Boost Your Apps' Emotional Intelligence

3 strategies to make your apps feel all the feels!

@jenlooper

Who am I?

Jen Looper

Progress

Senior Developer Advocate

@jenlooper

Let's talk about

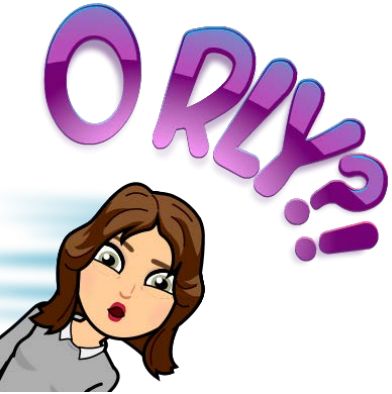
~~mobile apps~~

NativeScript

NativeScript is...

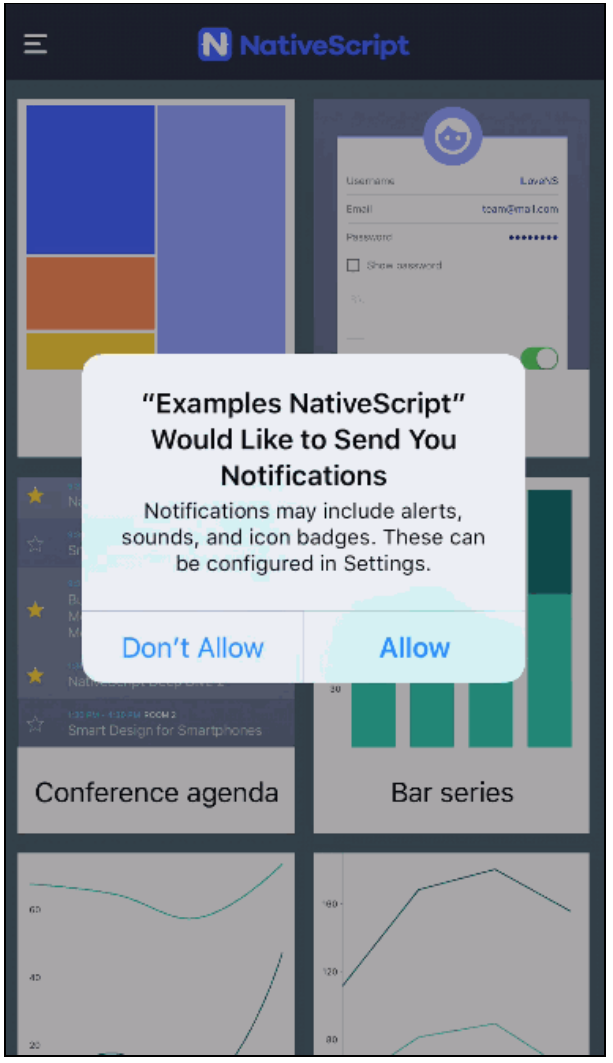
an open source framework for building truly native mobile apps with JavaScript. Use web skills, like TypeScript, Angular and CSS, and get native UI and performance on iOS and Android.

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

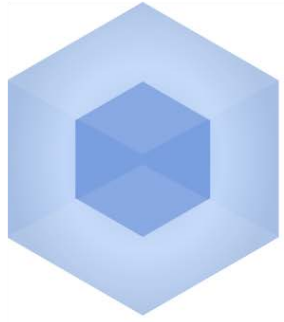


Rich, animated, “no compromise” native UI

(with shared UI code)



You know JavaScript? You know NativeScript!



Write once...

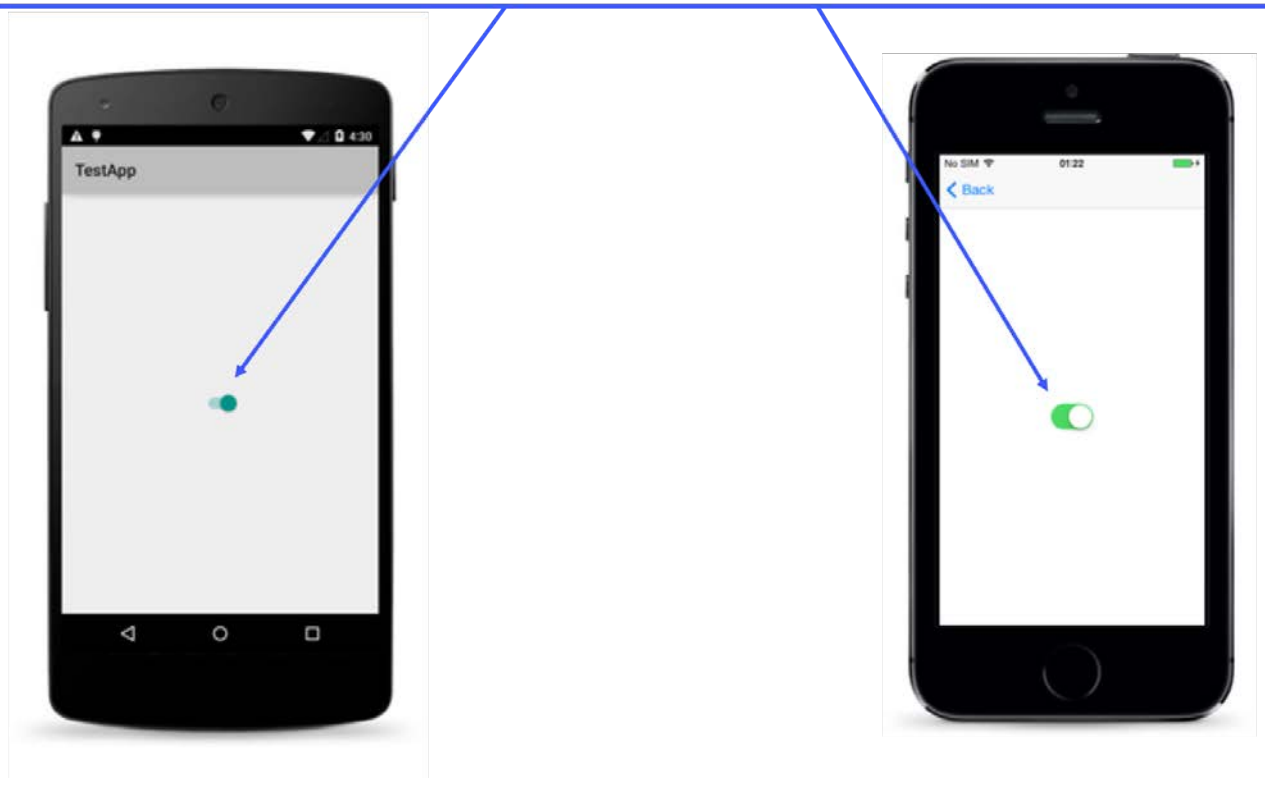
```
import { File } from "file-system";
new File();
```

