

# Boost Your Apps' Emotional Intelligence



3 strategies to make your apps feel all the  
feels!

# Who am I?



Jen Looper

Progress

Senior Developer Advocate

Let's talk about  
~~mobile apps~~  
NativeScript

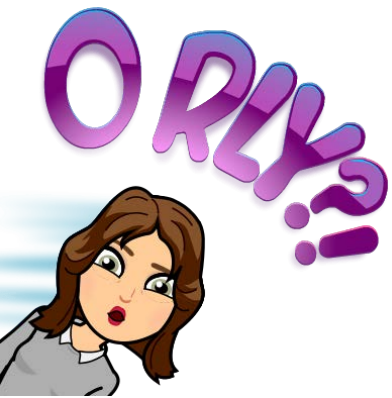


## NativeScript is...

an [open source](#) framework for building [truly native](#) mobile apps with [JavaScript](#).  
Use web skills, like TypeScript, [Angular](#) and CSS, and [get native UI and performance](#) on iOS and Android.

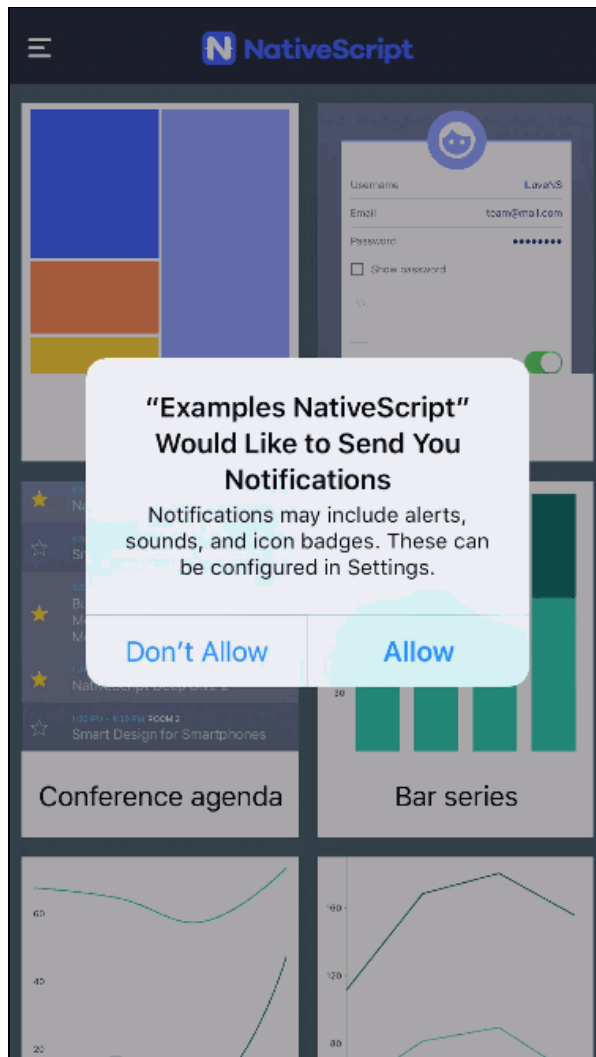


**NativeScript** is the best tool for  
cross-platform native app  
development 🎉



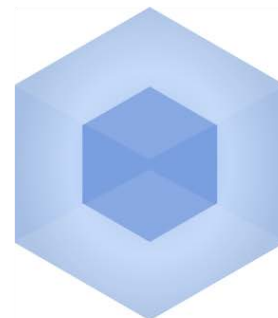


Rich, animated, “no compromise” native UI  
(with shared UI code)





You know  
JavaScript? You  
know NativeScript!



TypeScript





# Write once...

```
import { File } from "file-system";  
new File();
```



```
new java.io.File( path );
```



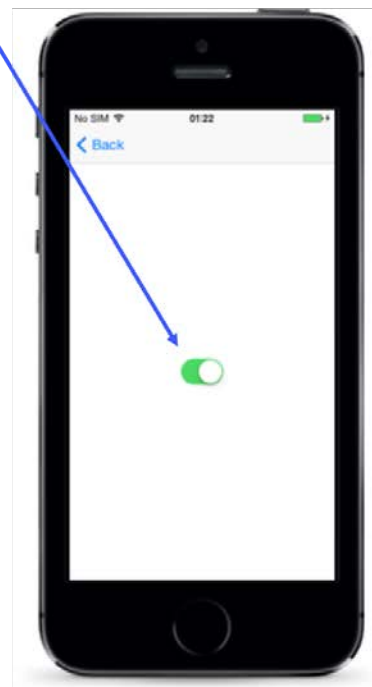
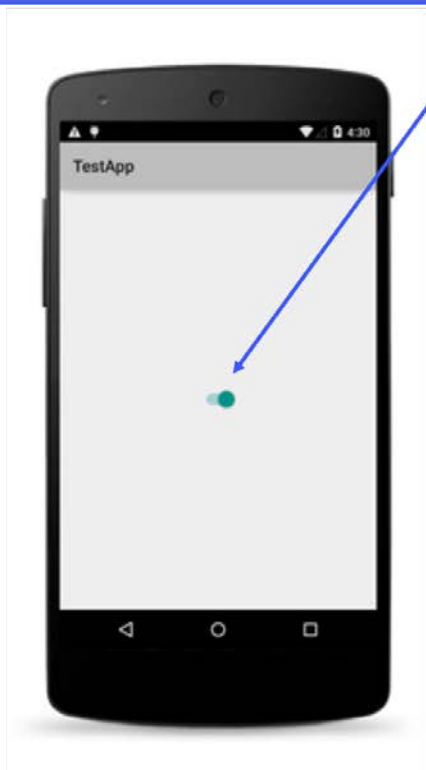
```
NSFileManager defaultManager();  
fileManager.createFileAtPathContentsAttributes(path);
```





# Craft the UI with XML

```
<Switch></Switch>
```





# Built plugins with native libraries




Android Arsenal


⟨COCOAPODS⟩









# ...or use the Marketplace for plugins

Verified vs. unverified plugins. Want to know the difference? ✕

 NativeScript | Marketplace NativeScript.org

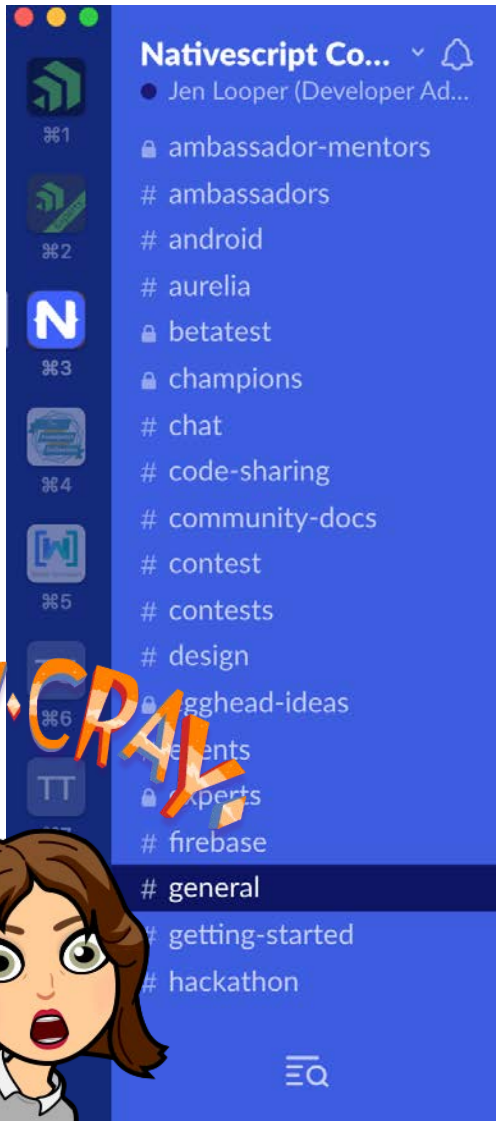
 Search for plugins

---

-  **Image Picker**  
by NativeScript Team | Version 4.0.1  
**VERIFIED** A plugin for the NativeScript framework implementing multiple image picker
-  **Pro UI**  
by Progress | Version 3.2.0  
**VERIFIED** Progress NativeScript Pro UI is a suite of rich user interface components based on the native iOS and Android implementations.
-  **Kinvey NativeScript SDK**  
by Kinvey | Version 3.9.2  
**VERIFIED** Kinvey JavaScript SDK for NativeScript applications.
-  **Geolocation**  
by NativeScript Team | Version 4.2.0  
**VERIFIED** Provides API for getting and monitoring location for NativeScript app.
-  **Drop Down**  
by Peter Staev | Version 3.2.0  
**VERIFIED** A NativeScript DropDown widget.
-  **Mapbox**



