YOUR_API_KEY`

The following is the part of the response to the preceding query asking for all sources under the `business` category:

```
"sources": [
    {
        "id": "bloomberg",
        "name": "Bloomberg",
        "description": "Bloomberg delivers business
        and markets news, data, analysis, and video
        to the world, featuring stories from Businessweek
        and Bloomberg News.",
        "url": "http://www.bloomberg.com",
        "category": "business",
        "language": "en",
        "country": "us",
        "urlsToLogos": {
            "small": "",
            "medium": "",
            "large": ""
        },
        "sortBysAvailable": [
        "top"
        ]
    },
    {
        "id": "business-insider",
        "name": "Business Insider",
        "description": "Business Insider is a fast-growing
        business site with deep financial, media, tech, and
        other industry verticals. Launched in 2007, the
        site is now the largest business news site on the web.",
        "url": "http://www.businessinsider.com",
        "category": "business",
        "language": "en",
        "country": "us",
        "urlsToLogos": {
            "small": "",
            "medium": "",
            "large": ""
        },
        "sortBysAvailable": [
        "top",
        "latest"
        ]
    },
    ...
]
```

7. Explore the articles:

`https://newsapi.org/v1/articles?source=bbc-news&apiKey=YOUR_API_KEY`

The following is the sample response:

```
"articles": [
    {
        "author": "BBC News",
        "title": "US Navy collision: Remains found in
                 hunt for missing sailors",
        "description": "Ten US sailors have been missing since Monday's
                collision with a tanker near Singapore.",
        "url": "http://www.bbc.co.uk/news/world-us-canada-41013686",
        "urlToImage":
        "https://ichef1.bbci.co.uk/news/1024/cpsprodpb/80D9/
                        production/_97458923_mediaitem97458918.jpg",
        "publishedAt": "2017-08-22T12:23:56Z"
    },
    {
        "author": "BBC News",
        "title": "Afghanistan hails Trump support in 'joint struggle'",
        "description": "President Ghani thanks Donald Trump for
                        supporting Afghanistan's battle against the
                        Taliban.",
        "url": "http://www.bbc.co.uk/news/world-asia-41012617",
        "urlToImage":
        "https://ichef.bbci.co.uk/images/ic/1024x576/p05d08pf.jpg",
        "publishedAt": "2017-08-22T11:45:49Z"
    },
    ...
]
```

For each article, the `author`, `title`, `description`, `url`, `urlToImage,`, and `publishedAt` fields are provided. Now that we have explored a source of news data that provides up-to-date news stories under various categories, let us go on to build a news bot.

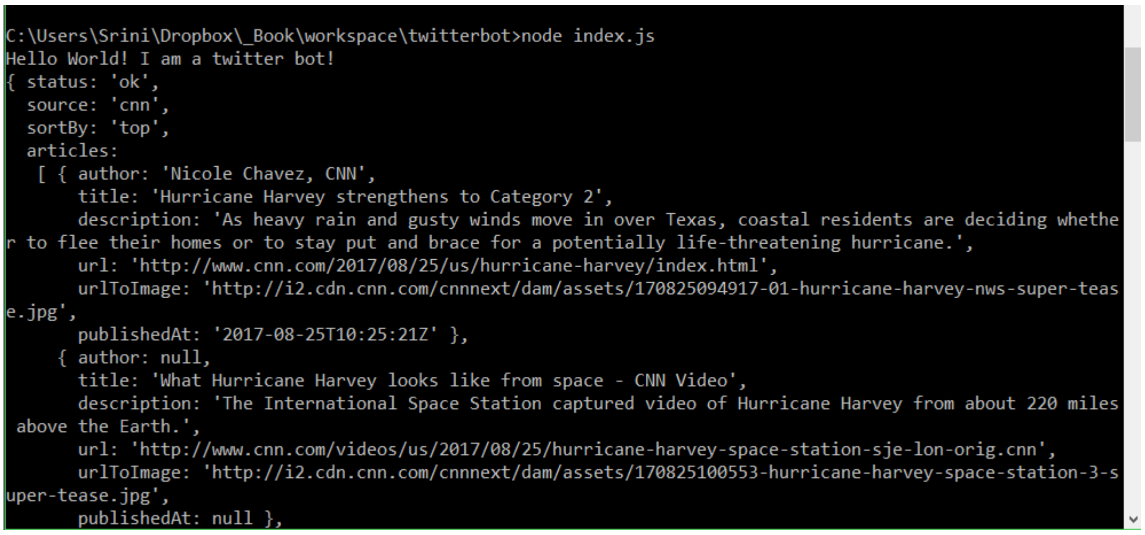
Building a Twitter news bot

Now that we have explored NewsAPI, a data source for the latest news updates, and a little bit of what the Twitter API can do, let us combine them both to build a bot tweeting interesting news stories, first on its own timeline and then specifically to each of its followers:

1. Let's build a news tweeter module that tweets the top news article given the source. The following code uses the `tweet()` function we built earlier:

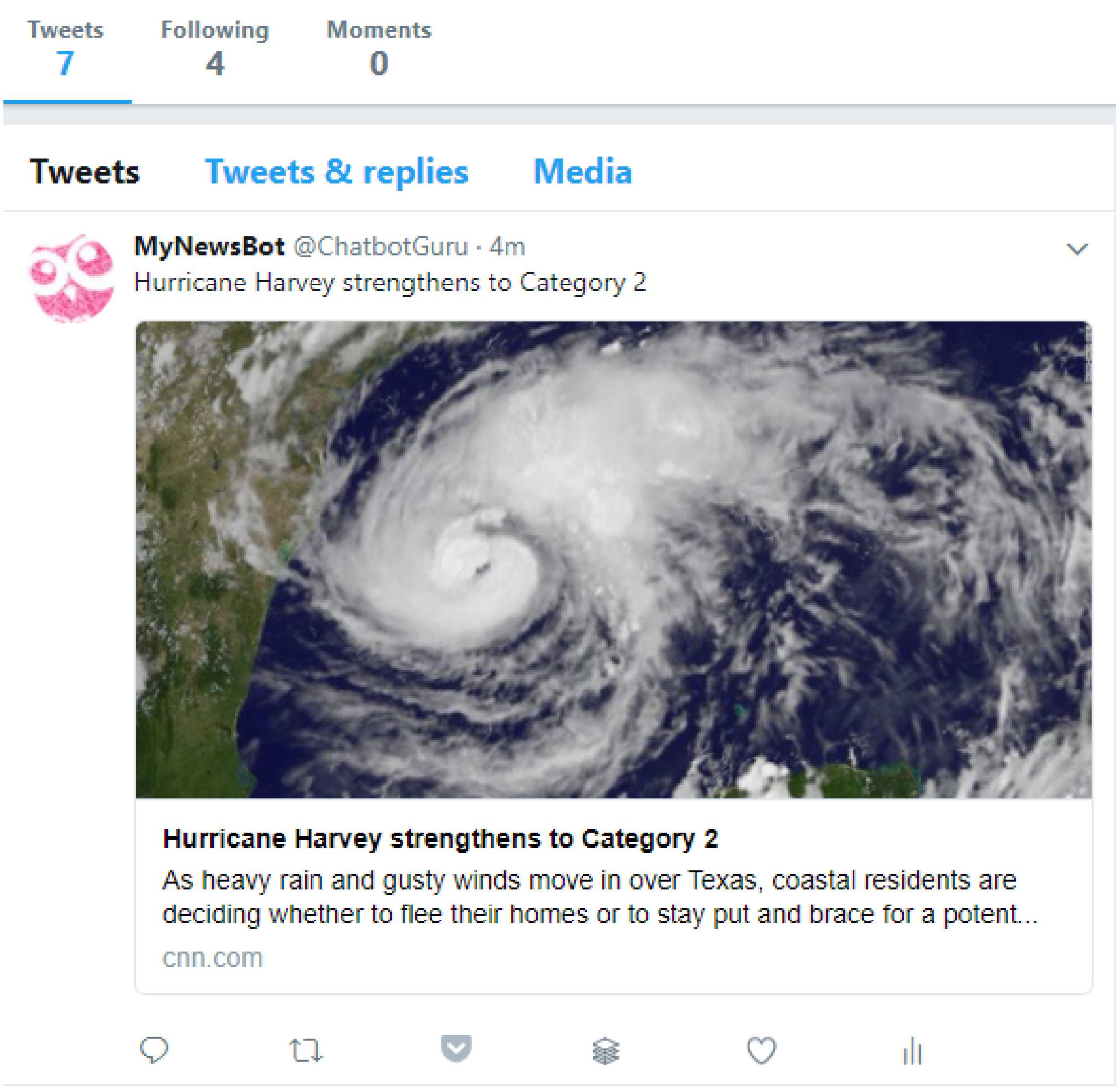
```
topNewsTweeter('cnn', null);

function topNewsTweeter(newsSource, screen_name, status_id){
    request({
            url: 'https://newsapi.org/v1/articles?source='
            + newsSource +
                      '&apiKey=YOUR_API_KEY',
            method: 'GET'
        },
        function (error, response, body) {
            //response is from the bot
            if (!error && response.statusCode == 200) {
                var botResponse = JSON.parse(body);
                console.log(botResponse);
                tweetTopArticle(botResponse.articles, screen_name);
            } else {
                console.log('Sorry. No new');
            }
        });
}

function tweetTopArticle(articles, screen_name, status_id){
    var article = articles[0];
    tweet(article.title + " " + article.url, screen_name);
}
```