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

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

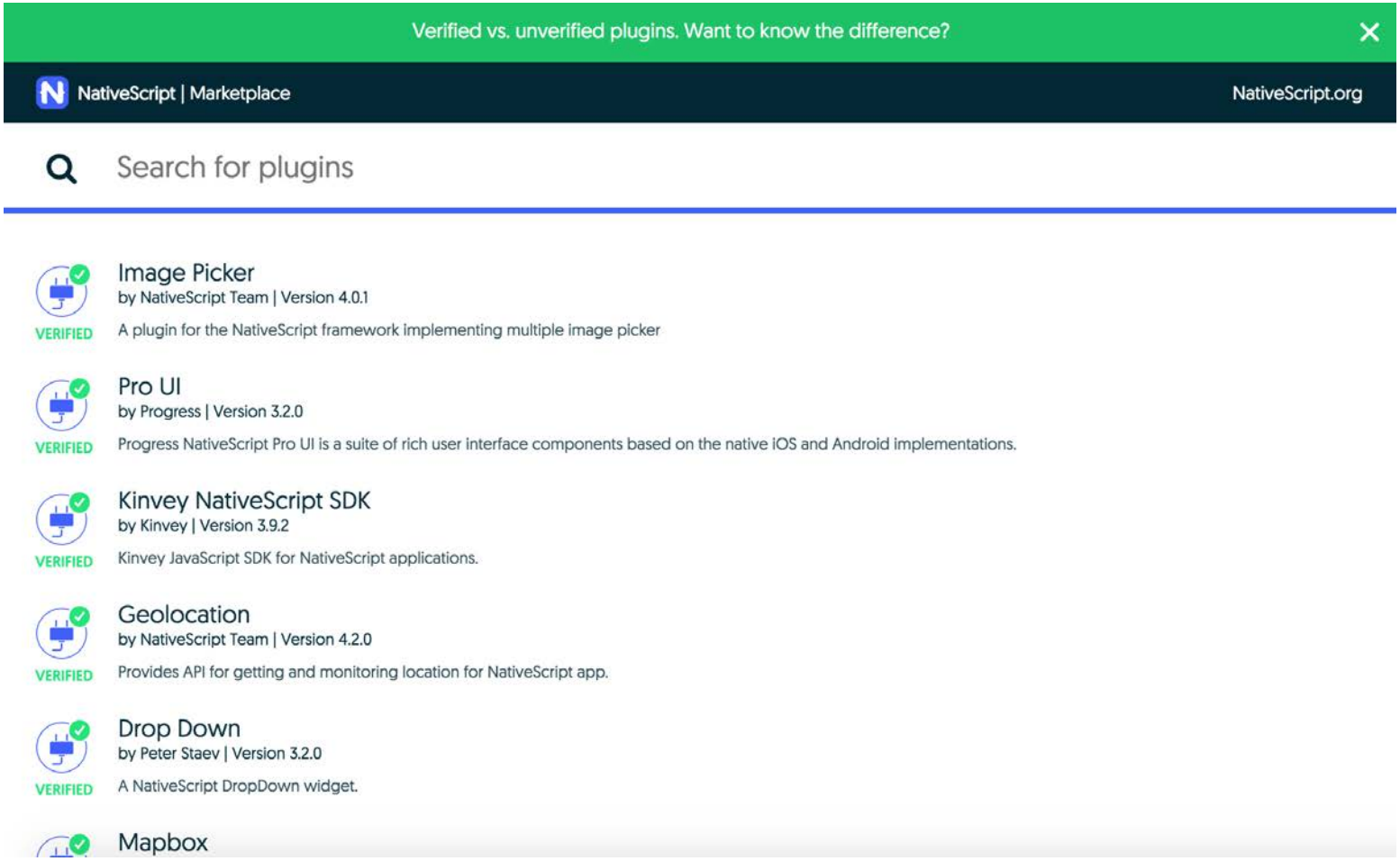
Craft the UI with XML

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



Built plugins with native libraries

...or use the Marke tplace for plugins



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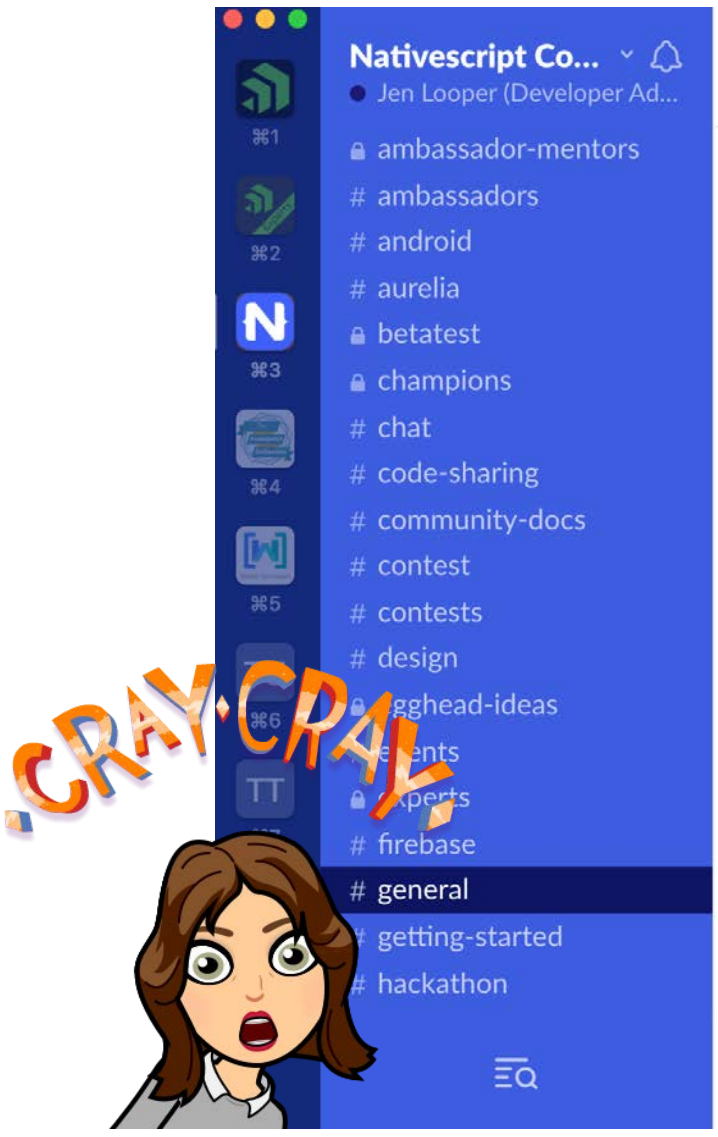
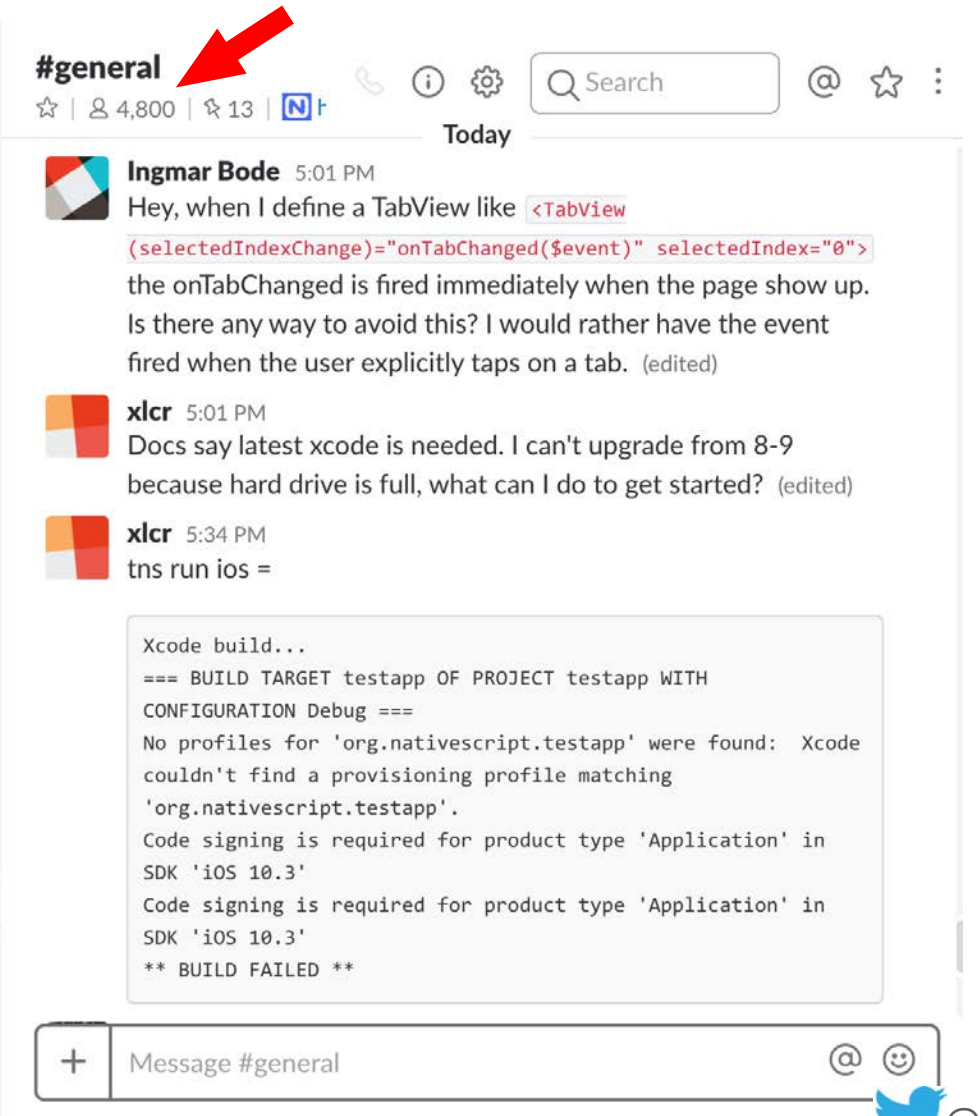
NativeScript community Slack channel





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blah blah blah bl
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blah blah

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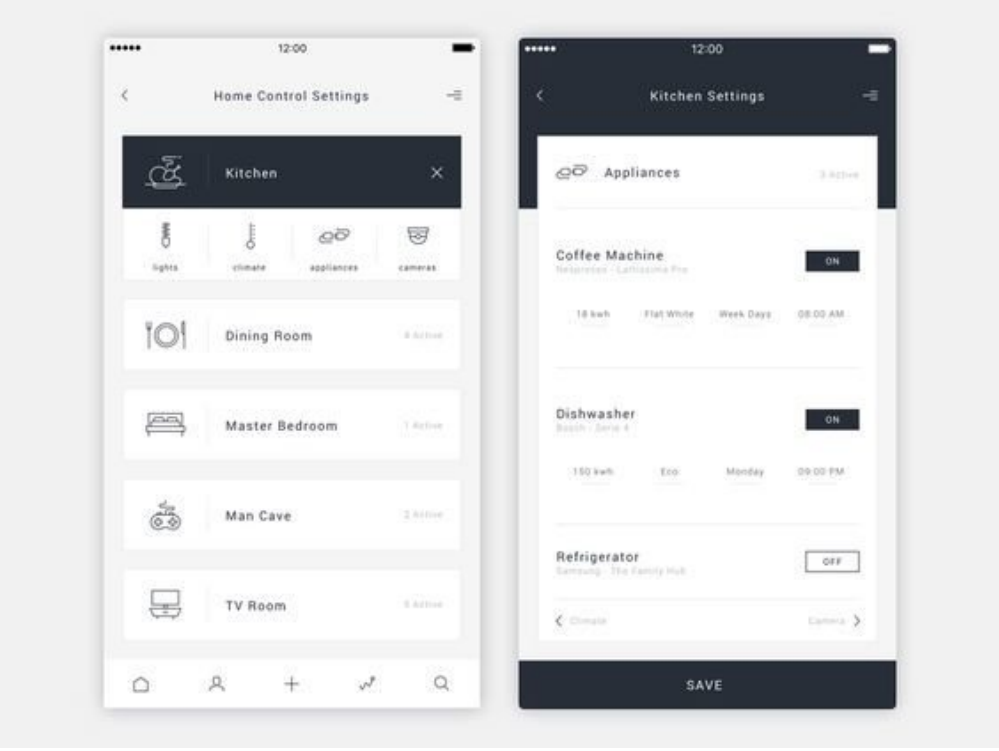
Help!