# NativeScript community Slack channel



## #general

☆ | 👤 4,800 | 🗨️ 13 |  t



Today



**Ingmar Bode** 5:01 PM

Hey, when I define a `TabView` like `<TabView (selectedIndexChange)="onTabChanged($event)" selectedIndex="0">` the `onTabChanged` is fired immediately when the page show up. Is there any way to avoid this? I would rather have the event fired when the user explicitly taps on a tab. (edited)



**xlcr** 5:01 PM

Docs say latest xcode is needed. I can't upgrade from 8-9 because hard drive is full, what can I do to get started? (edited)

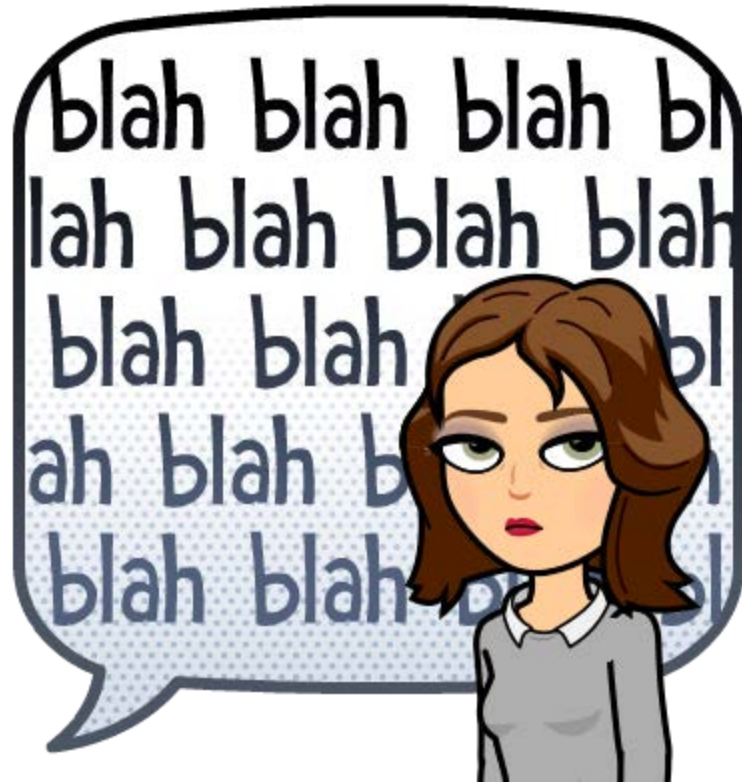


**xlcr** 5:34 PM

tns run ios =

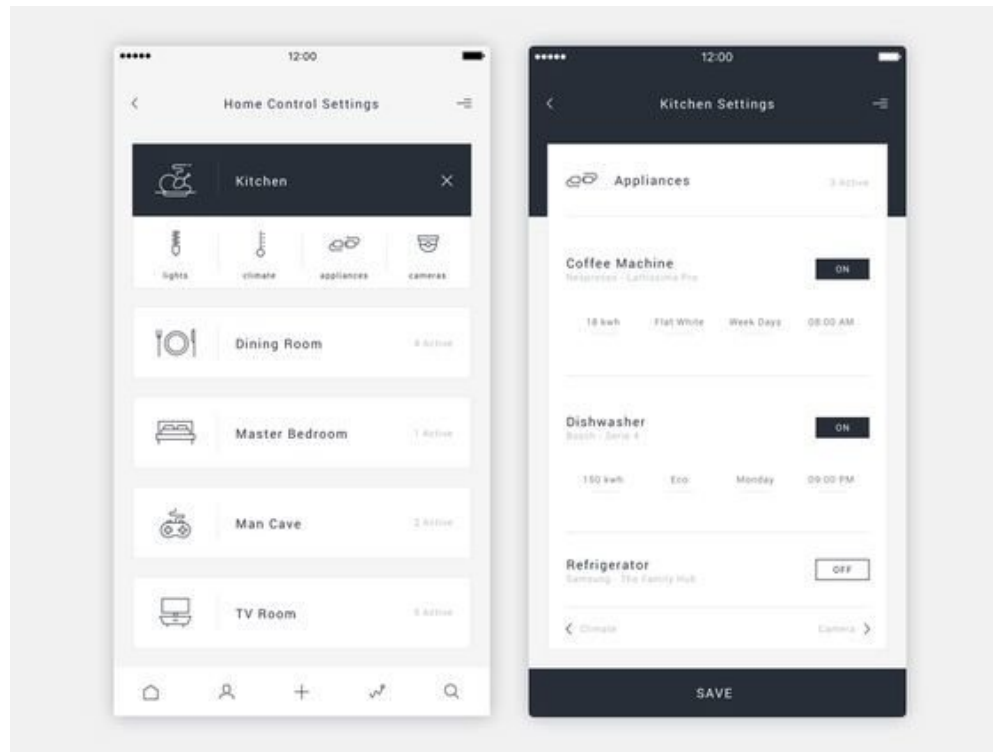
```
Xcode build...
=== BUILD TARGET testapp OF PROJECT testapp WITH
CONFIGURATION Debug ===
No profiles for 'org.nativescript.testapp' were found: Xcode
couldn't find a provisioning profile matching
'org.nativescript.testapp'.
Code signing is required for product type 'Application' in
SDK 'iOS 10.3'
Code signing is required for product type 'Application' in
SDK 'iOS 10.3'
** BUILD FAILED **
```





# Help!

My apps are stupid and boring



# Let's fix that!

Try an IoT integration!

Try two machine learning APIs

Talk a little about what's possible next

Make your  
apps "smarter"