Run the preceding program to fetch news from CNN and post the topmost article on Twitter:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot>node index.js
Hello World! I am a twitter bot!
{ status: 'ok',
  source: 'cnn',
  sortBy: 'top',
  articles:
   [ { author: 'Nicole Chavez, CNN',
       title: 'Hurricane Harvey strengthens to Category 2',
       description: 'As heavy rain and gusty winds move in over Texas, coastal residents are deciding whethe
r to flee their homes or to stay put and brace for a potentially life-threatening hurricane.',
       url: 'http://www.cnn.com/2017/08/25/us/hurricane-harvey/index.html',
       urlToImage: 'http://i2.cdn.cnn.com/cnnnext/dam/assets/170825094917-01-hurricane-harvey-nws-super-teas
e.jpg',
       publishedAt: '2017-08-25T10:25:21Z' },
     { author: null,
       title: 'What Hurricane Harvey looks like from space - CNN Video',
       description: 'The International Space Station captured video of Hurricane Harvey from about 220 miles
 above the Earth.',
       url: 'http://www.cnn.com/videos/us/2017/08/25/hurricane-harvey-space-station-sje-lon-orig.cnn',
       urlToImage: 'http://i2.cdn.cnn.com/cnnnext/dam/assets/170825100553-hurricane-harvey-space-station-3-s
uper-tease.jpg',
       publishedAt: null },
```

Here is the post on Twitter:


Tweets 7 Following 4 Moments 0

Tweets Tweets & replies Media

MyNewsBot @ChatbotGuru · 4m

Hurricane Harvey strengthens to Category 2

Hurricane Harvey strengthens to Category 2

As heavy rain and gusty winds move in over Texas, coastal residents are deciding whether to flee their homes or to stay put and brace for a potent...

cnn.com

2. Now, let us build a module that tweets news stories from a randomly-chosen source in a list of sources:

```
function tweetFromRandomSource(sources, screen_name, status_id){
    var max = sources.length;
    var randomSource = sources[Math.floor(Math.random() *
                                    (max + 1))];
    //topNewsTweeter(randomSource, screen_name, status_id);
}
```

3. Let's call the tweeting module after we acquire the list of sources:

```
function getAllSourcesAndTweet(){
    var sources = [];
    console.log('getting sources...')
    request({
            url: 'https://newsapi.org/v1/sources?
                 apiKey=YOUR_API_KEY',
                 method: 'GET'
```

```
        },
        function (error, response, body) {
            //response is from the bot
            if (!error && response.statusCode == 200) {
                // Print out the response body
                var botResponse = JSON.parse(body);
                for (var i = 0; i < botResponse.sources.length;
                     i++){
                    console.log('adding.. ' +
                                botResponse.sources[i].id)
                    sources.push(botResponse.sources[i].id)
                }
                tweetFromRandomSource(sources, null, null);
            } else {
                console.log('Sorry. No news sources!');
            }
        });
}
```

4. Let's create a new JS file called `tweeter.js`. In the `tweeter.js` file, call `getSourcesAndTweet()` to get the process started:

```
//tweeter.js

var TwitterPackage = require('twitter');
var request = require('request');

console.log("Hello World! I am a twitter bot!");

var secret = {
  consumer_key: 'YOUR_CONSUMER_KEY',
  consumer_secret: 'YOUR_CONSUMER_SECRET',
  access_token_key: 'YOUR_ACCESS_TOKEN_KEY',
  access_token_secret: 'YOUR_ACCESS_TOKEN_SECRET'
}

var Twitter = new TwitterPackage(secret);
getAllSourcesAndTweet();
```

5. Run the `tweeter.js` file on the console. This bot will tweet a news story every time it is called. It will choose top news stories from around 70 news sources randomly.

Building a personalized news bot

We now have a news bot that tweets news (or posts status updates) on its own timeline. We will look at how to set it to run on a regular basis in a little while. Let us now build a more interesting bot that can tweet to its followers using the news stories that they might like. In other words, let's personalize the news:

1. Let's assume that we have information about the users and their interests. Add the following to the `tweeter.js` file. For now, we are hardcoding the user interests information into the code itself. Later we will see how they can be stored and retrieved from a database:

```
var userInterests = [{'screen_name':'srinivasancj',
                            'user_interest': 'technology'}];
```

2. Create a `tweetUserSpecificNews` module that uses `userInterests` to get the category-specific sources. Call `tweetUserSpecificNews()` after `getAllSourcesAndTweet()`:

```
tweetUserSpecificNews();

function tweetUserSpecificNews(){
console.log('Tweeting personalised news');
    for (var i=0; i < userInterests.length; i++){
        var user = userInterests[i];
        var screen_name = user.screen_name;
        var interest = user.user_interest;
        var status_id = user.in_reply_to_status_id;
        //get sources
        request({
            url: 'https://newsapi.org/v1/sources?category=' +
                  interest +
                          '&apiKey=YOUR_API_KEY',
            method: 'GET'
        },
        function (error, response, body) {
            if (!error && response.statusCode == 200) {
                // Print out the response body
                var botResponse = JSON.parse(body);
                console.log(botResponse);
                var sources = [];
                for (var i = 0; i < botResponse.sources.length;
                     i++)
                {
                    console.log('adding.. ' +
                                botResponse.sources[i].id)
                    sources.push(botResponse.sources[i].id)
                }
                tweetFromRandomSource(sources, screen_name,
                                      status_id);
            } else {
                console.log('Sorry. No news in this category.');
            }
        });
    }
}
```

By specifying the `screen_name` of a tweet from the user, the tweets sent by the bot are treated as a response to the user's original tweet. Therefore these tweets don't end up on the bot's timeline. Instead they are sent directly to the user and therefore personalized to the user.

3. Now that we have a bot that, when run, updates its own timeline with a random news article and sends personalized news to its followers, let's make it run automatically on a regular basis, say, once an hour. To do this, we first need to create a web app and push it on to the Cloud.
4. Create a `bin` folder and move the `tweeter.js` file into the `bin` folder.

5. Rename the `tweeter.js` file to `tweeter`. And add the following code as the first line. This is to tell Heroku which interpreter program to use to run the script:

```
#!/usr/bin/env node
```

6. In the project root directory, create a file named `Procfile` with the following code:

```
web: node index.js
```

7. Create a local Git repository for the project, add files, and make an initial commit. Type the following command on the console:

```
> git init
> git add .
> git commit -m initial-commit-personalised-bot
```

8. Create a Heroku app:

```
> heroku create my-twitter-bot
```

9. Push the app onto Heroku Cloud:

```
> git push heroku master
```

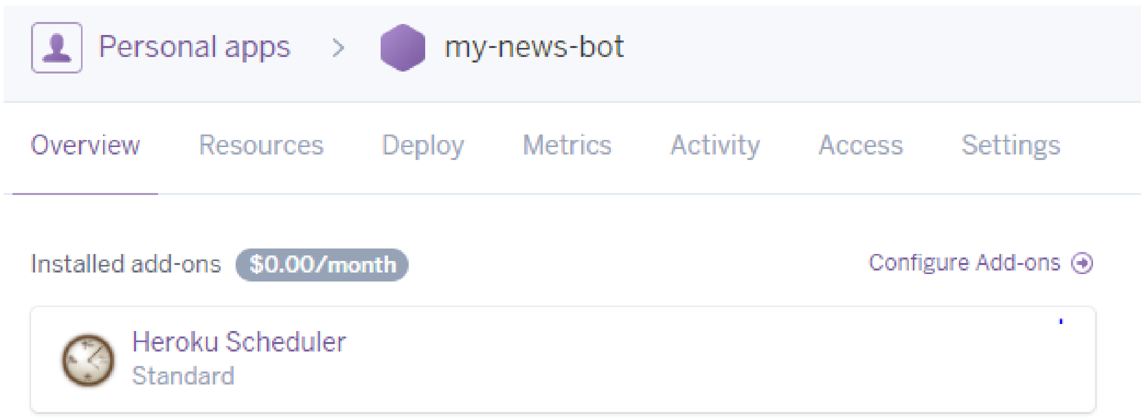
10. Add a Heroku Scheduler:

```
> heroku addons:add scheduler
```

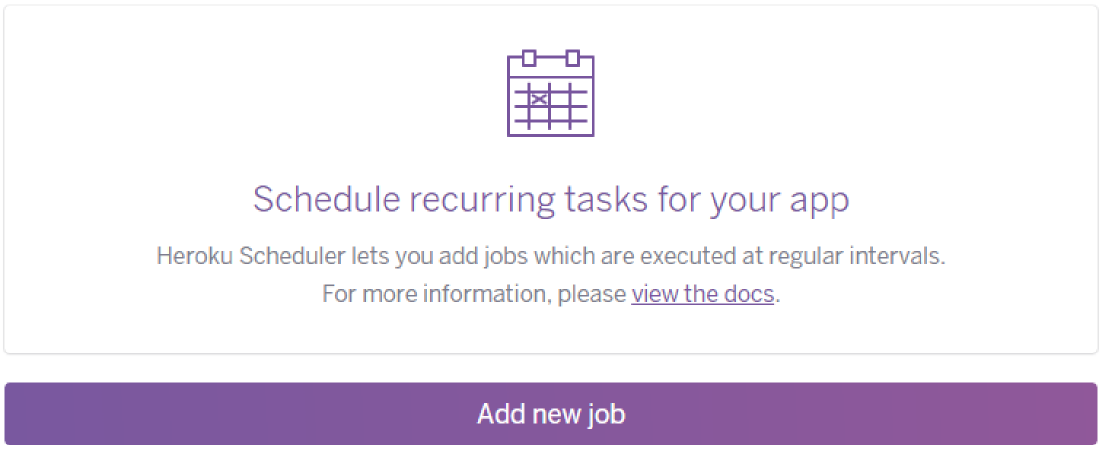
11. Open your Heroku Dashboard on a browser:

https://dashboard.heroku.com/apps

12. Choose your Twitter bot app and open the app's dashboard.
13. In the **`Overview`** tab, under **`Installed add-ons`**, you will find the Heroku Scheduler add-on listed. Click it:



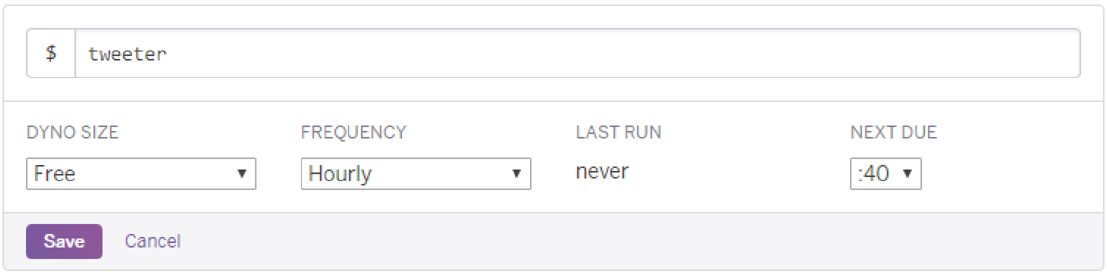
14. You will now see the scheduled tasks for the app. Since we have just created this app, you won't see any. Click **`Add new job`**:



Schedule recurring tasks for your app

Heroku Scheduler lets you add jobs which are executed at regular intervals.
For more information, please view the docs.

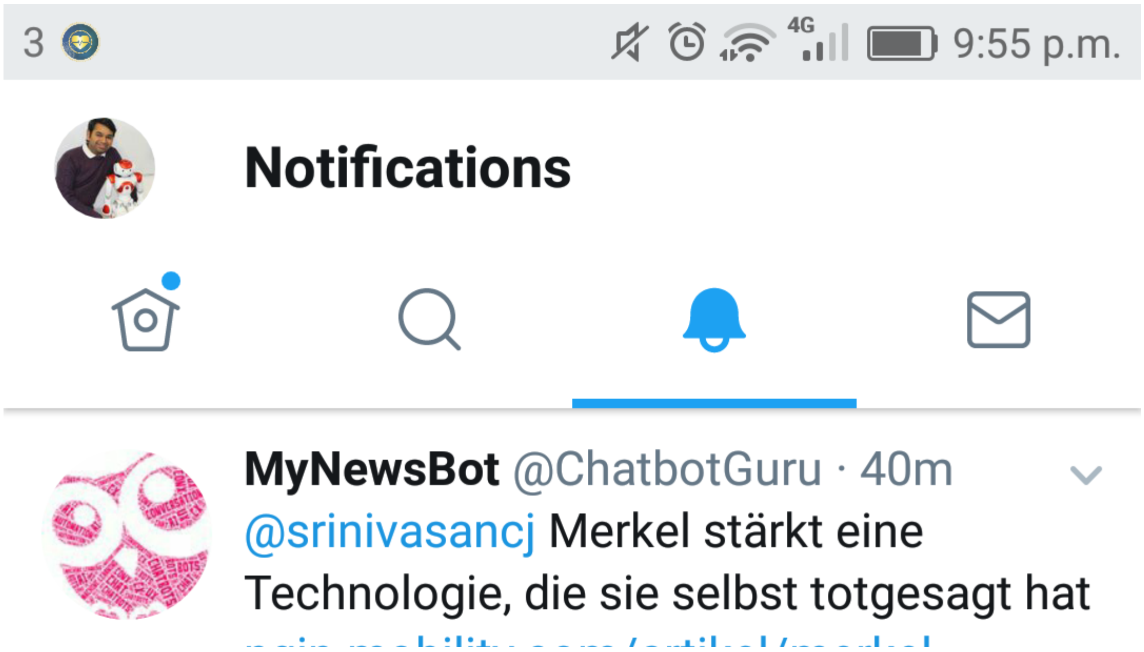
15. Type the name of the program that needs to run on a scheduled basis, in our case it is `tweeter`, and click `Save`:



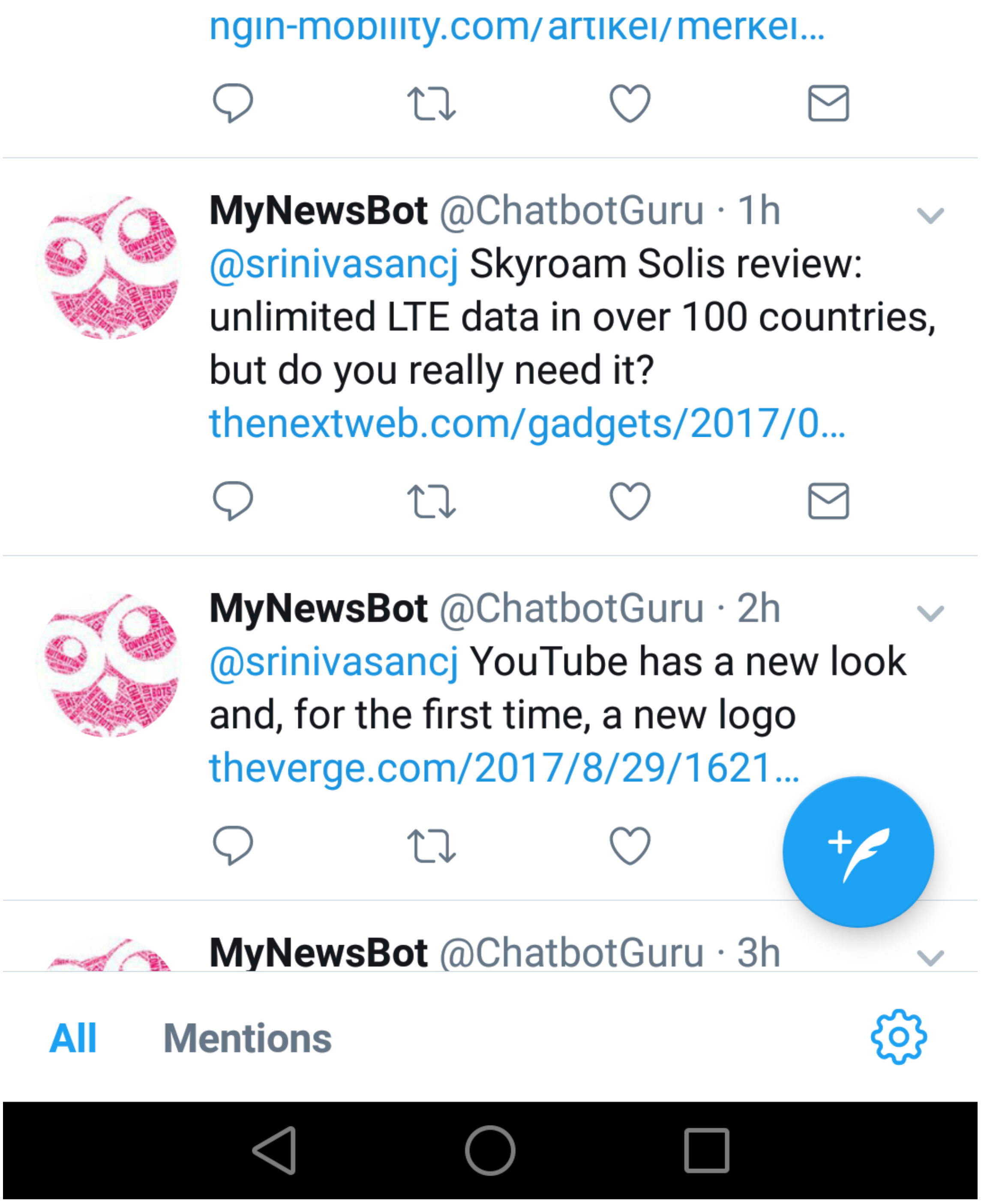
```
$ tweeter
```

DYNO SIZE	FREQUENCY	LAST RUN	NEXT DUE
Free	Hourly	never	:40

16. The scheduler will now run the tweeter program on a regular basis, sending personalized news to subscribed users:



MyNewsBot @ChatbotGuru · 40m
@srinivasancj Merkel stärkt eine Technologie, die sie selbst totgesagt hat


ngin-mobility.com/artikel/merkel...

MyNewsBot @ChatbotGuru · 1h
@srinivasancj Skyroam Solis review: unlimited LTE data in over 100 countries, but do you really need it? thenextweb.com/gadgets/2017/0...

MyNewsBot @ChatbotGuru · 2h
@srinivasancj YouTube has a new look and, for the first time, a new logo theverge.com/2017/8/29/1621...

MyNewsBot @ChatbotGuru · 3h

Creating a database of user interests

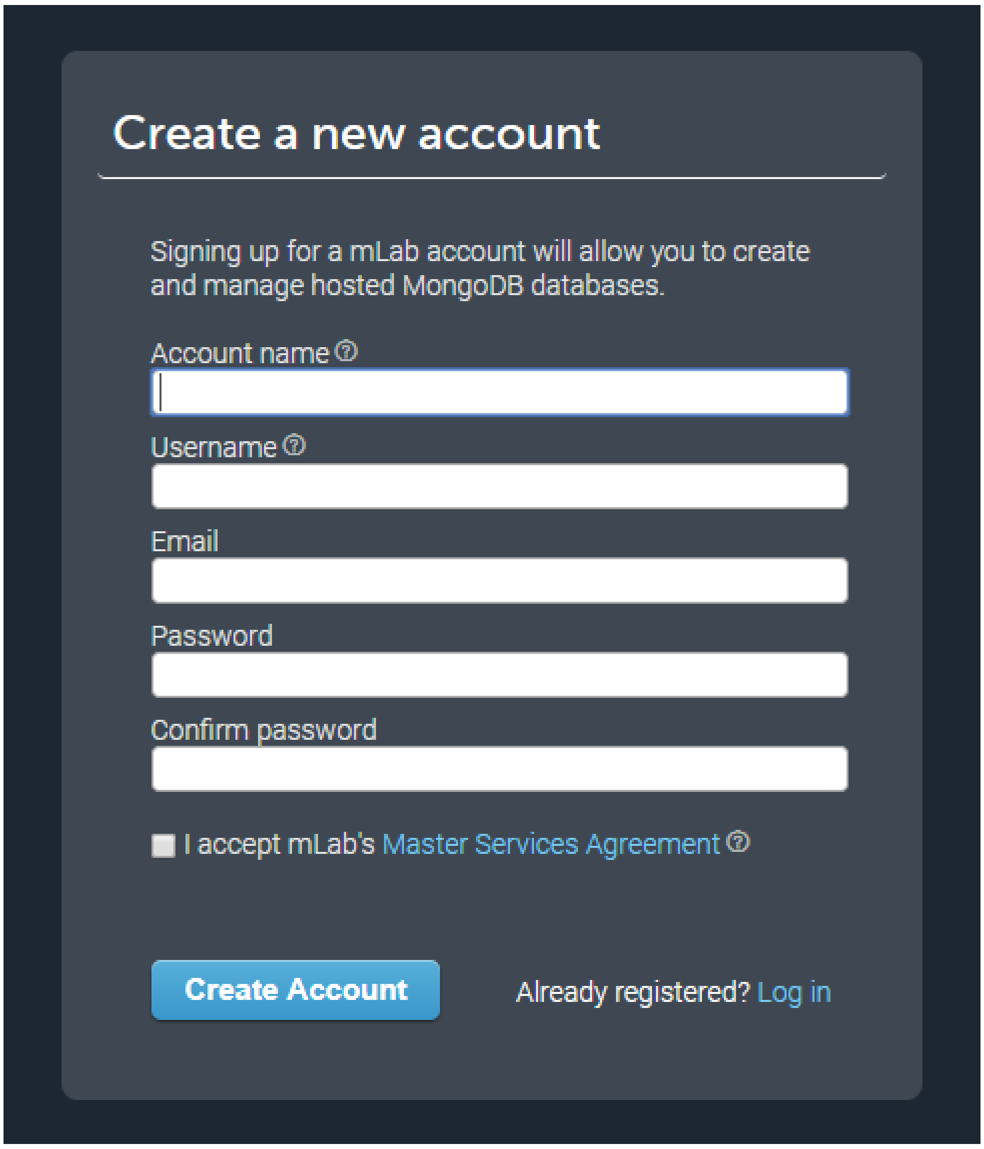
Now that we have a web app that runs regularly, tweeting personalized news to users, let's move on to the next obvious step, which is creating a database where the Twitter bot can pick up user information. Currently, we have hardcoded this information into the bot, which is not ideal. To create a database, let us use a MongoDB hosting service called mlab.com.

Note

Be aware that for legal reasons, if you decide to make the bot publicly available, you may have to inform users that the bot will store users' personal information.

To create a database for the twitter bot, follow these steps:

1. Go to www.mlab.com. Click `SIGN UP`:



Create a new account

Signing up for a mLab account will allow you to create and manage hosted MongoDB databases.