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

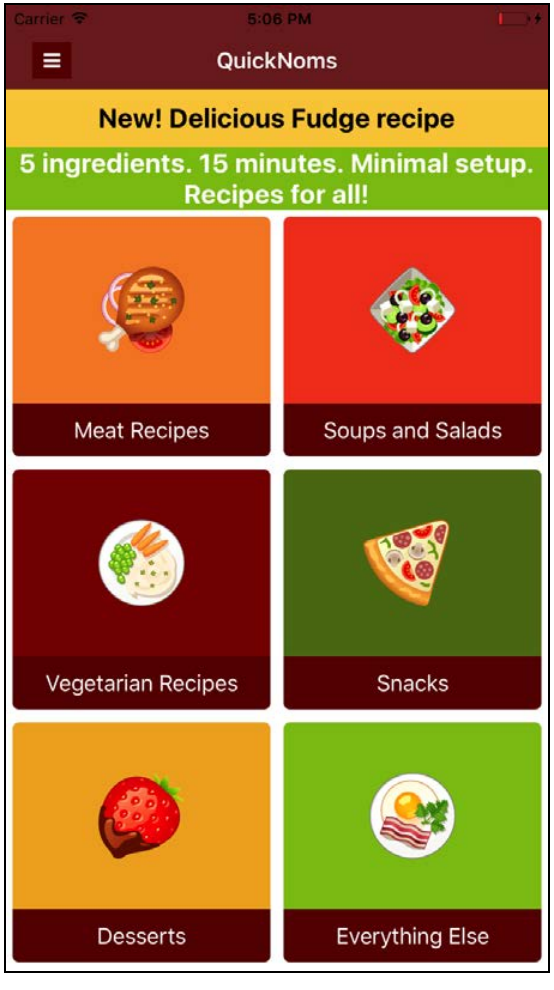
Make your apps "smarter"

"smart" = more human

Let's build something

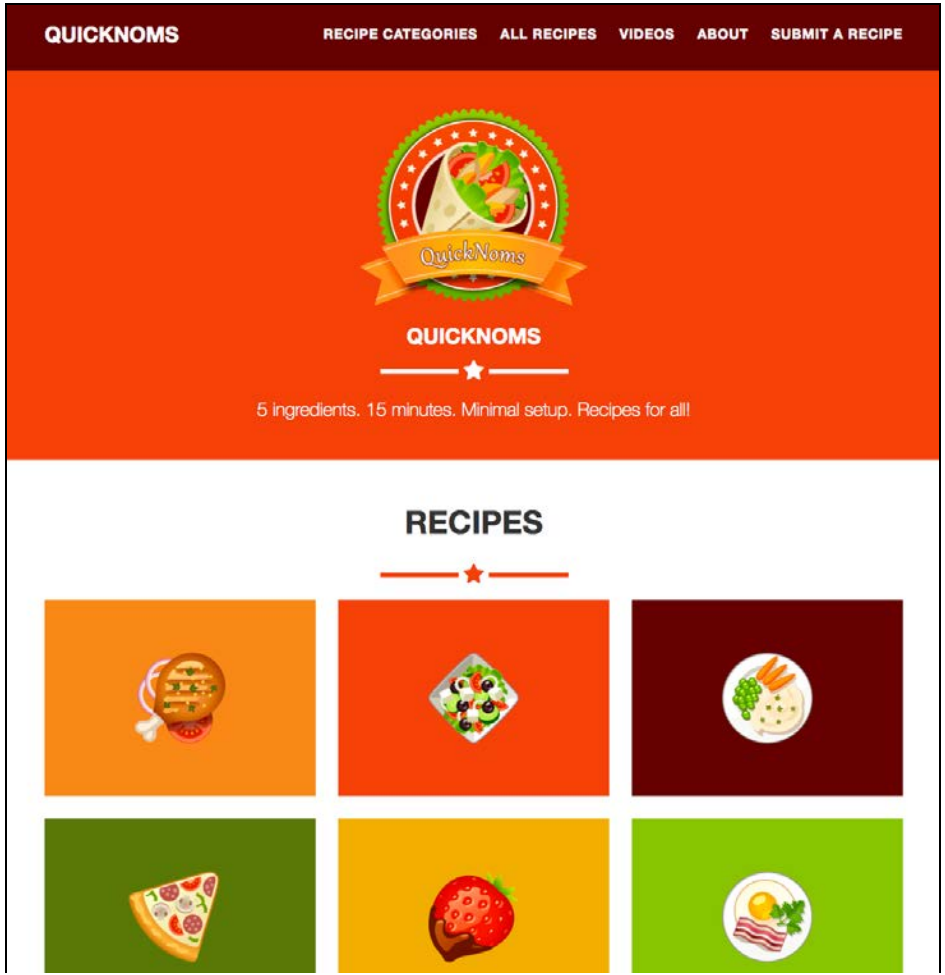
QuickNoms: a smart recipe app

Powered by Firebase & NativeScript



Submit your recipes on the web!

QuickNoms.com



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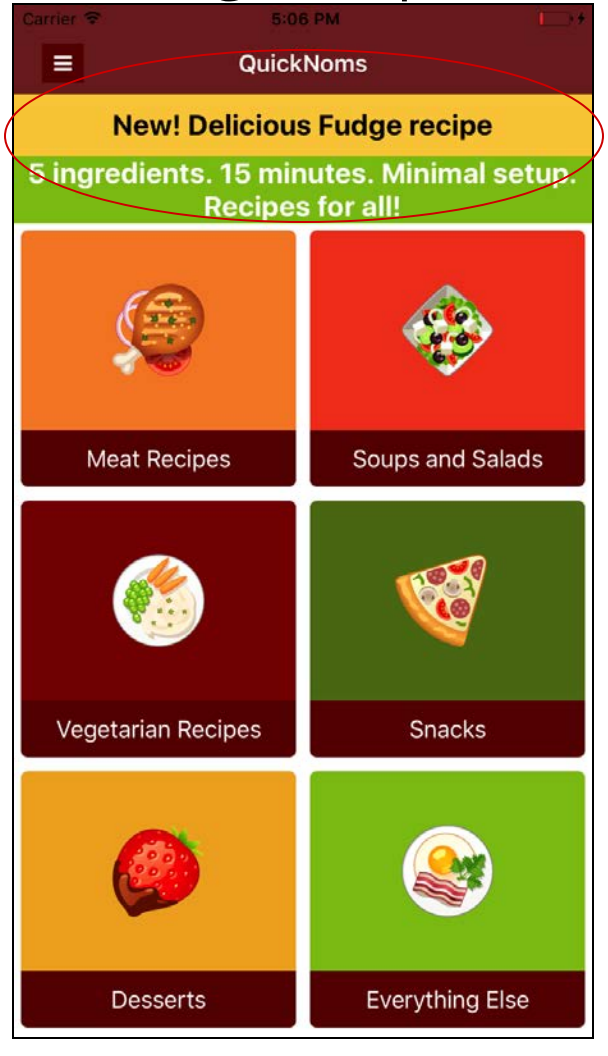
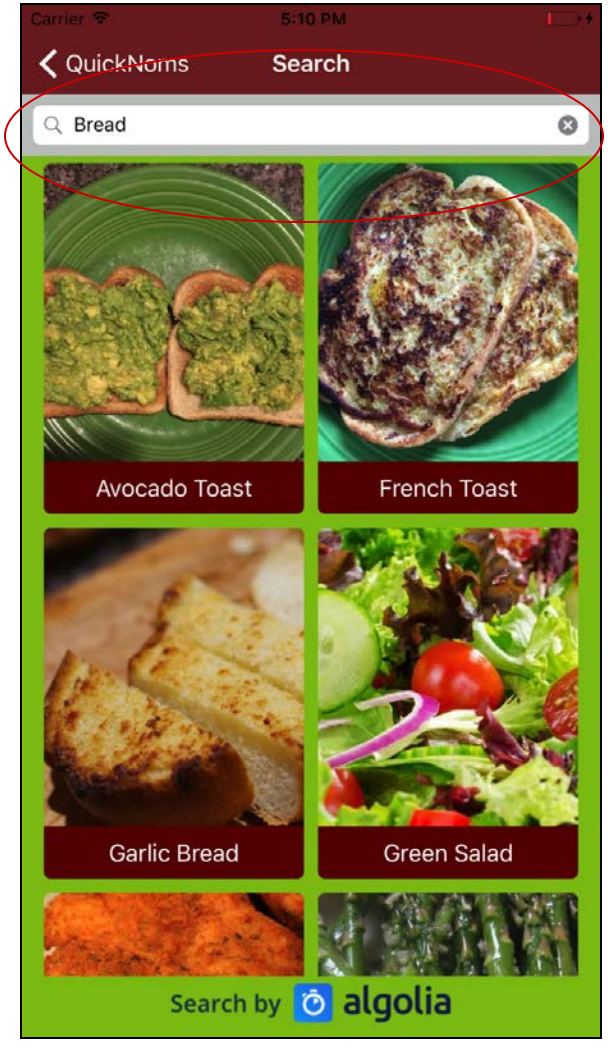
Mobile App Features:

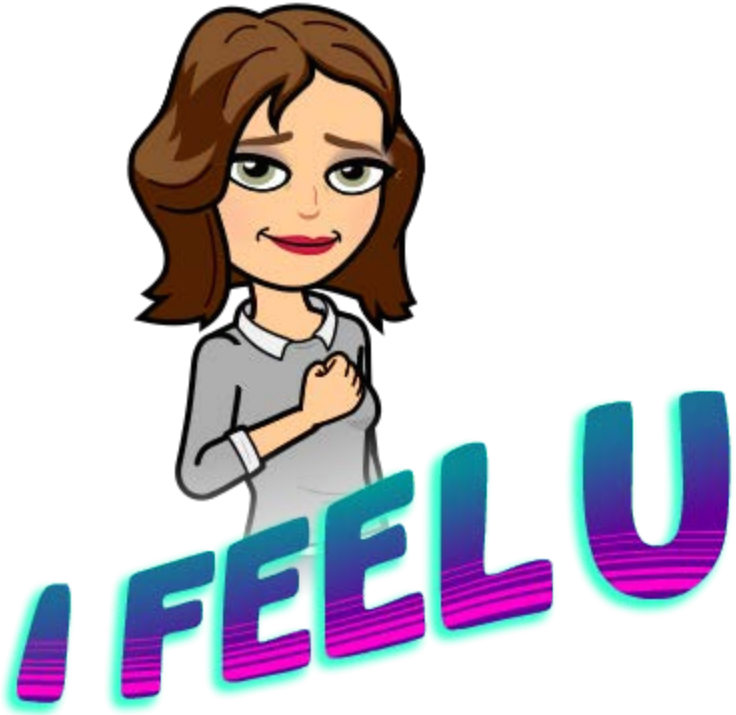
Firebase Remote Config marquee



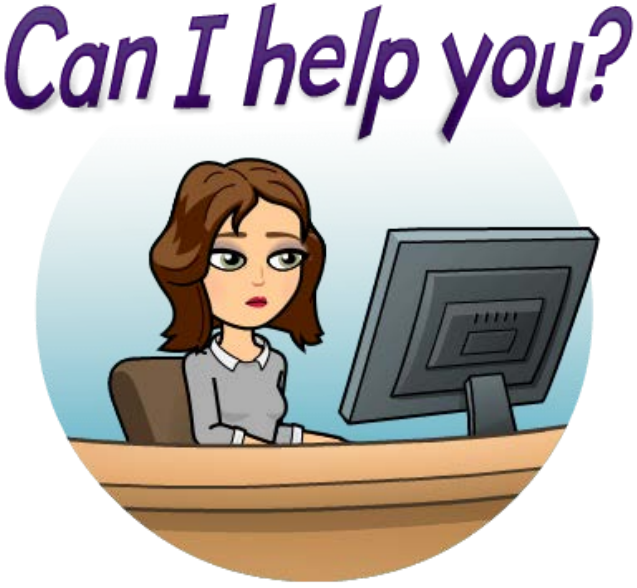
Algolia search



goal: empathetic apps

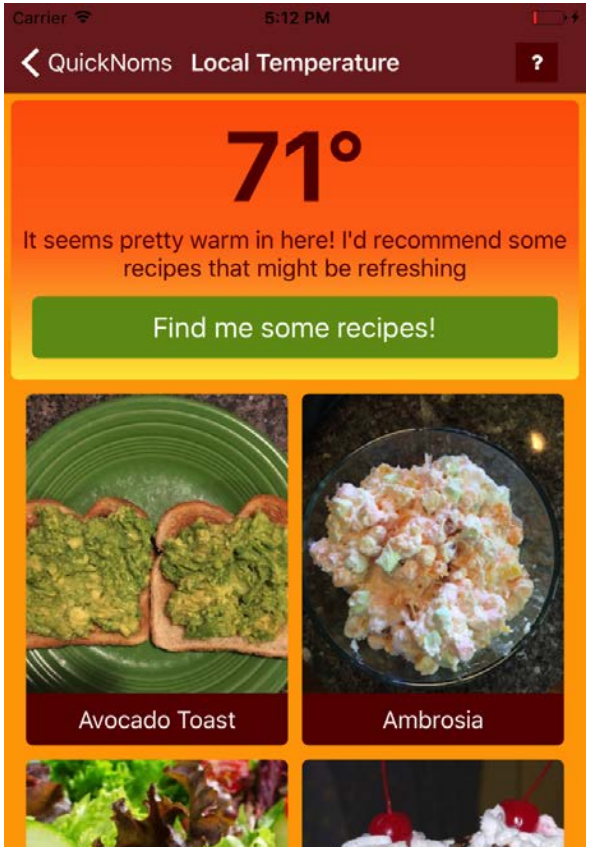


Move from a simple master/de tail app to…

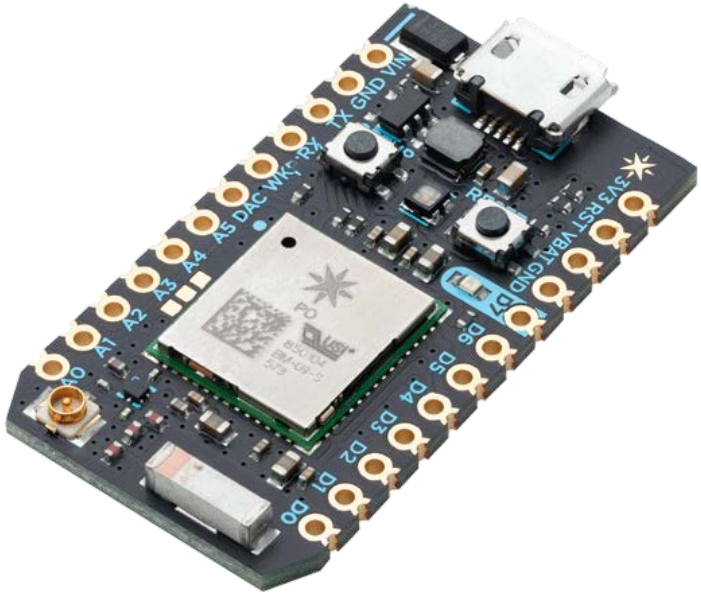


Make your app 'sensitive'