"smart" = more  
human

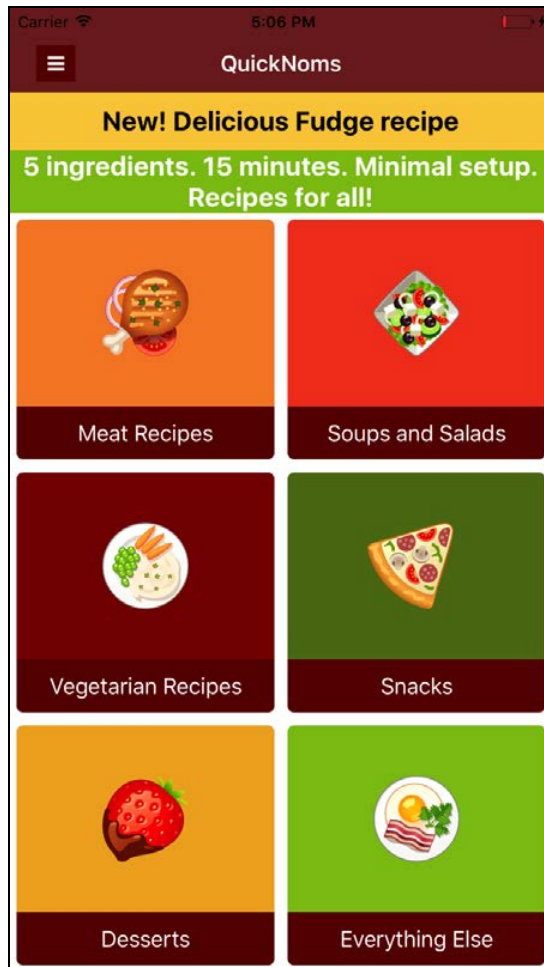


# Let's build something



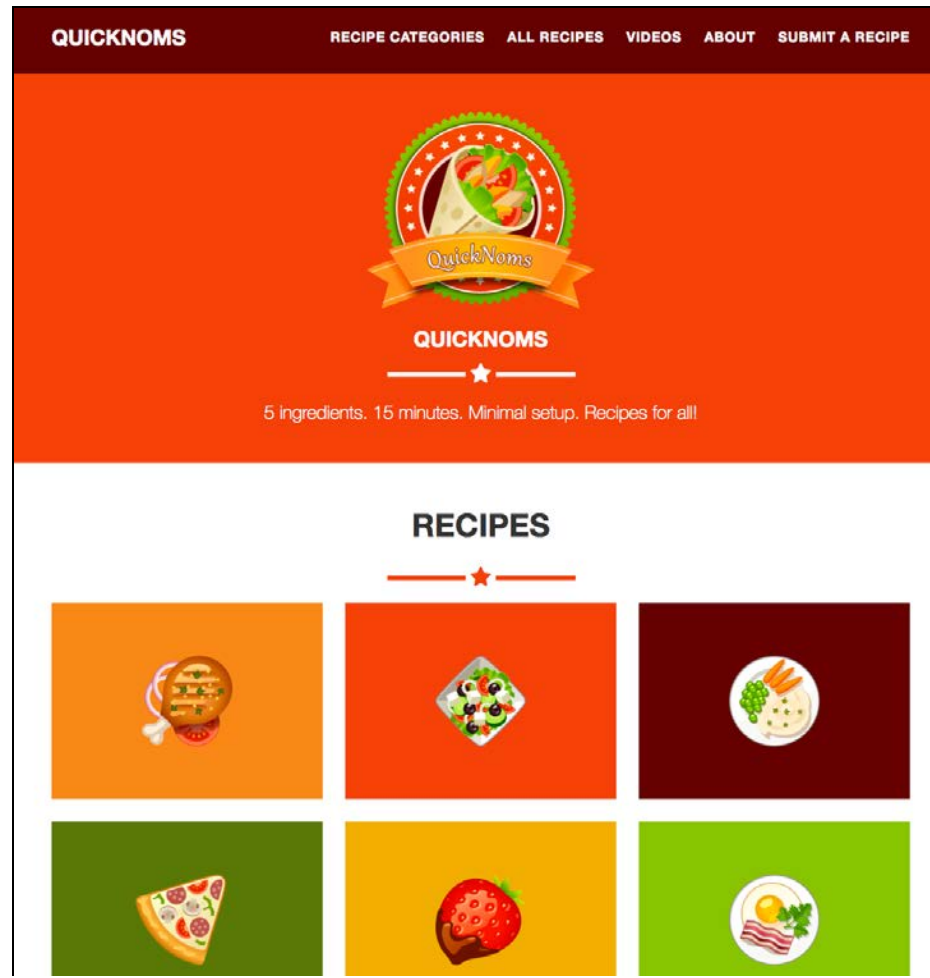
# QuickNoms: a smart recipe app

Powered by Firebase & NativeScript



# Submit your recipes on the web!

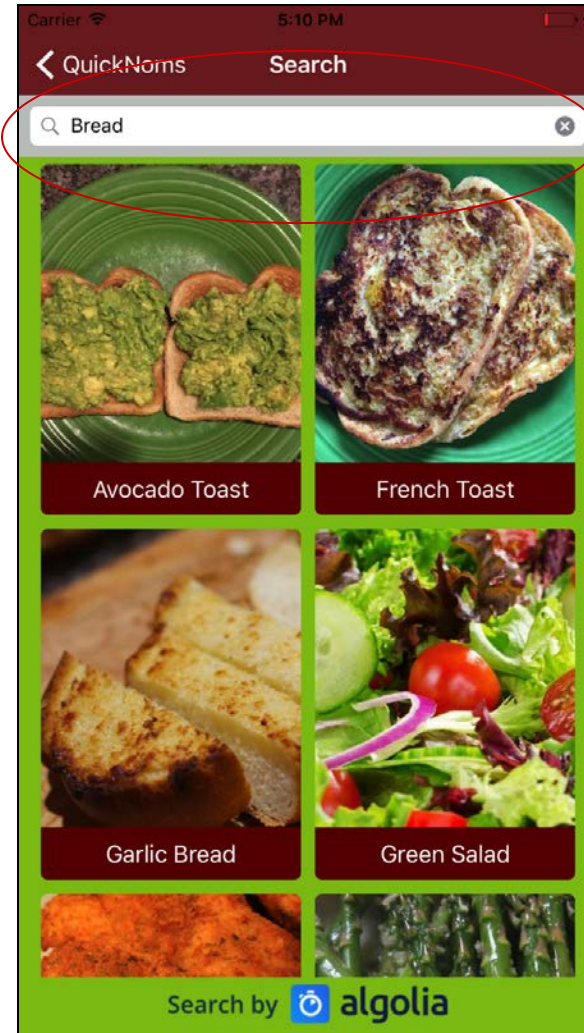
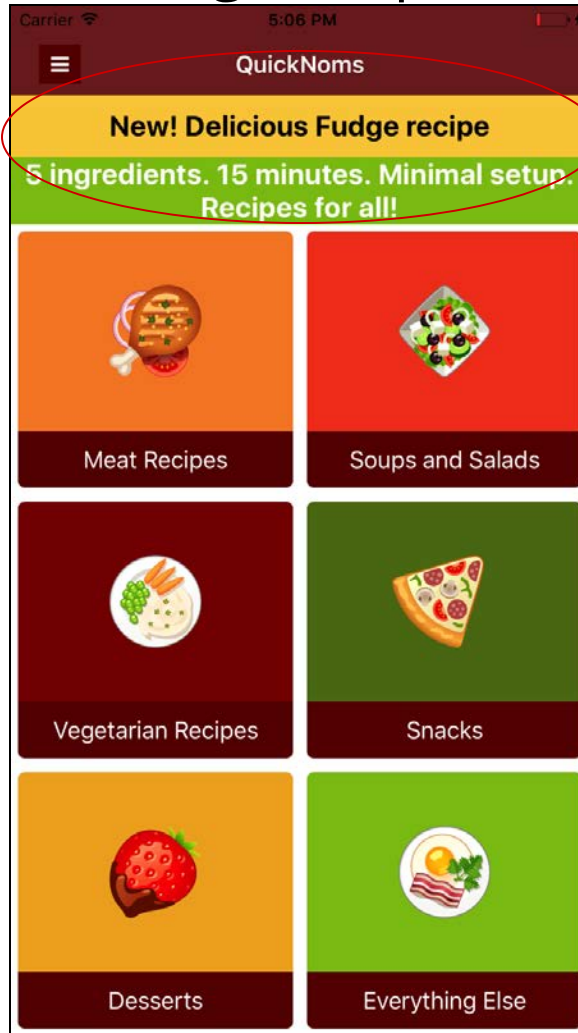
QuickNoms.com