Account name

Username

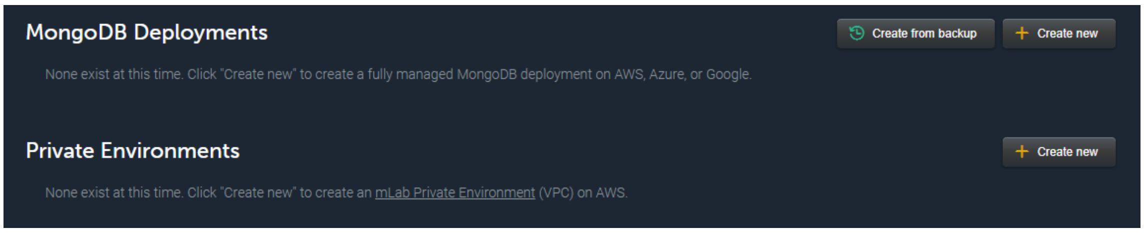
Email

Password

Confirm password

I accept mLab's Master Services Agreement

2. Fill in your details and click `Create Account`.
3. Verify your email by clicking the link that they send you. This will take you to the account dashboard:



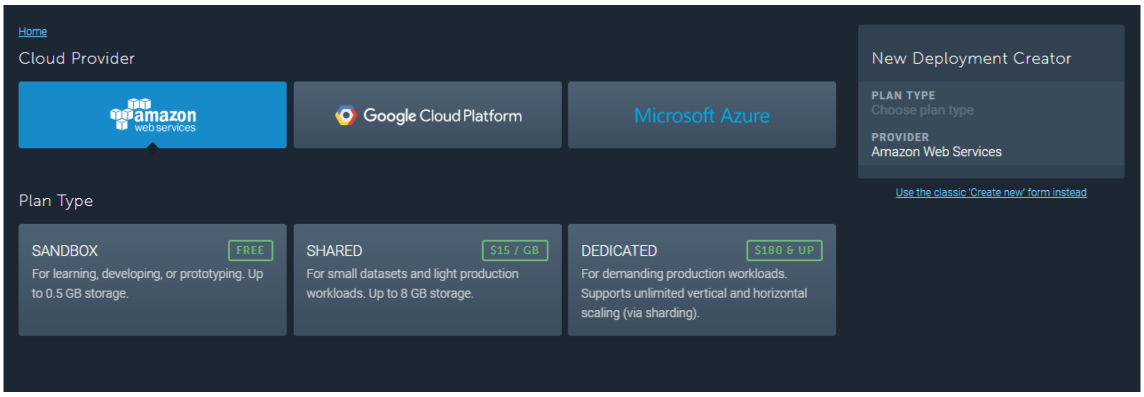
MongoDB Deployments

None exist at this time. Click "Create new" to create a fully managed MongoDB deployment on AWS, Azure, or Google.

Private Environments

None exist at this time. Click "Create new" to create an mLab Private Environment (VPC) on AWS.

4. We need a MongoDB deployment. So, on the dashboard, click `Create new`:



SANDBOX FREE
For learning, developing, or prototyping. Up to 0.5 GB storage.

SHARED $15 / GB
For small datasets and light production workloads. Up to 8 GB storage.

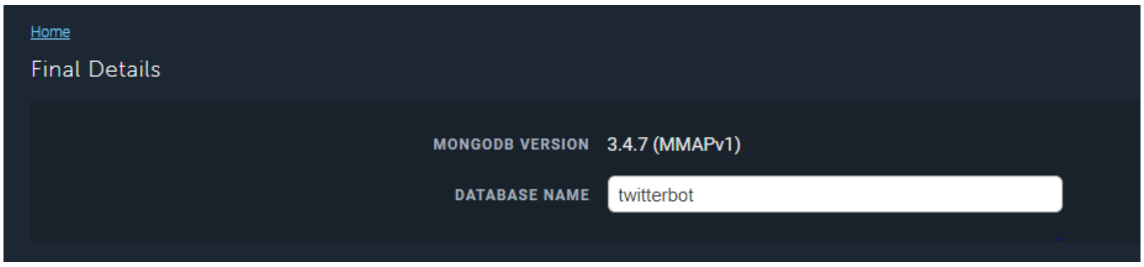
DEDICATED $180 & UP
For demanding production workloads. Supports unlimited vertical and horizontal scaling (via sharding).

PLAN TYPE
Choose plan type

PROVIDER
Amazon Web Services

5. Choose any Cloud provider you like from the following three choices: `a``mazon web services`, `Google Cloud Platform`, or `Microsoft Azure`.
6. Click `SANDBOX`. Sandbox is a type of environment where you can play and practice with deployments before you move them on to production. Click `CONTINUE`:

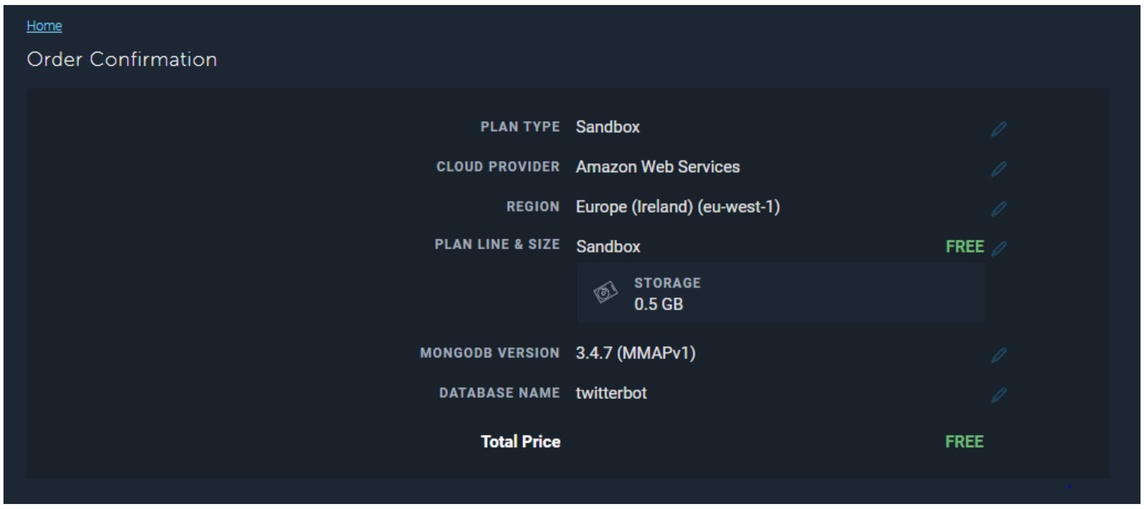
7. Choose the AWS region and click `CONTINUE`:



MONGODB VERSION 3.4.7 (MMAPv1)

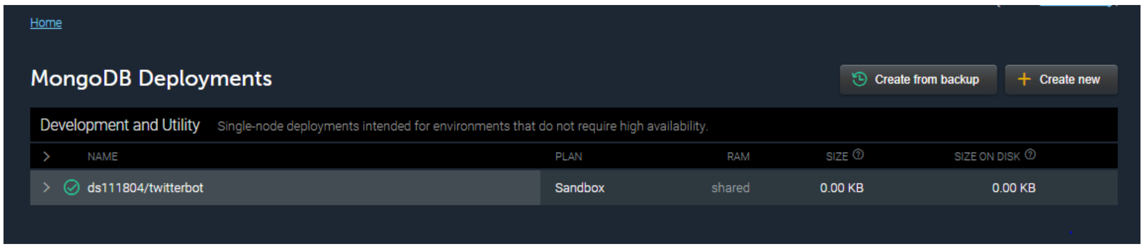
DATABASE NAME twitterbot

8. Provide the final details, database name, and click `CONTINUE`:



PLAN TYPE	Sandbox	
CLOUD PROVIDER	Amazon Web Services	
REGION	Europe (Ireland) (eu-west-1)	
PLAN LINE & SIZE	Sandbox	FREE
	STORAGE 0.5 GB	
MONGODB VERSION	3.4.7 (MMAPv1)	
DATABASE NAME	twitterbot	
Total Price		FREE

9. Check the details and click `SUBMIT ORDER` to finish:

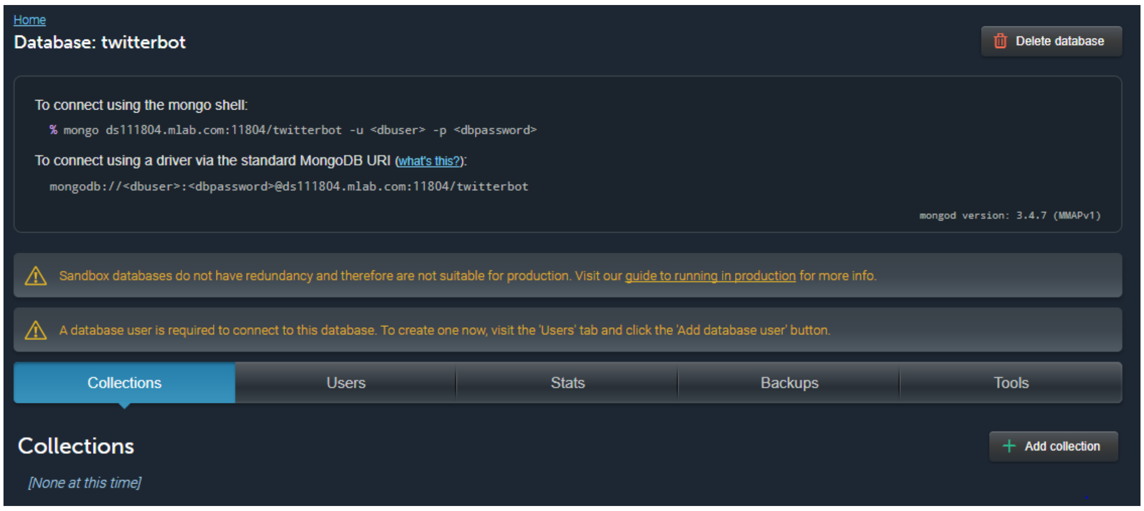


Development and Utility Single-node deployments intended for environments that do not require high availability.

NAME	PLAN	RAM	SIZE	SIZE ON DISK
ds111804/twitterbot	Sandbox	shared	0.00 KB	0.00 KB

You have now created a database called `twitterbot`, which can be used to store information concerning user interests.

10. Create a new collection by double-clicking the `twitterbot` database entry:



To connect using the mongo shell:

```
% mongo ds111804.mlab.com:11804/twitterbot -u <dbuser> -p <dbpassword>
```

To connect using a driver via the standard MongoDB URI (what's this?):

```
mongodb://<dbuser>:<dbpassword>@ds111804.mlab.com:11804/twitterbot
```

```
mongod version: 3.4.7 (MMAPv1)
```

Sandbox databases do not have redundancy and therefore are not suitable for production. Visit our guide to running in production for more info.

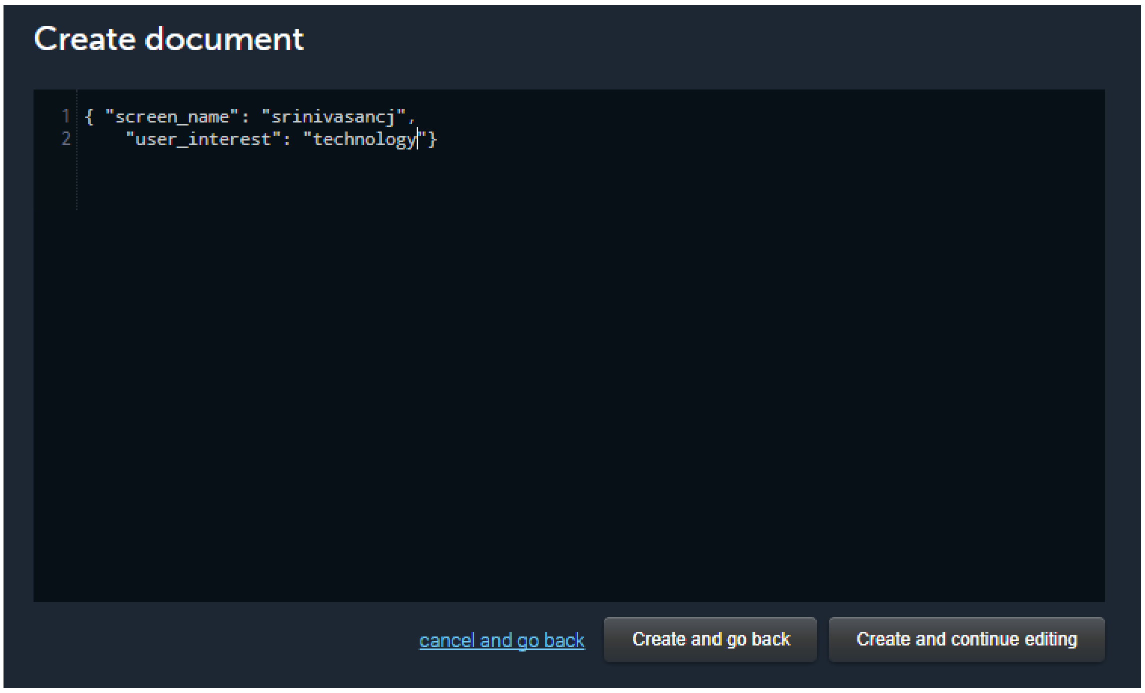
A database user is required to connect to this database. To create one now, visit the 'Users' tab and click the 'Add database user' button.

11. Click **`Add collection`**. Create a collection called `users`.
12. Now, in order to connect to a database, we need to define its users. To create a user, click the **`Users`** tab (next to **`Collections`**).
13. Click **`Add database user`**.
14. Create a new database user.
15. Get the URL of the database. It looks like this one:

`mongodb://<dbuser>:<dbpassword>@ds111804.mlab.com:11804/twitterbot`

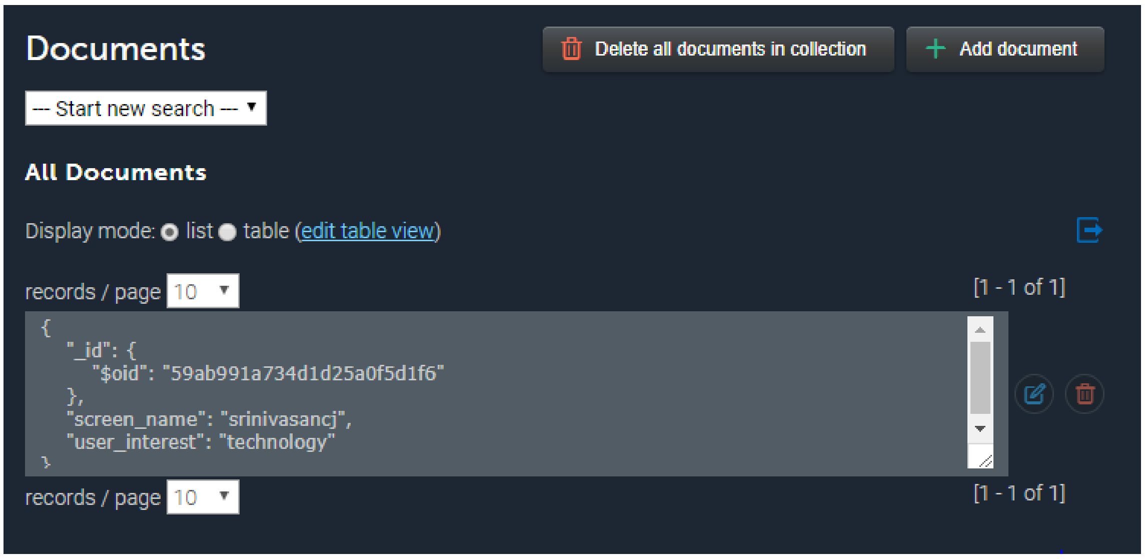
Replace `<dbuser>` and `<dbpassword>` with the user ID and password of the new database user that you just created. Hang on to this.

16. Let's add some data into the `users` collection for the Twitter bot to read. Click the **`Collections`** tab and then the `users` collection.
17. Click **`Add document`**. Type the JSON object from the `user_interests` list. Click **`Create and go back`**:



```
{ "screen_name": "srinivasancj",
    "user_interest": "technology"}
```

18. Now you have your documents added to the collection:



```
{
    "_id": {
        "$oid": "59ab991a734d1d25a0f5d1f6"
    },
    "screen_name": "srinivasancj",
    "user_interest": "technology"
}
```

Great! Now we have a MongoDB document database in the Cloud (Mlab.com) to store information about user interests. Let's now figure out how to use this database to store and retrieve information on user interests with the bot.

Accessing the user interests database

In the previous section, we created a MongoDB document database where we can store user information that will be used by the Twitter bot to personalize news. In this section, we will see how to connect to the database in real time with the bot.

1. Install the `mongodb` library (version 2.2.31) using the `npm install` command:

```
> npm install mongodb@2.2.31 --save
```

2. Test the connection by creating a Node.js program called `mongodb.js` with the following code:

```
var MongoClient = require('mongodb').MongoClient;

// Connection URL
var url = 'YOUR_MONGO_DB_URI';