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

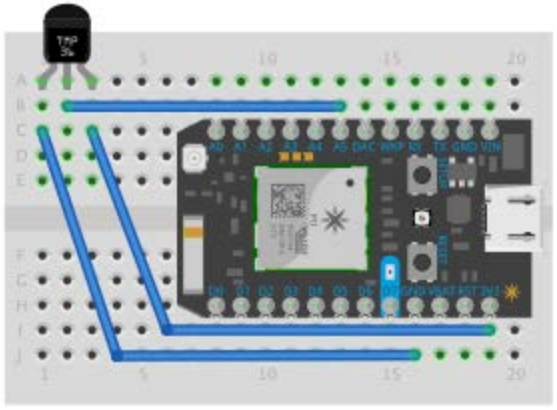


Add a sensor


TX GND VIN
A5 DAC WKP RX
A4
A3
A2
A1
A0
3V3 RST VBAT GND
D6
D5
D4
D3
D2
D1
D0

Build the device

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



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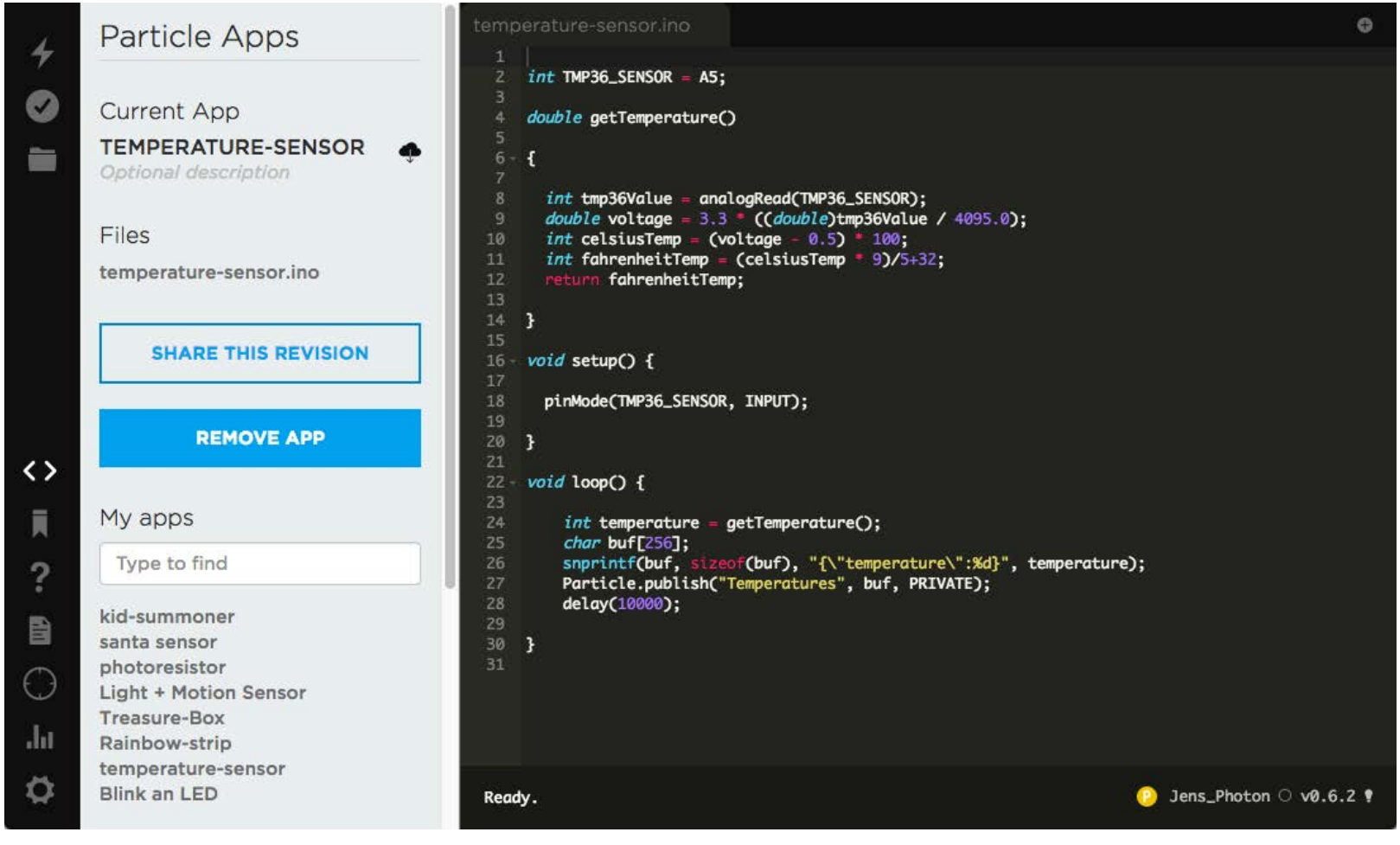
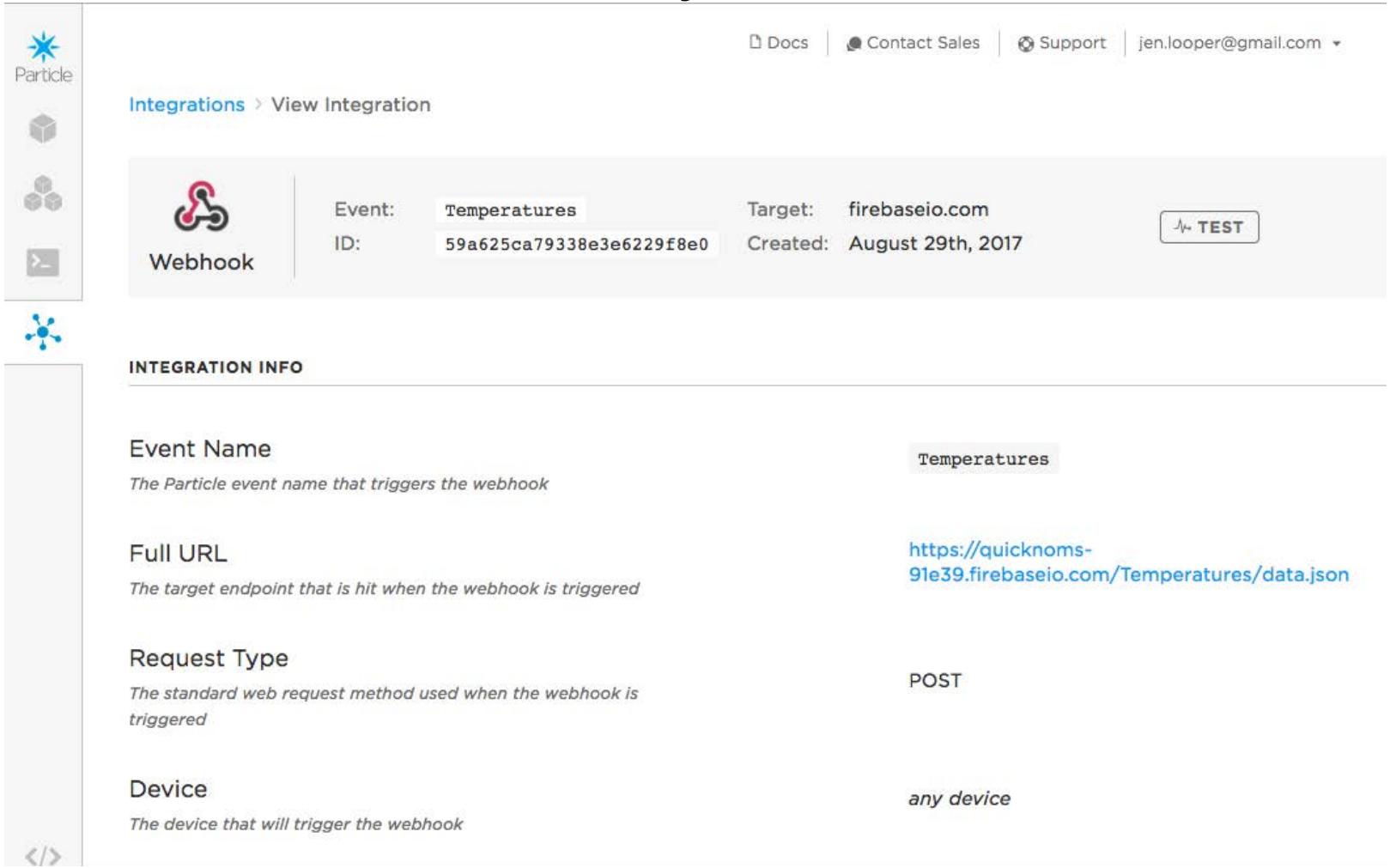
Flash code to the Photon