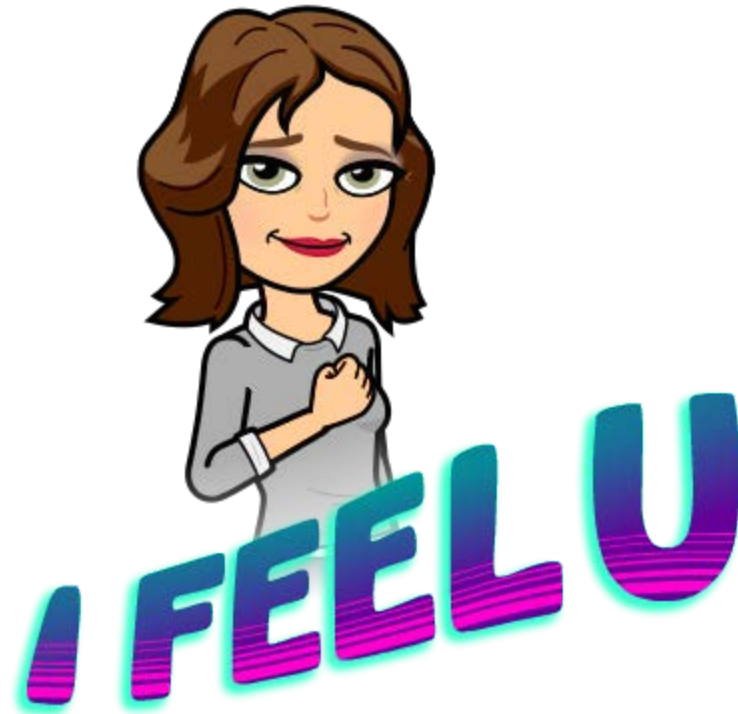
# Mobile App Features:

Firestore Remote  
Config marquee

Algolia search

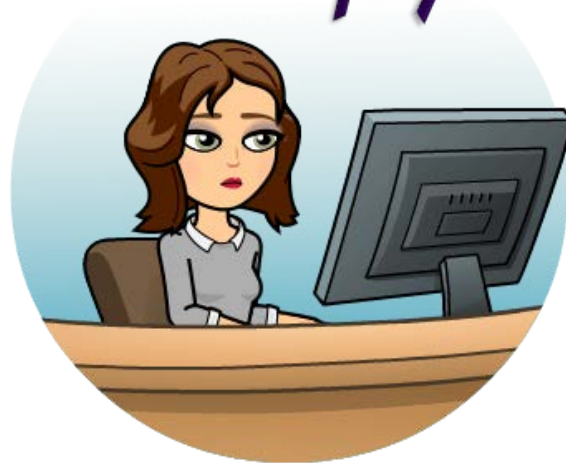


goal: empathetic apps



Move from a simple  
master/detail app  
to...