// Use connect method to connect to the server
MongoClient.connect(url, function(err, db) {
  console.log("Connected successfully to server");
  db.close();
});
```

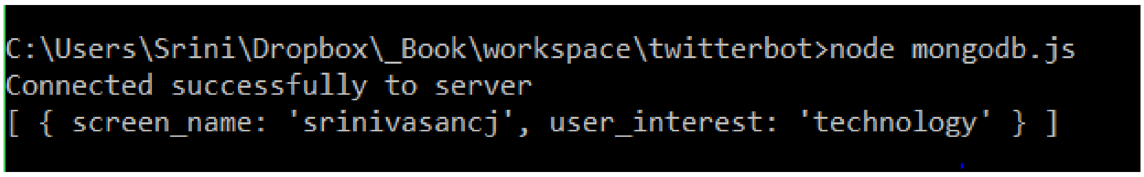
3. Run it to see whether the program is able to connect to your database.
4. Add a function to the `mongodb.js` program to fetch all documents in your collection:

```
function findDocuments(db, callback) {
   // Get the documents collection
   var collection = db.collection('users');
   // Find documents
   collection.find({}).toArray(function(err, docs) {
       callback(docs);
   });
}
```

5. Replace the `db.close()` call in `mongodb.js` with a call to the preceding function, as shown here:

```
var userInterests = [];

// Use connect method to connect to the server
MongoClient.connect(url, function(err, db) {
  console.log("Connected successfully to server");
  findDocuments(db, function(docs) {
      for (var i = 0; i < docs.length; i++){
          var user = {};
          user.screen_name = docs[i].screen_name;
          user.user_interest = docs[i].user_interest;
          userInterests.push(user);
      }
      db.close();
      console.log(userInterests);
  });
});
```

6. Run it to see whether it fetches the document that we put into the collection:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot>node mongodb.js
Connected successfully to server
[ { screen_name: 'srinivasancj', user_interest: 'technology' } ]
```

You should be able to see the document that we already stored in the `users` collection. Later we will see how to put more user data into the collection using the Twitter bot.

7. Now that we are able to successfully read user interests, let's wire this up to the bot so that it can send personalized news to users based on the information it finds in the database.
8. Open the `tweeter` program in the `bin` folder. Replace the `userInterests` variable declaration with the following:

```
var MongoClient = require('mongodb').MongoClient;
// Connection URL
var url = 'YOUR_MONGO_DB_URI';
var userInterests = [];
loadUserData();
```

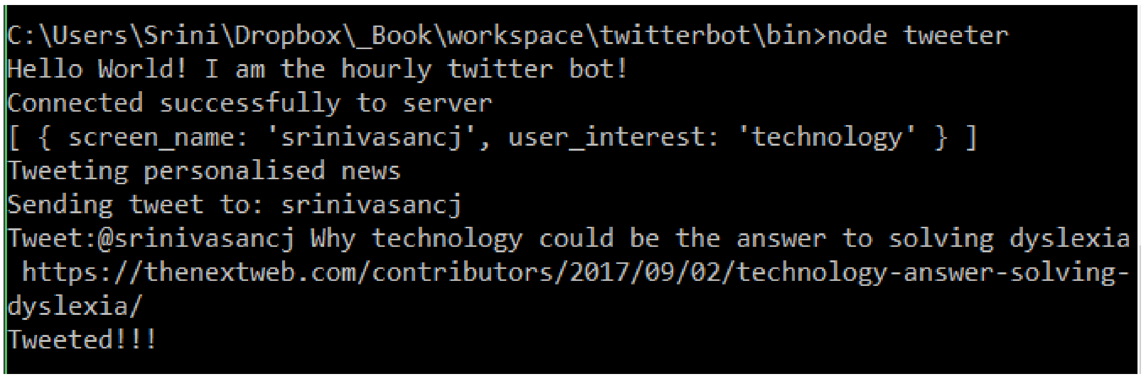
9. Let's define the `loadUserData()` function that will load the user data from the document database:

```
function loadUserData(){
    // Use connect method to connect to the server
    MongoClient.connect(url, function(err, db) {
      console.log("Connected successfully to server");

      findDocuments(db, function(docs) {
          //console.log("Found the following records");
          for (var i = 0; i < docs.length; i++){
              var user = {};
              user.screen_name = docs[i].screen_name;
              user.user_interest = docs[i].user_interest;
              userInterests.push(user);
          }
          db.close();
          console.log(userInterests);

          //tweet to those followers who have
          //expressed interest in specific categories
          tweetUserSpecificNews();
      });
    });
}
```

10. Notice how `tweetUserSpecificNews()` is now called after loading the `userInterests` array with data from the database. Remove the call to this function if one exists outside the `loadUserData()` function.
11. Run the program on the console (in the `bin` folder) to see it in action:

```
> node tweeter
```

This will fetch user interests from the database, query for all sources, pick out user-specific sources, randomly select one, and tweet the top news article from the selected source:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot\bin>node tweeter
Hello World! I am the hourly twitter bot!
Connected successfully to server
[ { screen_name: 'srinivasancj', user_interest: 'technology' } ]
Tweeting personalised news
Sending tweet to: srinivasancj
Tweet:@srinivasancj Why technology could be the answer to solving dyslexia
 https://thenextweb.com/contributors/2017/09/02/technology-answer-solving-
dyslexia/
Tweeted!!!
```

Great! We are now one step closer to a conversational Twitter bot. The only piece of the puzzle that's missing is a way to tell the bot what the user is interested in without having to manually create documents in the database.

Informing the bot of user interests

Wouldn't it be interesting to have users tweet the bot about what they are and are not interested in? The bot could then personalize the news based on what the users say they like. The tweet conversation could go like the one shown here:

```
User > I am interested in politics.
Bot tweets political news every hour.
User > Send me technology news.
Bot tweets technology and political news every hour.
User > Stop sending political news to me.
Bot tweets technology news every hour.
```

To make this Twitter conversation possible, we need a listener that listens to tweets sent to the bot by users informing it of their interests. This information, in natural language, needs to be parsed, understood, and updated in the database. The hourly tweeter would tweet personalized news based on the information it gets from the database. Sound good? Let's get cracking on the tweet listener:

1. Open the `index.js` file. Retain the code for importing the Twitter library and setting up the credentials:

```
var TwitterPackage = require('twitter');
var request = require('request');

var secret = {
  consumer_key: 'YOUR_CONSUMER_KEY',
  consumer_secret: 'YOUR_CONSUMER_SECRET',
  access_token_key: 'YOUR_ACCESS_TOKEN_KEY',
  access_token_secret: 'YOUR_ACCESS_TOKEN_SECRET'
}

var Twitter = new TwitterPackage(secret);
console.log("Hello World! I am a twitter bot!");
```

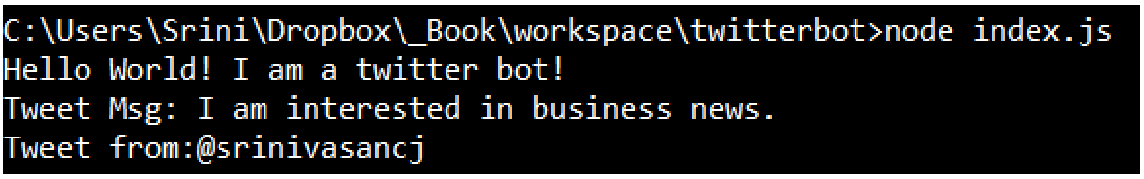
2. Set up a tweet listener to listen to all tweets sent to the bot. My bot's Twitter handle is `@chatbotguru`:

```
//listening to incoming tweets
Twitter.stream('user', {}, function(stream) {
    stream.on('data', function(tweet) {
        console.log(tweet);

        var ct = /@chatbotguru/i;
        var userUtt = 'null';
        if (tweet.text.search(ct) != -1){
            userUtt = tweet.text.replace(ct, '');
            console.log('Tweet Msg:' + userUtt);
            console.log('Tweet from:' + '@' +
            tweet.user.screen_name);
        }
    });
});
```

3. Run the code.

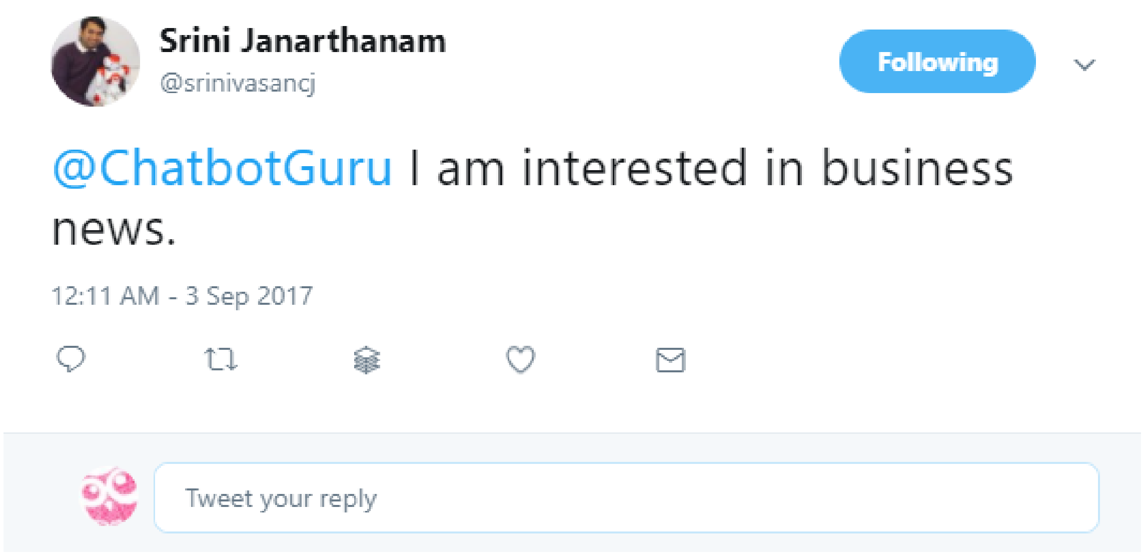
```
> node index.js
```

4. Send a tweet from your personal Twitter account to your bot's account. For example, `@chatbotguru I am interested in business news`. This tweet will be received by the listener that we have just set up:



```
C:\Users\Srini\Dropbox\_Book\workspace\twitterbot>node index.js
Hello World! I am a twitter bot!
Tweet Msg: I am interested in business news.
Tweet from:@srinivasancj
```

You should be able to see the tweet received by the bot on your Twitter app, too:



Srini Janarthanam
@srinivasancj

@ChatbotGuru I am interested in business news.

12:11 AM - 3 Sep 2017

5. Now let's work on the message that we have received from the user. Let's examine the utterance for the topic of interest (politics, business, and so on) and the sentiment conveyed (interested/not interested). This

is then used to insert or delete the user interest record in the database:

```
if (tweet.text.search(ct) != -1){
    userUtt = tweet.text.replace(ct, '');
    console.log('Tweet Msg:' + userUtt);
    console.log('Tweet from:' + '@' + tweet.user.screen_name);

    var userInterest = getInterestedGenre(userUtt);
    var userSentiment = getSentiment(userUtt);

    var user = { 'screen_name' : tweet.user.screen_name,
                'user_interest' : userInterest};

    console.log(user);

    // Use connect method to connect to the server
    MongoClient.connect(url, function(err, db) {
       console.log("Connected successfully to server");
       var collection = db.collection('users');
       if (userSentiment == 'positive'){
           collection.insertMany([user], function(err, result) {
              if (err){
                  console.log(err);
              } else {
                  console.log("Inserted a user interest into the
                              collection");
                  db.close();
              }
            });
       } else {
           collection.deleteOne(user, function(err, result) {
              console.log(err);
              console.log("Deleted a user interest from
                          the collection");
              db.close();
            });
       }
    });
}
```

6. Let's define the `getInterestedTopic()` and `getSentiment()` functions:

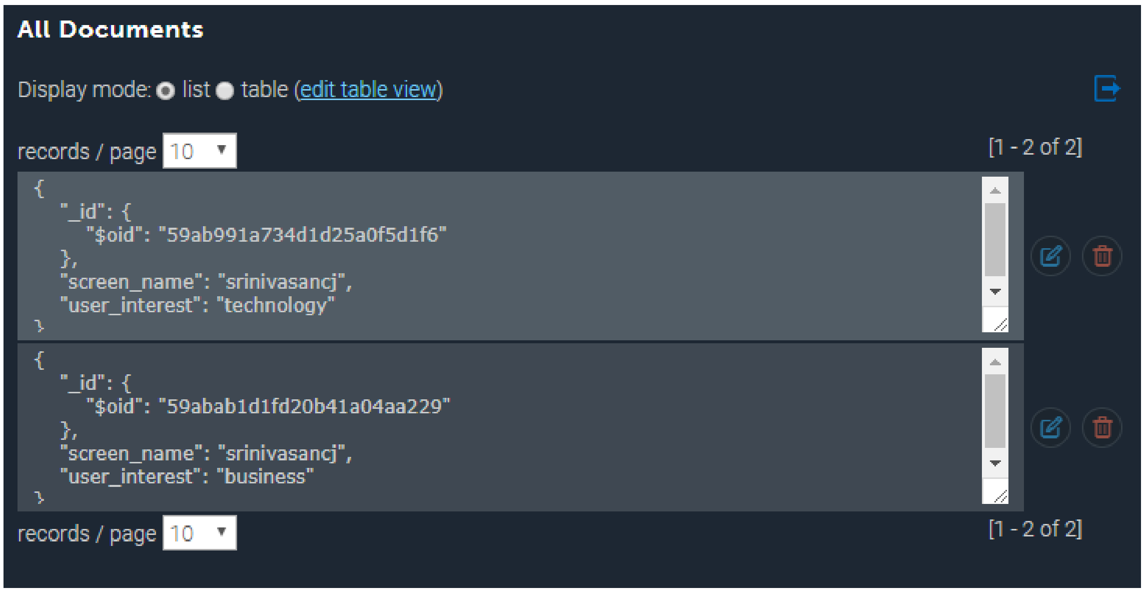
```
function getSentiment(text){
    if (text.search('not interested') != -1){
        return 'negative';
    }
    if (text.search('no more') != -1){
        return 'negative';
    }
    if (text.search('don\'t send') != -1){
        return 'negative';
    }
    if (text.search('no ') != -1){
        return 'negative';
    }
    if (text.search('dont like ') != -1){
        return 'negative';
    }
    if (text.search('unsubscribe ') != -1){
        return 'negative';
    }
    if (text.search('don\'t follow ') != -1){
        return 'negative';
    }
    if (text.search('stop ') != -1){
        return 'negative';
    }
    return 'positive';
}

function getInterestedGenre(text){
    if (text.search('tech') != -1 ||
        text.search('technology') != -1 ){
        return 'technology';
    }
    else if (text.search('all kinds') != -1){
        return 'general';
    }
    else if (text.search('politics') != -1 ||
             text.search('political') != -1){
        return 'politics';
    }
    else if (text.search('sports') != -1){
        return 'sport';
    }
    else if (text.search('business') != -1){
        return 'business';
    }
}
```

These are very simple definitions to start with. You could use NLU toolkits, such as API.AI, to understand user utterances for more complex functionality.

7. For the preceding code to work, we also need to import the MongoDB library and set it up in the `index.js` file:

```
var MongoClient = require('mongodb').MongoClient;
var url = 'YOUR_MONGO_DB_URI';
```

8. Run the code again, send a tweet, and see how it works. You will be able to see that the bot is now able to insert/delete records from the database. Go back to mlab.com and have a look:


All Documents

Display mode: ● list ● table (edit table view)

records / page 10 [1 - 2 of 2]

```
{
    "_id": {
        "$oid": "59ab991a734d1d25a0f5d1f6"
    },
    "screen_name": "srinivasancj",
    "user_interest": "technology"
}
```

```
{
    "_id": {
        "$oid": "59ababb1d1fd20b41a04aa229"
    },
    "screen_name": "srinivasancj",
    "user_interest": "business"
}
```

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That's it! Your hourly tweeter will now be able to pick up the updates in the database and tweet personalized news to all its users. Lastly, push the changes to Heroku Cloud so that you don't have to keep the `index.js` file running on your local machine.

Summary

Hurray! You have built your very own conversational Twitter bot. I would strongly recommend that you take this further and explore other kinds of conversation that you can possibly have with the bot. How about having the bot search and retweet hashtags automatically for you? How would you use metrics, such as retweet counts, follower numbers, and like counts, to qualify a tweet for retweeting? Explore these questions to build better and more useful Twitter bots.

In this lab, we have covered a lot. We started off with the Twitter API and got a taste of how we can automatically tweet, retweet, and search for tweets using hashtags. We then explored a News source API that provides news articles from about 70 different newspapers. We integrated it with our Twitter bot to create a new tweeting bot. We explored how to personalize it for users by using user interest tags stored in a MongoDB database.