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

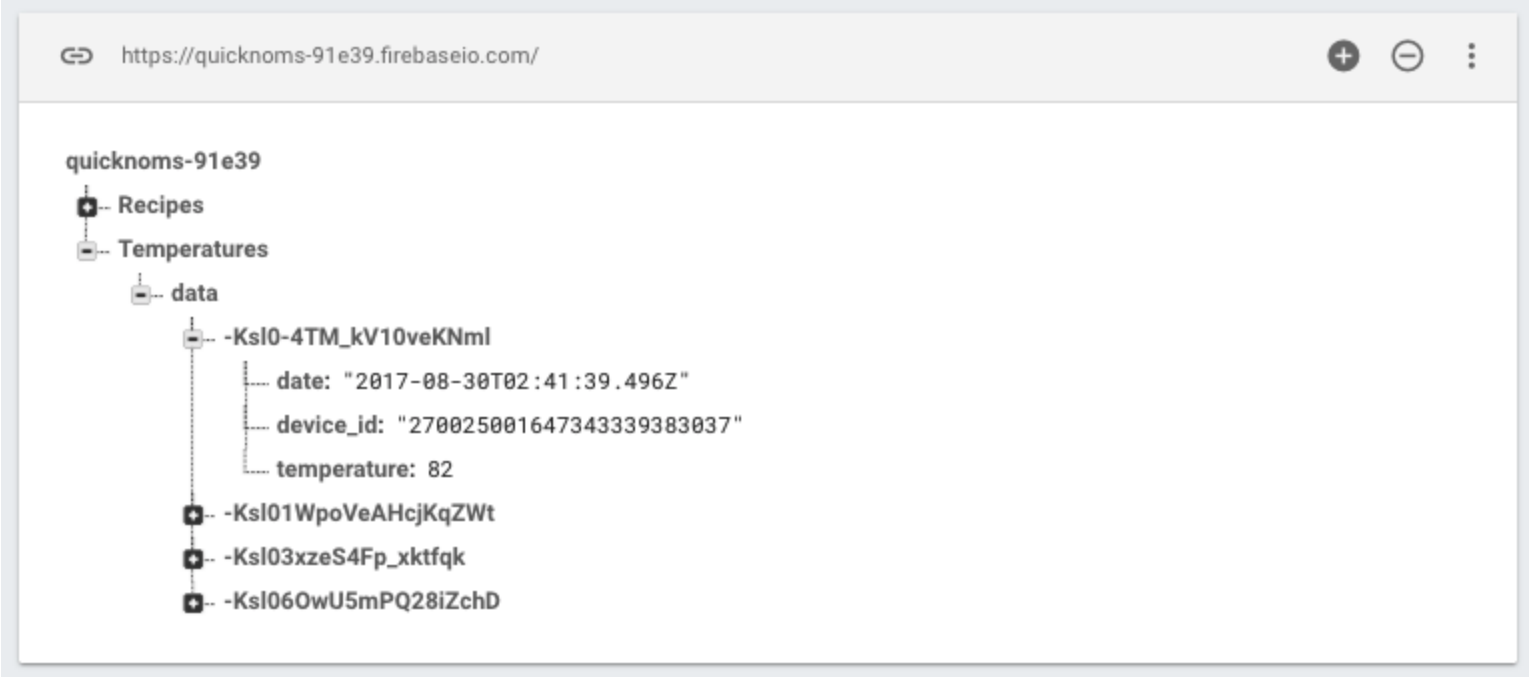


Build webhook

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



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
  - duct/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

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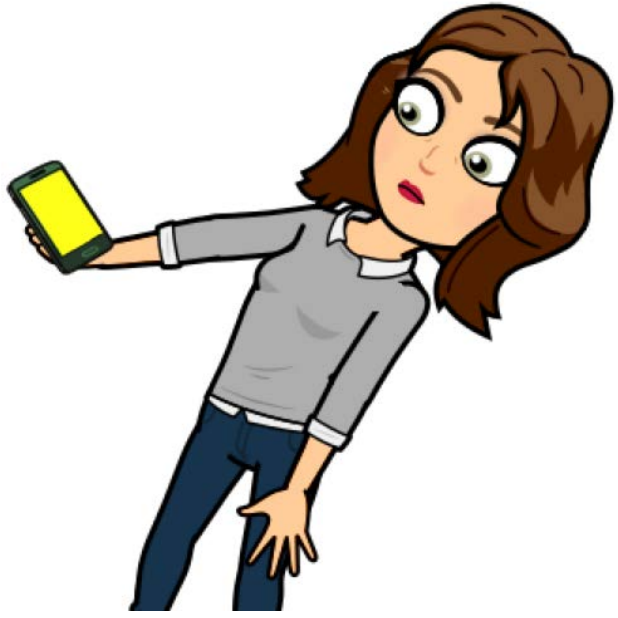
demo

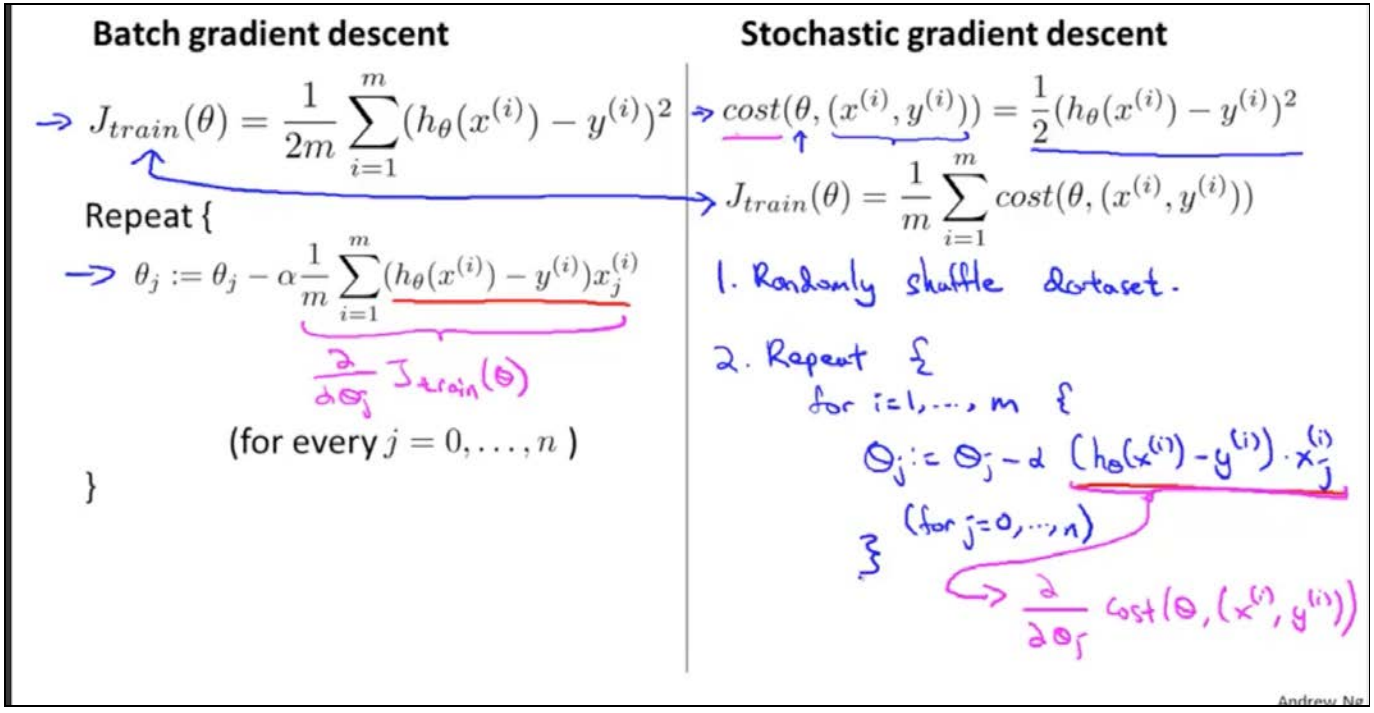
Add some Machine Learning



Machine Learning + Mobile = ❤️

think of the possibilities f or photos, video, audio

ML is easy



not

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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

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ML in the wild

Good uses of ML

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

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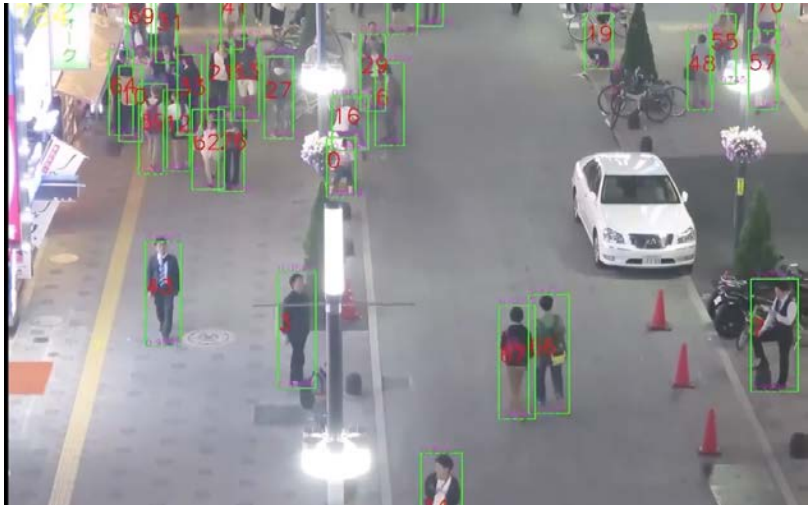
Scary uses of ML



install a ton of surveillance cameras

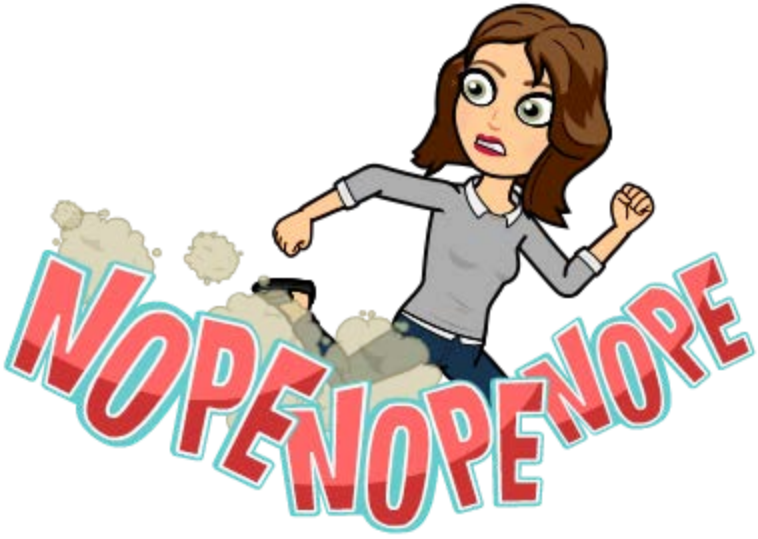
get really good at ml-powered facial recognition

match faces to IDs

monitor emotions...and manipulate them

push ads at people based on age/gender

invisibly track location


NOPE
NOPE
NOPE

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!