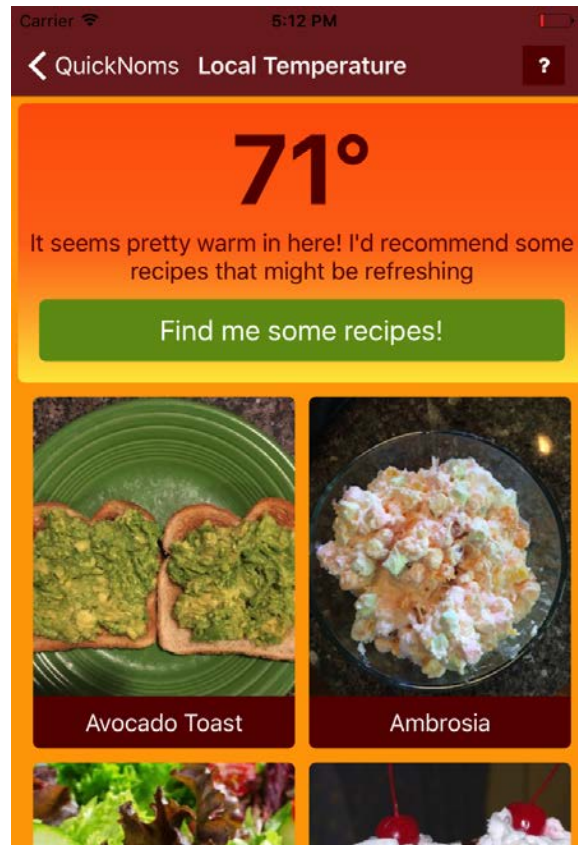
*Can I help you?*



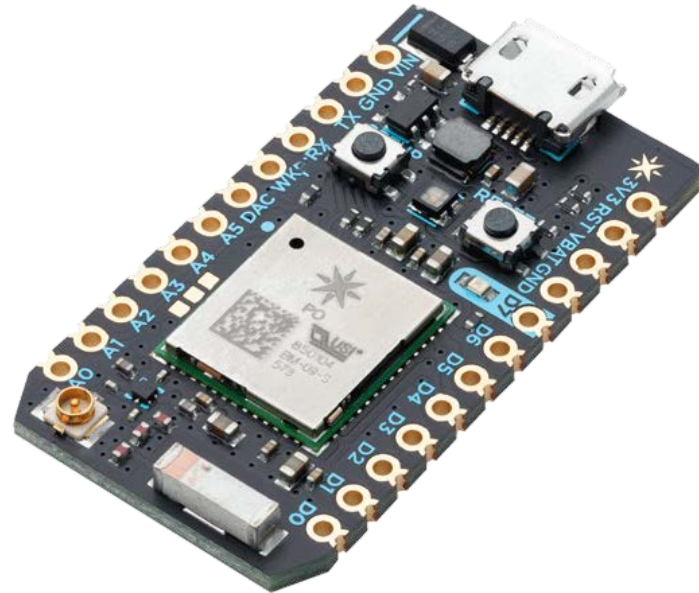


# Make your app 'sensitive'

Build an IoT integration to craft a recipe recommender based on room temperature



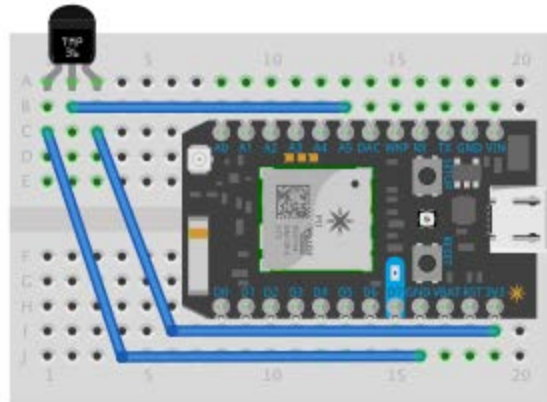
# Add a sensor





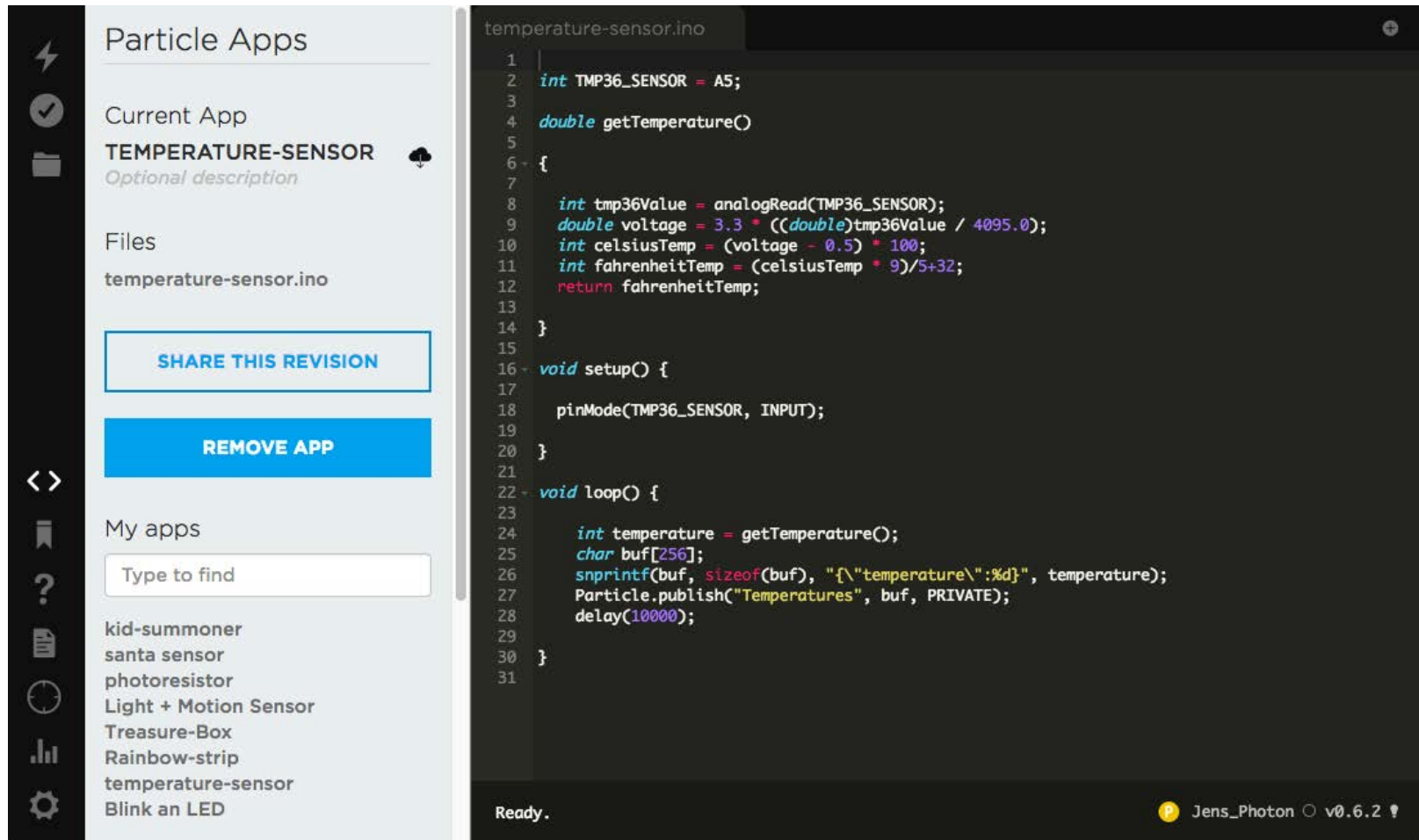
# Build the device

wifi-connected Particle Photon +  
temperature sensor - about \$25 total



# Flash code to the Photon

Photon reads temp every 10 secs, writes data to Particle Cloud



The screenshot displays the Particle IDE interface. On the left, a sidebar contains navigation icons and a list of apps. The main area shows the code for 'temperature-sensor.ino'.

**Particle Apps**

Current App  
**TEMPERATURE-SENSOR**  
*Optional description*

Files  
temperature-sensor.ino

[SHARE THIS REVISION](#)

[REMOVE APP](#)

My apps

Type to find

- kid-summoner
- santa sensor
- photoresistor
- Light + Motion Sensor
- Treasure-Box
- Rainbow-strip
- temperature-sensor
- Blink an LED

```
temperature-sensor.ino
1
2 int TMP36_SENSOR = A5;
3
4 double getTemperature()
5
6 {
7
8     int tmp36Value = analogRead(TMP36_SENSOR);
9     double voltage = 3.3 * ((double)tmp36Value / 4095.0);
10    int celsiusTemp = (voltage - 0.5) * 100;
11    int fahrenheitTemp = (celsiusTemp * 9)/5+32;
12    return fahrenheitTemp;
13
14 }
15
16 void setup() {
17
18     pinMode(TMP36_SENSOR, INPUT);
19
20 }
21
22 void loop() {
23
24     int temperature = getTemperature();
25     char buf[256];
26     sprintf(buf, sizeof(buf), "{\"temperature\":%d}", temperature);
27     Particle.publish("Temperatures", buf, PRIVATE);
28     delay(10000);
29
30 }
31
```

Ready. P Jens\_Photon ○ v0.6.2 !


# Build webhook

webhook lives in Particle Cloud, watches for data written by Photon to cloud

Particle

Docs | Contact Sales | Support | jen.looper@gmail.com

Integrations > View Integration

 **Webhook**

Event: **Temperatures** Target: **firebaseio.com**

ID: **59a625ca79338e3e6229f8e0** Created: **August 29th, 2017** **TEST**

### INTEGRATION INFO

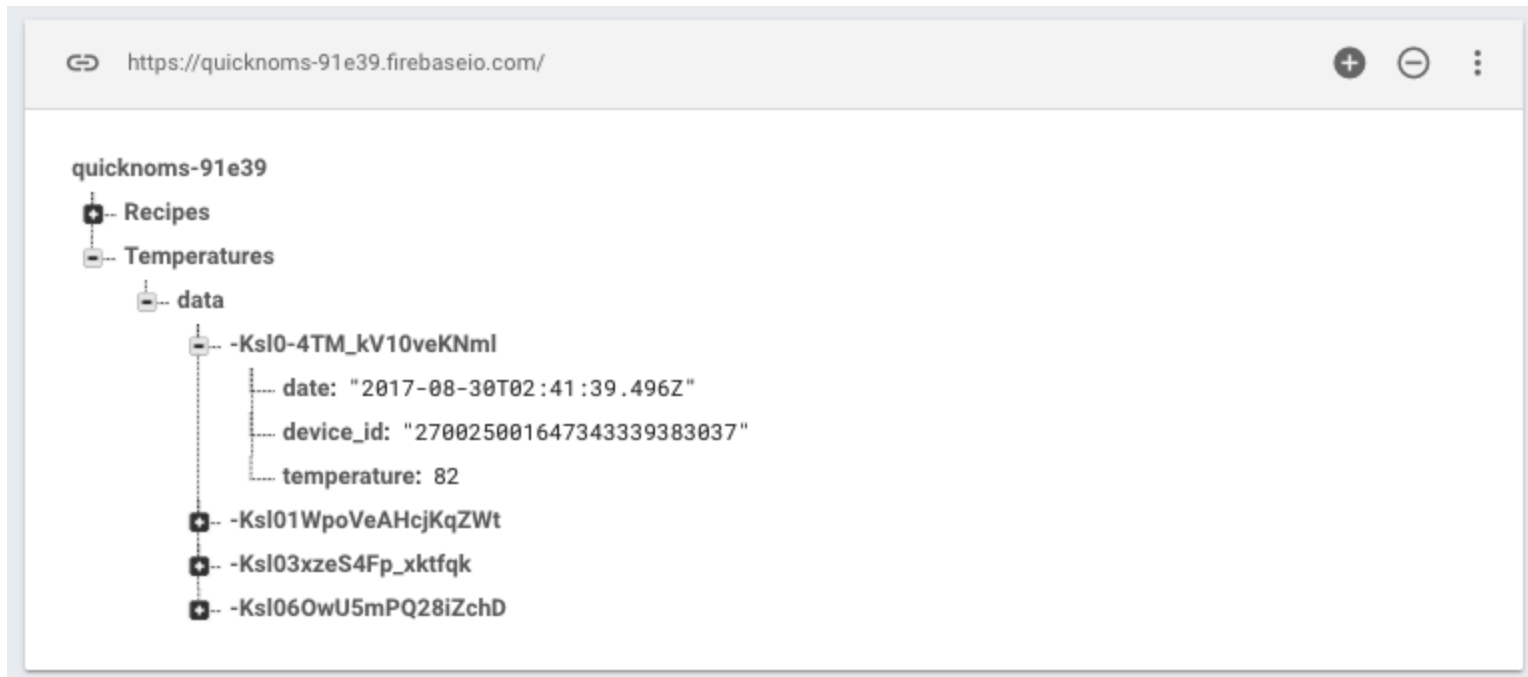
**Event Name** **Temperatures**  
*The Particle event name that triggers the webhook*

**Full URL** <https://quicknoms-91e39.firebaseio.com/Temperatures/data.json>  
*The target endpoint that is hit when the webhook is triggered*

**Request Type** **POST**  
*The standard web request method used when the webhook is triggered*

**Device** **any device**  
*The device that will trigger the webhook*

# Webhook writes to Firebase



# app consumes data and reacts

Select recipes tagged as 'hot'  
or 'cold' - atmosphere type  
recipes

# Observable subscribes to temperature saved to Firebase

```
ngOnInit(): void {  
    this.recipesService.getTemperatures(AuthService.deviceId).subscribe((temperature) => {  
        this.temperature$ = temperature[0].temperature;  
        this.getRecommendation(this.mode)  
    })  
}  
  
getRecommendation(mode){  
  
    if (mode == 'F'){  
        if (Number(this.temperature$) > 70) {  
            this.gradient = this.hotGradient;  
            this.recommendation = this.hotRecommendation;  
        }  
        else {  
            this.gradient = this.coolGradient;  
            this.recommendation = this.coolRecommendation;  
        }  
    }  
}
```

...

