How machine learning with open source tools helps everyone build better products

Michelle Casbon
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Strata Data
New York City
whoami  Michelle Casbon

• Where I work
  • Qordoba, Director of Data Science
• What I’ve done
• What I love
  • Natural language processing
  • Distributed systems
  • Emoji One
Data Science Engineer

What my friends think I do
What my parents think I do
What society thinks I do
What my boss thinks I do
What I think I do
What I actually do
TL;DR

• Definition of better product
• Description of i18n
  • Why it’s hard
  • How it can be made easier
  • Examples
• The role of NLP in solving this problem
• Deployment of ML models in production
  • Infrastructure
  • CD Process
What is Qordoba?
Every product in every language, by default

Fast, scalable way to go from one market to many
Together, our team has lived & worked in 34 countries
better product

users

engineering

business
Users

- stability
- uptime
- responsiveness
- usability
- reliability

Does it solve my problem?
Engineering

Does it solve the user's problem?

- scalability
- automated
- regression tests
- organization
- velocity
- maintenance
- elegance
- simplicity
Does it solve the user’s problem?

- Business
- Does it solve the user’s problem?
- growth
- stickiness
- happy customers
- engagement
- expansion
- cost
- growth
This apartment is in a killer location

Diese Wohnung befindet sich an einem mörderischen Standort
Localization is hard

• People
  • Product managers
  • Marketers
  • Designers
  • Linguists
  • Engineers

• Things
  • Copies of copy
  • String files
  • Emails
  • Pull requests

• Wash, rinse, repeat
Did you know the human body needs at least 1,000 milligrams of calcium a day? And if you want to give your kids a nutritious treat, it's the calcium and vitamins that make chocolate milk a great choice? So my growing bones and I have four words for moms everywhere. Show me the milk.
Ich sehe ein, wann diese Telefondienst auffällt, das kann nur eine Sache bedeuten...

I realize that when this telephone service flashes, it can only mean one thing...

I KNOW WHEN THAT HOTLINE BLING, THAT CAN ONLY MEAN ONE THING...

NICOLEMILLER.COM
MOBILE IS LIVE!

THE FIRST 20 CUSTOMERS WILL GET A COMPLIMENTARY IPHONE 6 CASE GIFT WITH MOBILE PURCHASE.
Localization is hard

• People
  • Product managers
  • Marketers
  • Designers
  • Linguists
  • Engineers

• Things
  • Copies of copy
  • String files
  • Emails
  • Pull requests

• Results
  • Got milk?

• Wash, rinse, repeat

You're doing it wrong
The Docker ecosystem of content

- Domain specific tools: Microservices, CI/CD, logs systems, storage APIs, etc
- Container service
- Automated infrastructure

@texasmichelle
Containers

- Powered by
- All the way down
  - Legal
  - Informal
  - Somber
Problem

Content is disorganized & deeply embedded
Similar strings are translated over & over
A translation is wrong & needs to be updated everywhere
Adding new content takes time
Translations don’t reflect the correct context
Making a change to content takes forever

Solution

Content stored in one central location, separate from the application logic
Translation Memory & machine learning
The text is corrected once & changes are reflected everywhere, without a deployment
Real-time translation of new strings
Live editor
A GitHub integration propagates changes automatically
Affect Detection

• What is it?
• Why do we want it?
  • Hands-off translations 🙋🏼‍♀️
  • Workflow transitions 🔄
Affect Detection

• I had dinner with my wife 💰
• I had dinner with my girlfriend 🍽
• Help Wanted 🐈
• Busca empleo 🐈
• This apartment is in a killer location 🏙️
• Diese Wohnung befindet sich an einem mörderischen Standort 🏙️
Requirements

- REST interface
  - Response time
- Scalability
  - Languages
  - Deployment
  - Models
- Accuracy
  - Open source
Feature Extraction

Extract content → Tokenize → Unigrams → Term frequency

Bigrams

Lorem ipsum dolor sit amet, consectetur adipiscing elit
Training
Prediction

Lorem ipsum dolor sit amet, consectetur adipiscing elit

Extract content → Tokenize → Unigrams → Term frequency → Deployed model

[1.0, 0.0, 3.0, ... ]

joy

PROFIT
Cross-validation
How is building a better product?
Engineering

Does it solve the user’s problem?

- scalability
- automated
- regression tests
- organization
- velocity
- maintenance
- elegance
- simplicity
Problem

Application components have different resource footprints
Problem
Application components have different resource footprints

Solution
Components run as containers & resources are requested
Before
After
After
Problem

IP addresses change sometimes
Problem
IP addresses change sometimes

Solution
Services call each other by name, not host
Problem

Config files are scattered
Problem
Config files are scattered

Solution
Environment-specific configuration is defined as k8s objects & stored in GitHub
# push files to kubernetes
if git checkout $1
    then
        for SVC in "${SERVICES[@]}"; do
            kubectl --context=$CONTEXT delete secret $SVC-secret
            kubectl --context=$CONTEXT create secret generic $SVC-secret --from-file=$SVC/secrets/
            kubectl --context=$CONTEXT delete configmap $SVC-config
            kubectl --context=$CONTEXT create configmap $SVC-config --from-file=$SVC/configmaps/
            kubectl --context=$CONTEXT apply -f $SVC/$SVC-ing.yaml
            kubectl --context=$CONTEXT apply -f $SVC/$SVC-svc.yaml
            kubectl --context=$CONTEXT apply -f $SVC/$SVC-dep.yaml
        done
    else
        echo $USAGE
    fi
Problem
Machines choke sometimes
Problem
Machines choke sometimes

Solution
Configuration is reloaded from GitHub
Problem

Releases are time-consuming
Problem
Releases are time-consuming

Solution
Triggered via PR merge
Deployment k8s object handles rollout
GitOps

- Jenkinsfile lives here
- Single source of truth – k8s
- PR merge
- watches
- pushes
- watches
- watches, pushes (dep, svc, ing)
- manual pusherman (configmap, secret)
- Multi-branch pipeline job
- Live platform
- deploy (auto, manual)
Problem

Adding capacity involves setup
Problem
Adding capacity involves setup

Solution
Increment an integer. That's it!

<table>
<thead>
<tr>
<th>Name</th>
<th>Zone</th>
<th>Cluster size</th>
<th>Total cores</th>
<th>Total memory</th>
<th>Node version</th>
</tr>
</thead>
<tbody>
<tr>
<td>dev-3</td>
<td>us-central1-c</td>
<td>2</td>
<td>8 vCPUs</td>
<td>30.00 GB</td>
<td>1.7.6</td>
</tr>
</tbody>
</table>
Single Model
Many Models

OH, LOGISTIC REGRESSION ISN’T ENOUGH FOR YOU?
TELL ME MORE ABOUT RANDOM FOREST ENSEMBLES
Affect Detection Image

- Affect Detection
- Mysql Client
- Apache PredictionIO (incubating) 0.12.0
- Apache Spark 2.2.0 Native BLAS
- Java 8
- Ubuntu 16.04
Router Image

- affect-router
- qordoba-builder

- affect-router
- qordoba-builder

@texasmichelle
YO DAWG I HEARD YOU LIKE DOCKER
SO WE PUT A DOCKER IN YOUR DOCKER

ERMAHGERD
MULTI-STAGE BUILDS
Challenge
Don’t just build products that scale. Build products that scale content.