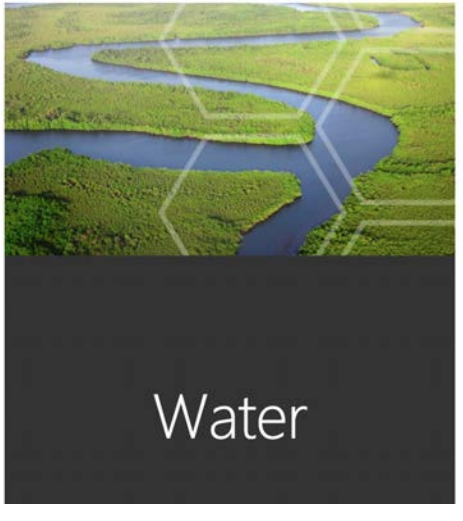
Microsoft 👏

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

Microsoft 👏

"AI For Earth"

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




BACK
TO
REALITY

DIY Machine Learning is hard

you need a lot of firepower & skillz

Use a third party with pretrained models

clarifai

Google Cloud Platform

clarifai

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!

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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

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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!

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Machine learning on device

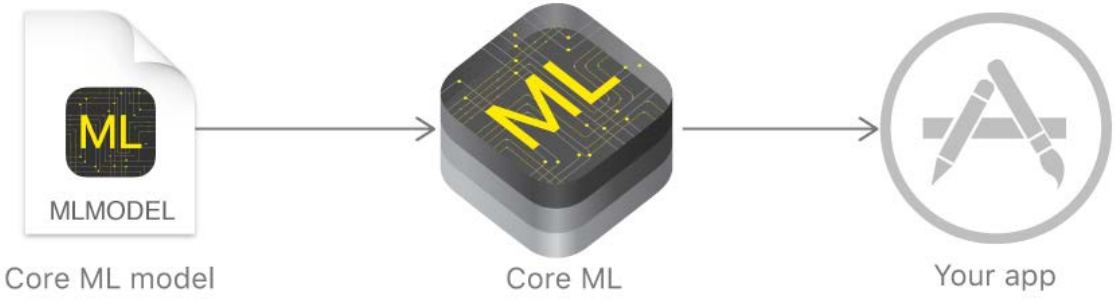
What if you don't want to make a bunch of expensive $$ REST API calls?

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?

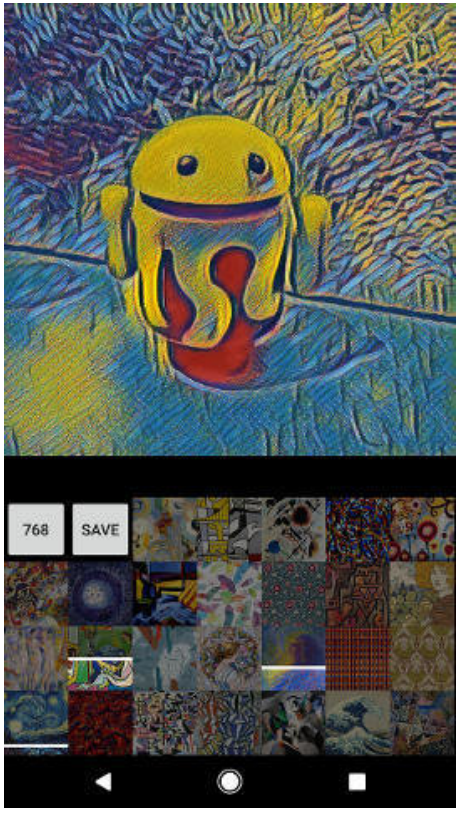
Machine learning on device

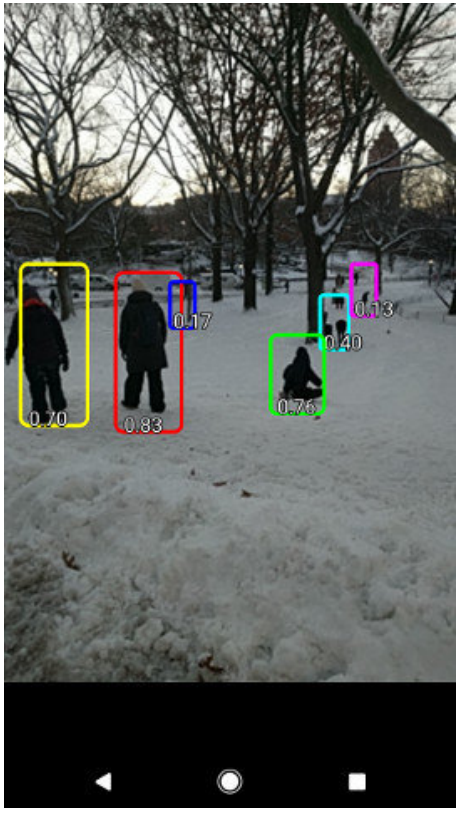


Now landed in iOS 11: Core ML

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

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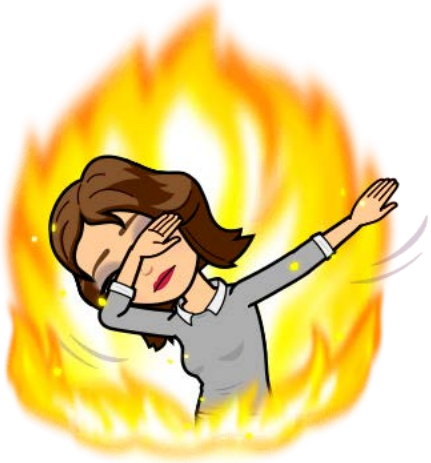
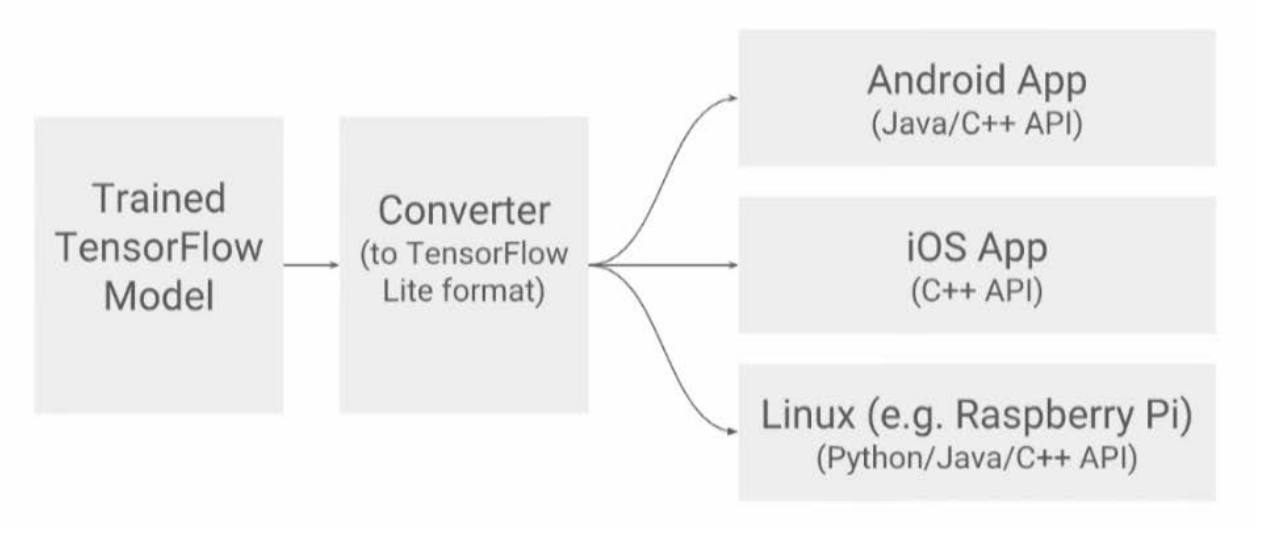
New! Hot! TensorFlow Lite!