# Scale the idea



nest Developers Home Docs API Explorer Blog Community Search GO TO CONSOLE

Documentation

GUIDES REFERENCE SAMPLES SUPPORT BETA

API Reference  
Overview  
Thermostat  
Smoke+CO Alarm  
Camera  
Product/Resource

## Thermostat API

The Nest API works with all Nest Learning Thermostat™ models.

Users can add multiple Nest Thermostats to the `devices/thermostats` group, up to the [maximum per structure](#). When you make a call to this data location, you can access Nest Thermostat data (data values for devices in the structure).

All the below values are found under each `devices/thermostats/device_id` in the JSON document.

### device\_id

Nest Thermostat unique identifier.

Details

```
https://developer-api.nest.com/devices/thermostats/device_id/device_id
```

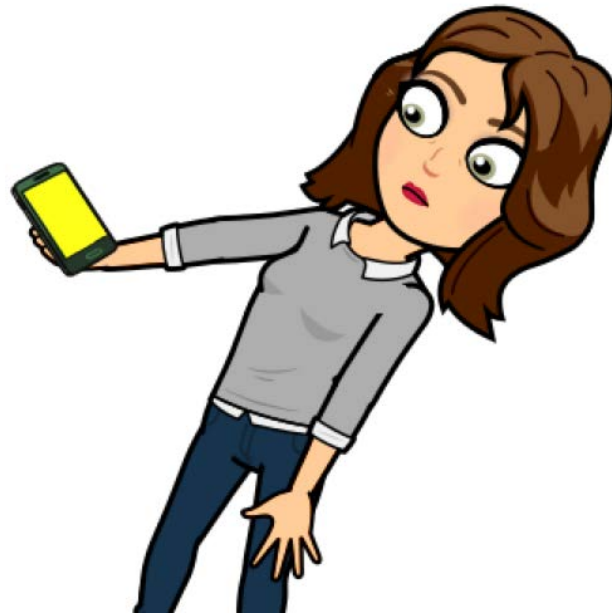
Contents

- device\_id
- locale
- software\_version
- structure\_id
- name
- name\_long
- last\_connection
- is\_online
- can\_cool
- can\_heat
- is\_using\_emergency\_h...
- has\_fan
- fan\_timer\_active
- fan\_timer\_timeout
- has\_leaf
- temperature\_scale
- target\_temperature\_f
- target\_temperature\_c

demo



# Add some Machine Learning



Machine Learning +  
Mobile = ❤️

think of the possibilities for  
photos, video, audio

# ML is easy

Batch gradient descent	Stochastic gradient descent
$\rightarrow J_{train}(\theta) = \frac{1}{2m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)})^2$	$\rightarrow \text{cost}(\theta, (x^{(i)}, y^{(i)})) = \frac{1}{2} (h_{\theta}(x^{(i)}) - y^{(i)})^2$
Repeat {	$\rightarrow J_{train}(\theta) = \frac{1}{m} \sum_{i=1}^m \text{cost}(\theta, (x^{(i)}, y^{(i)}))$
$\rightarrow \theta_j := \theta_j - \alpha \frac{1}{m} \sum_{i=1}^m (h_{\theta}(x^{(i)}) - y^{(i)}) x_j^{(i)}$ <p style="text-align: center;"><math>\frac{\partial}{\partial \theta_j} J_{train}(\theta)</math></p> <p style="text-align: center;">(for every <math>j = 0, \dots, n</math>)</p>	1. Randomly shuffle dataset.
}	2. Repeat {
	for $i=1, \dots, m$ {
	$\theta_j := \theta_j - \alpha (h_{\theta}(x^{(i)}) - y^{(i)}) \cdot x_j^{(i)}$ <p style="text-align: center;">(for <math>j=0, \dots, n</math>)</p>
	}
	$\rightarrow \frac{\partial}{\partial \theta_j} \text{cost}(\theta, (x^{(i)}, y^{(i)}))$

Andrew Ng

not

# What even is machine learning?



# Machine Learning is:

a way to give “computers the ability to learn without being explicitly programmed.”

"A computer program is said to learn from experience  $E$  with respect to some class of tasks  $T$  and performance measure  $P$  if its performance at tasks in  $T$ , as measured by  $P$ , **improves** with experience  $E$ ." (Tom Mitchell, 1997).



# How to make a machine learn\*

\*"supervised learning"

Gather a lot of data (images, sounds)

Divide that data into a training set and a test set

- The training set is categorized (sorted by hand or by machine)
- The test set is uncategorized

Use an algorithm to train a model with the training set by pairing input with expected output

Use the test set to test the accuracy of the training

rinse & repeat



ML in the wild

# Good uses of ML



STITCH FIX

StitchFix combines ML + human curation

Formulas to pick out clothes based on  
customer input

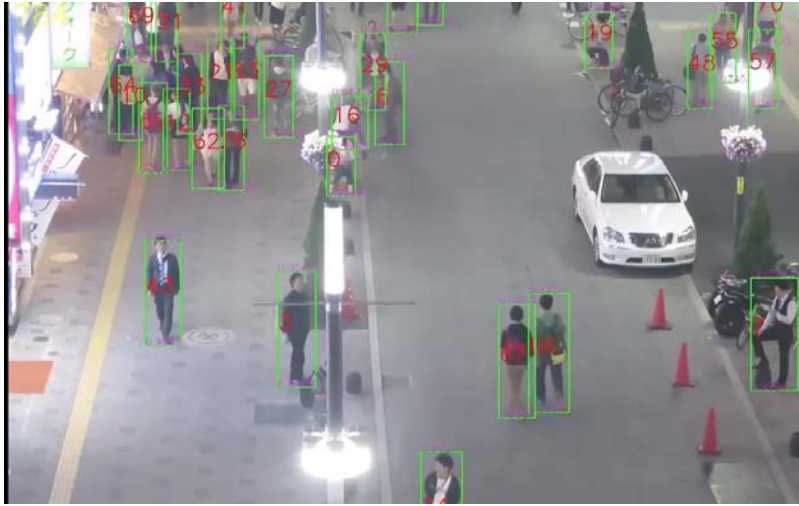
Formulas to pair a shopper with a stylist

Formulas to calculate distance of  
warehouse to customer

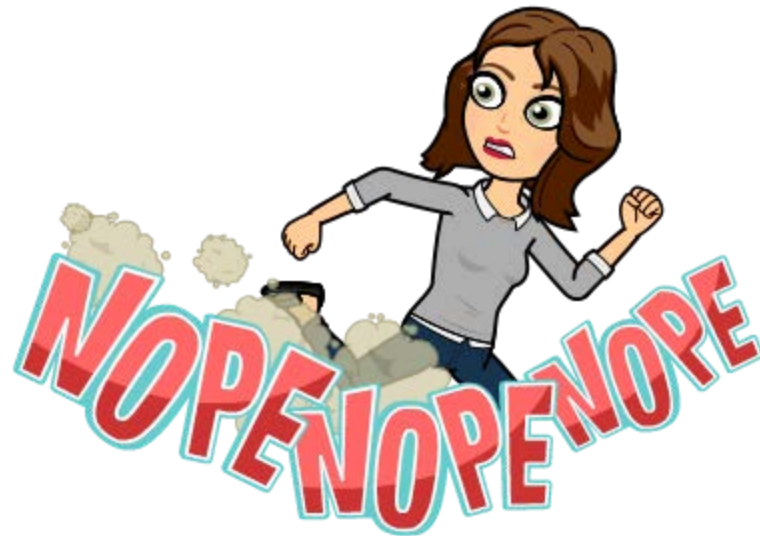
Algorithms to search and classify clothing  
trends to recommend



# Scary uses of ML



install a ton of surveillance cameras  
get really good at ml-powered facial recognition  
match faces to IDs  
monitor emotions...and manipulate them  
push ads at people based on age/gender  
invisibly track location



# good and bad?

MIT students used an algorithm to  
optimize school bus routes



50 superfluous routes eliminated

\$3-5 million saved

50 union bus drivers out of work

with great power  
comes great responsibility!