next-gen version of TensorFlow for mobile

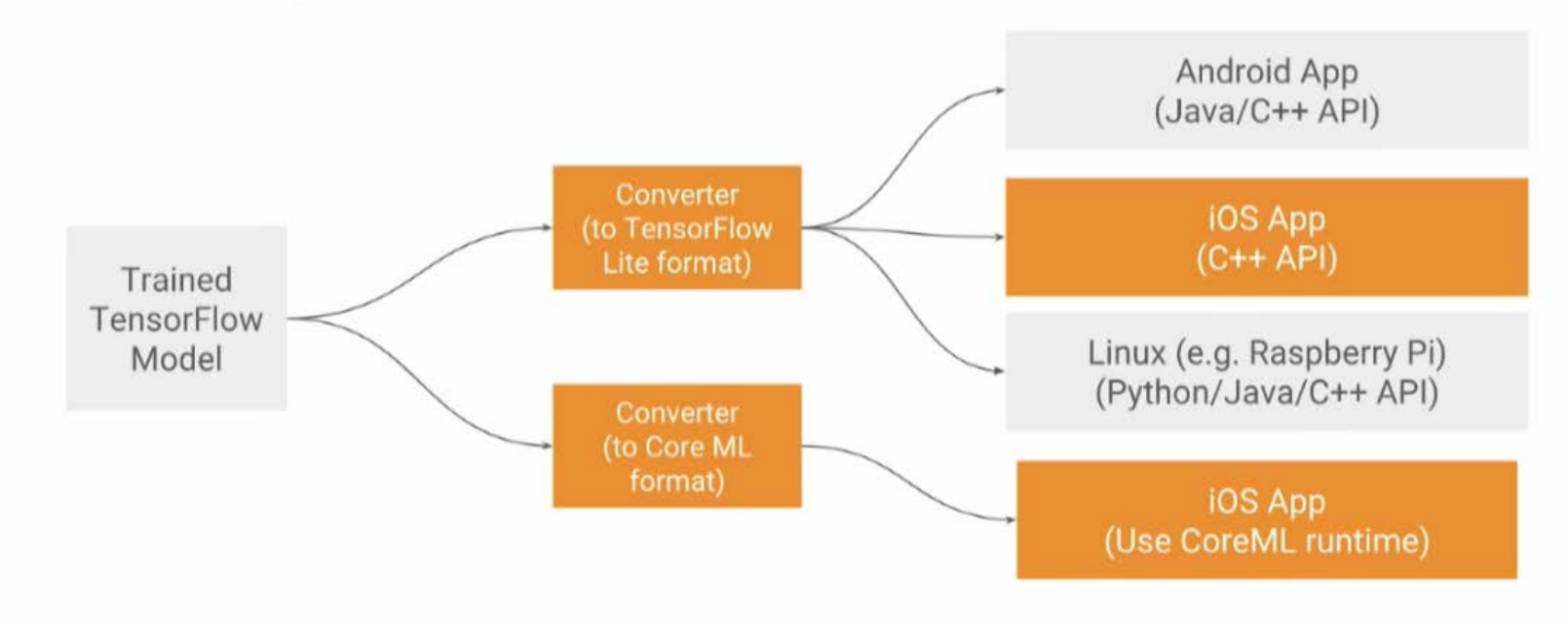
"on-device machine learning inference with low latency and a small binary size."





TensorFlow Lite for iOS

you have the option to convert to CoreML!



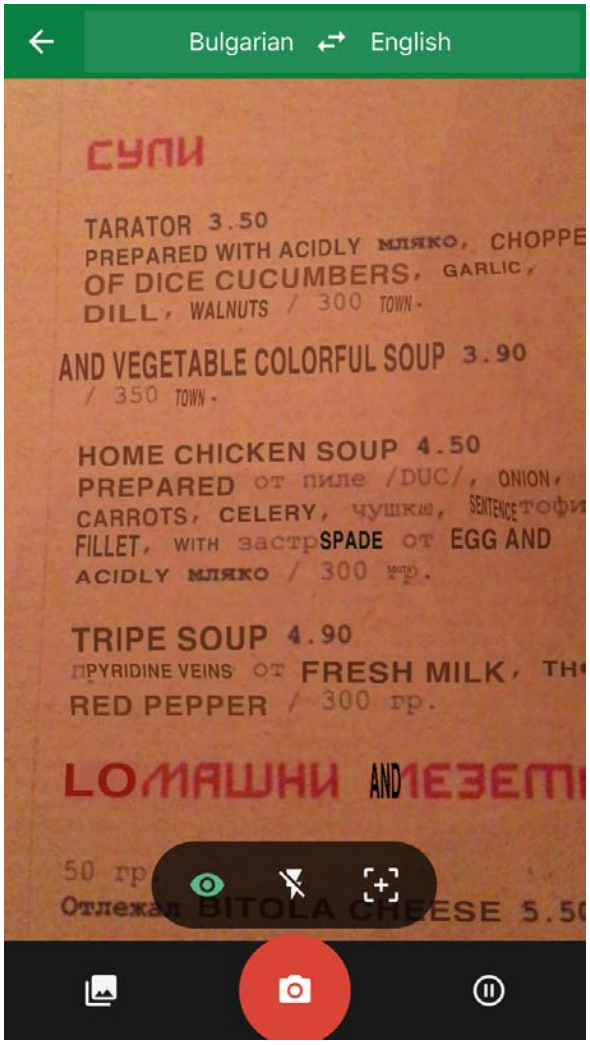
Featuring:

- 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!



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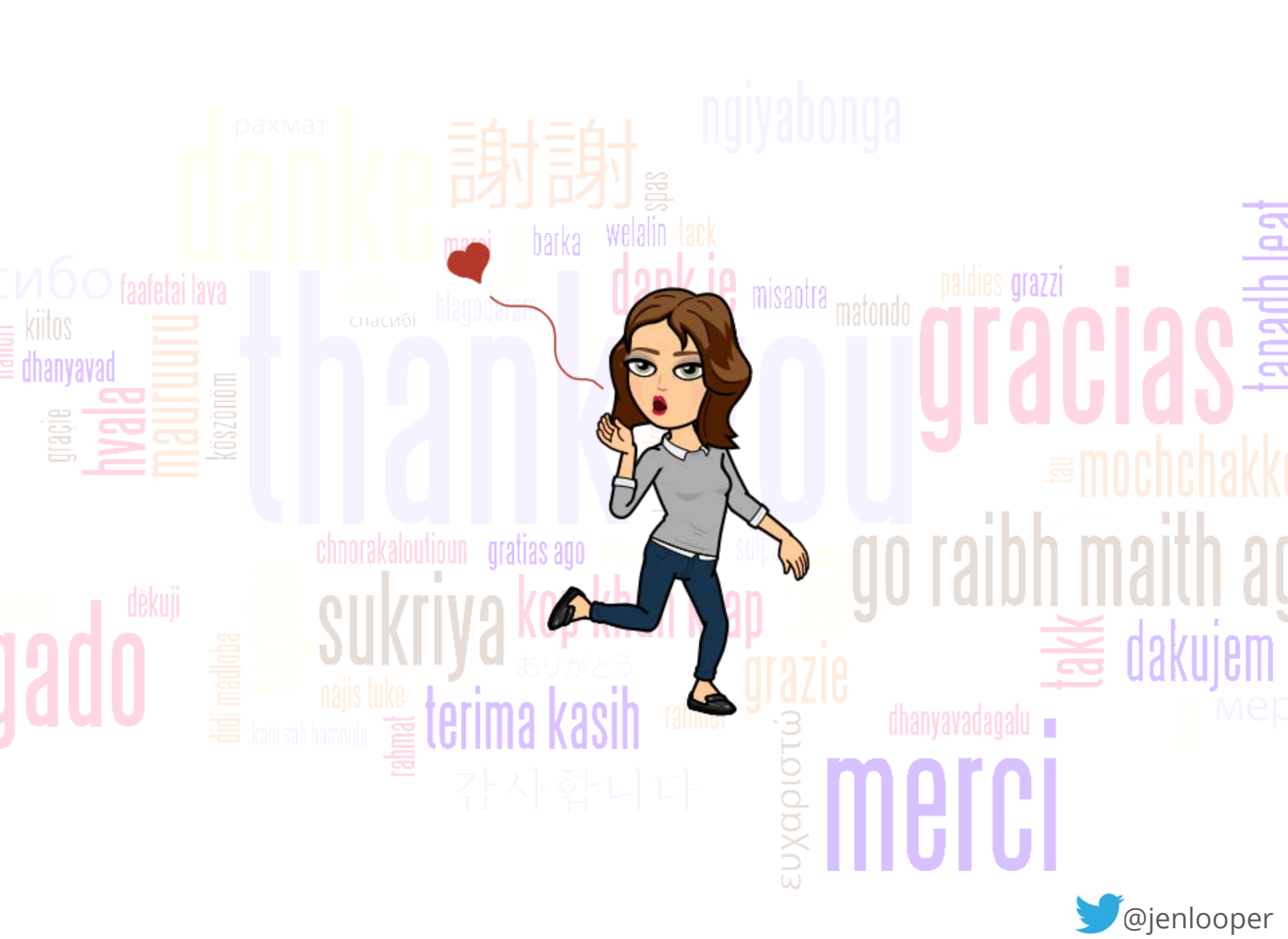
demo:

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

demo:

TensorFlow Mobile on iOS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dhanyavad
hvala
mauruuru
köszönöm
gracie
barka
welalin
tack
dankje
misaotra
matondo
paldies
grazzi
gracias
tapadh leat
thankyou
tau
mochchakke
chnorakaloutioun
gratias ago
go raibh maith ag
sukriya
dēkuji
gado
grazie
takk
dakujem
najis tuke
terima kasih
dhanyavadagalu
merci
rahmat
감사합니다
ευχαριστώ

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