# Microsoft 🙌

"snow leopard or not" -  
partnership with the  
Snow Leopard Trust





# Microsoft 🙌

"AI For Earth"

<https://www.microsoft.com/en-us/aiforearth>



Climate  
Change



Biodiversity



Agriculture



Water



# DIY Machine Learning is hard

you need a lot of firepower  
& skillz

# Use a third party with pretrained models

**clarifai**



Google Cloud Platform



Specialists in image analysis

Took top 5 awards in 2013 ImageNet  
challenge

Innovative techniques in training models  
to analyze images

Offer useful pre-trained models like "Food"  
"Wedding" "NSFW"

Or, train your own model!

# "Does this dish qualify as a QuickNom?"

Use Clarif.ai's pretrained Food model to analyze images of plates of food for inspiration



probably not!



might be!

# Take a picture

```
takePhoto() {  
  
    const options: camera.CameraOptions = {  
        width: 300,  
        height: 300,  
        keepAspectRatio: true,  
        saveToGallery: false  
    };  
  
    camera.takePicture(options)  
        .then((imageAsset: ImageAsset) => {  
            this.processRecipePic(imageAsset);  
        }).catch(err => {  
            console.log(err.message);  
        });  
  
}
```

# Send it to Clarif.ai via REST API call

```
public queryClarifaiAPI(imageAsBase64):Promise<any>{
  return http.request({
    url: AuthService.clarifaiUrl,
    method: "POST",
    headers: {
      "Content-Type": "application/json",
      "Authorization": "Key " + AuthService.clarifaiKey,
    },
    content: JSON.stringify({
      "inputs": [{
        "data": {
          "image": {
            "base64": imageAsBase64
          }
        }
      }]
    })
  })
  .then(function (response) {
    return response
  })
}
```



# Analyze returned tags

QuickNom dishes have a few easy-to-see, simple ingredients if between 4 & 8 ingredients are listed with over .899 certainty, it's a QuickNom!

```
.then(res => {
  this.loader.hide();
  try {
    let result = res.content.toJSON();
    let tags = result.outputs[0].data.concepts.map( mc => mc.name + '|' + mc.value );
    let ingredients = [];
    tags.forEach(function(entry) {
      let prob = entry.split('|');
      prob = prob[1];
      let ingred = entry.split('|');
      if(prob > 0.899){
        ingredients.push(ingred[0])
      }
    });
    //there should be between four and eight discernable ingredients
    if (ingredients.length >= 4 && ingredients.length <= 8) {
      alert("Yes! This dish might qualify as a QuickNom! It contains "+ingredients)
    }
    else {
      alert("Hmm. This recipe doesn't have the qualifications of a QuickNom.
        Try again!")
    }
  }
}
```

demo

# "What can I make with an avocado?"

Use Google's Vision API to match images with recipes





Do it all with Google!

Leverage its consumption of millions of photos via Google Photos with Cloud Vision API

- Label Detection
- Explicit Content Detection
- Logo Detection
- Landmark Detection
- Face Detection
- Web Detection (search for similar)

# Take a picture

```
takePhoto() {  
  
    const options: camera.CameraOptions = {  
        width: 300,  
        height: 300,  
        keepAspectRatio: true,  
        saveToGallery: false  
    };  
  
    camera.takePicture(options)  
        .then((imageAsset: ImageAsset) => {  
            this.processItemPic(imageAsset);  
        }).catch(err => {  
            console.log(err.message);  
        });  
  
}
```

# Send it to Google

```
public queryGoogleVisionAPI(imageAsBase64: string):Promise<any>{
  return http.request({
    url: "https://vision.googleapis.com/v1/images:annotate?key="+AuthService.googleKey,
    method: "POST",
    headers: {
      "Content-Type": "application/json",
      "Content-Length": imageAsBase64.length,
    },
    content: JSON.stringify({
      "requests": [{
        "image": {
          "content": imageAsBase64
        },
        "features" : [
          {
            "type": "LABEL_DETECTION",
            "maxResults": 1
          }
        ]
      }
    ]
  })
})
.then(function (response) {
  return response
})
})
```

# Grab the first label returned and send to Algolia search

```
this.mlService.queryGoogleVisionAPI(imageAsBase64)
  .then(res => {
    let result = res.content.toJSON();
    this.ingredient = result.responses[0].labelAnnotations.map( mc => mc.description );
    this.ngZone.run(() => {
      this.searchRecipes(this.ingredient)
    })
  });
```

demo



# Looking forward



DIY machine learning  
made a little easier!

# Machine learning on device

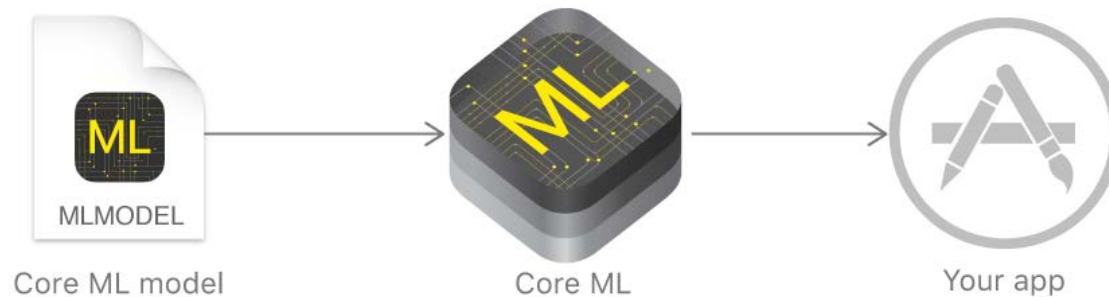
What if you don't want to make a bunch of  
expensive \$\$ REST API calls?

What if you need offline capability?

What if you want to keep your data on  
device?

What if you need to train something really  
custom?

# Machine learning on device

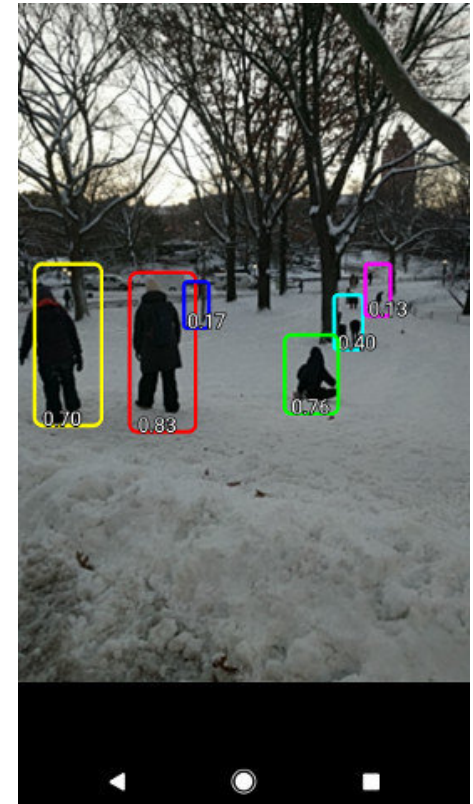
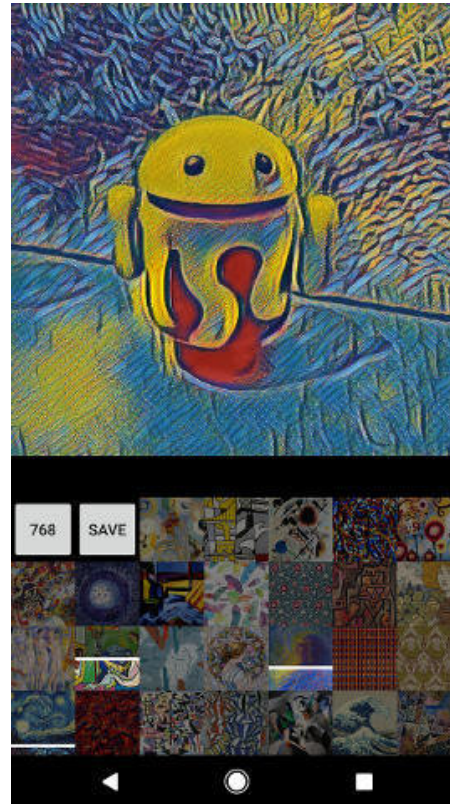


Now landed in iOS 11: Core ML

Train a model externally, let Core ML process it for your app on device



# Machine learning on device



TensorFlow Mobile (v1)

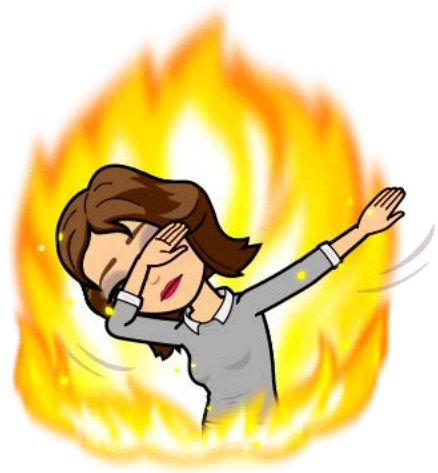
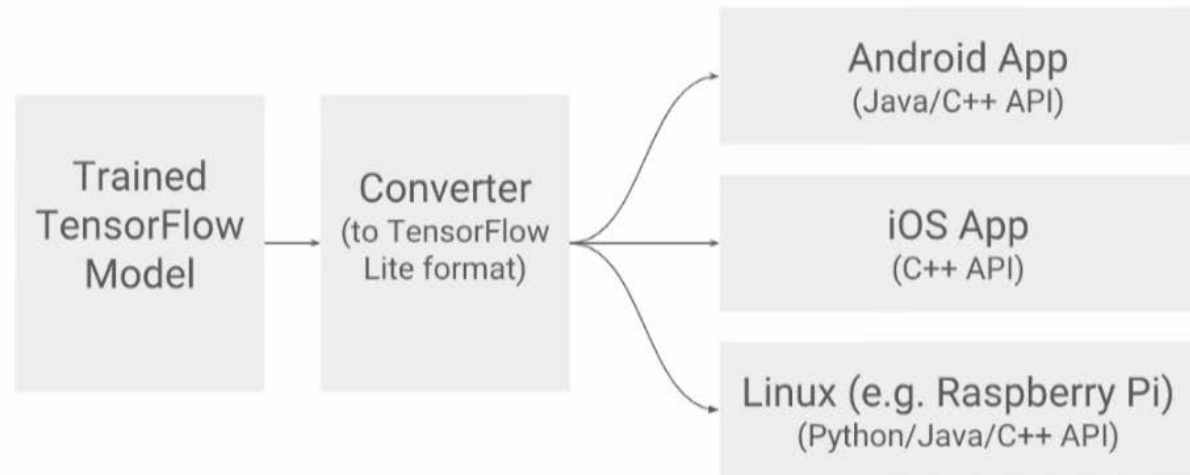
Designed for low-end Androids, works for iOS and Android

# New! Hot!

# TensorFlow Lite!

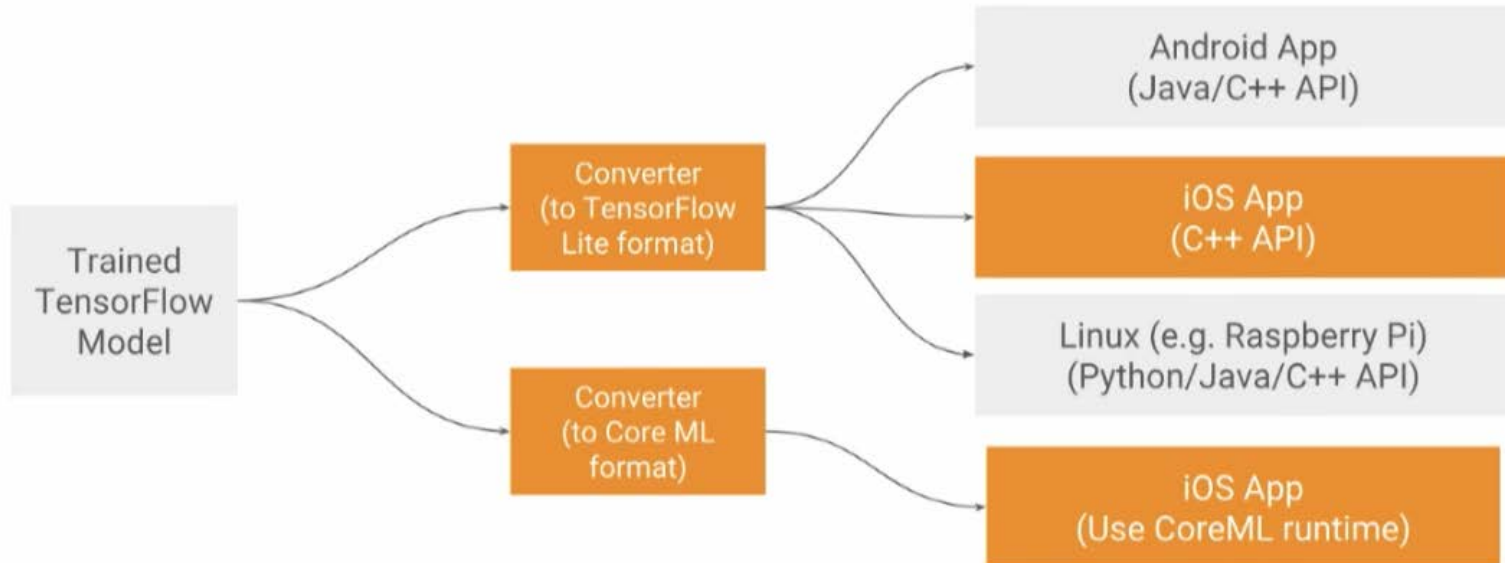
next-gen version of TensorFlow for mobile

"on-device machine learning inference with low latency  
and a small binary size."



# TensorFlow Lite for iOS

you have the option to convert to CoreML!



# Featuring:

- a new model file format, based on "FlatBuffers" - smaller/faster/more memory efficient than ProtocolBuffers
- new mobile-optimized interpreter
- an interface to leverage hardware acceleration (Android)
- small footprint! 75 - 400 kb!

Watch this project! Coming soon: train ON DEVICE







# Machine learning on device

TensorFlow powers Google Translate!





demo:  
Google Translate  
(realtime text  
recognition using  
TensorFlow models  
on device)



demo:

TensorFlow Mobile  
on iOS

Word cloud featuring the word "thank you" in various languages and scripts, including: danke, 謝謝, ngiyabonga, spas, barka, welalin, tack, merci, misaotra, matondo, paldies, grazzi, faafetai lava, vinaka, спасибо, blagodarim, kiitos, dhanyavad, hvala, maururu, köszönöm, thank you, gracias, tau, mochchakke, go, raibh, maith, ag, sukriya, chnorakaloutioun, gratias ago, grazie, go, raibh, maith, ag, takk, dakujem, gado, dekuji, didi madloba, sagobun, kam sah hamnida, najis tuke, terima kasih, rahmat, ありがとう, 감사합니다, euχαριστώ, dhanyavadagalu, merci, tanadh leat.

