Overview of Groupon engineering & fraud prevention

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Groupon is the world’s largest marketplace of deals.
Groupon is the global leader in local commerce, making it easy for people around the world to search and discover great businesses at unbeatable prices.

**Worldwide**

200M+ subscribers  43M+ active customers  500+ markets  400M+ deals sold

$5b+ in annual billings  10,000+ global employees

Source: Internal data, September 2013
Groupon is #1 in:

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<th>United States</th>
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Internal data, March 2013
The Groupon World for consumers

Web
Tablets
iPhones
iPad
Android
Winmo
Blackberry
The Groupon World for merchants

Local merchants
Get more customers to my business

Manufacturers
Introduce my product to a larger audience

Hotels
Attract more travelers to my property

Venues
Sell tickets to my event

Restaurants, Spas
Fill reservations at my upscale business

National chains
Distribute my coupons digitally

Pages
Claim your business’ profile, build a fanbase

Breadcrumb
Get a simpler, more affordable POS system

Payments
Accept credit cards at much lower rates

Booking
Allow online appointment scheduling
1,000s of deals every day.

🔍 Check Groupon First
Groupon is driving the mobile-local revolution
Leading the way in mobile commerce

Groupon’s vibrant mobile marketplace connects consumers with their local economy

Nearly **70 million** people worldwide have downloaded our mobile app to date; 9 million in Q4 2013.

Nearly **50%** of our global transactions completed on a mobile device in December 2013

*Our mobile app is available in 43 countries*

One of the **25** *most downloaded* free apps of all time

48 COUNTRIES

$6B GROSS BOOKINGS THIS YEAR

42M+ CONSUMERS HAVE PURCHASED GROUPONS

500K+ MERCHANTS HAVE RUN GROUPONS
2B+ REQUESTS / DAY

4K+ SERVERS

100+ SERVICES IN PLATFORM

8PB+ IN HDFS
Working at Groupon
Where do we work?

- Silicon Valley (Palo Alto)
- San Francisco
- Seattle
- Chicago (HQ)
- New York
- Dublin
- Berlin
- Schaffhausen
- Chennai
- Santiago
- São Paulo
Yes, we have that

- Free coffee, sodas, smoothies, and snacks
- Embroidered track jacket after first year of service
Yes, we have that

- Practical jokes
- Free catered lunch
- Shuttle from San Francisco
- Caltrain pass
- Discounted Equinox gym membership
- The Deer Head Center of Excellence (21 & over only)
Preventing fraud at Groupon
Types of fraud seen at Groupon

**Stolen card fraud**
Credit card number and billing details obtained via crime network (e.g. Target breach) used to purchase goods and vouchers from Groupon.

**Account takeover fraud**
Groupon customer account login credentials (username and password) are stolen (e.g. via phishing) and then customer’s stored cards are used to purchase goods which are then shipped to the fraudster.
Credit card network for purchases

Customer

Buy Groupon

Groupon’s gateway

Groupon’s bank

Customer’s bank

Credit Card network
  e.g. Visa or American Express

Bill
Credit card network for chargebacks

- Customer
  - Reports fraud
  - Customer’s bank
  - Credit Card network (e.g., Visa or American Express)
  - Groupon’s gateway
  - Groupon’s bank
Impact of chargebacks

• Funds being returned to customer by Groupon
• Chargebacks have a fee associated with them
• Merchandise shipped to fraudsters by Groupon are usually unrecovered
• Services rendered to fraudsters are not returnable
Fraud detection is binary classification

Binary classification is the task of classifying the elements of a given set into two groups on the basis of a classification rule.
Types of binary classifiers

Linear regressions

Support vector machines (SVM)

Decision trees

Neural networks
Evaluating binary classifiers

Confusion matrix

- **True positive** (as determined by "Gold standard")
- **False positive** (Type I error)
- **False negative** (Type II error)
- **True negative**
How weighted rule sets work

- Binary rules with integer weights
- Order score is sum of weights of rules that applied
- If total score exceeds threshold, classify that order as fraudulent

**Example:**
100 Shipping address not same as billing address
300 IP address from foreign country
–100 has been a Groupon customer more than 6 months
Sum: 300, Threshold: 200
Decision: **FRAUD**
ROC curve

Threshold 900  FA 7.840%  CA 61.480%

- old ruleset
- new tuned ruleset
Analytical work

• Gathering data on performance of fraud model by writing queries to get data from data warehouse
• Tuning model based on updated inputs using machine learning tools
• Reporting for business questions on types of fraud with different characteristics
• Simulating new rules to determine what engineering work will detect the most fraud
Engineering work

- Integrating fraud model into order processing system
- Building fraud-fighting features in customer-facing applications
- Implementing rules based on new ideas for how to detect fraud
Now hiring for intern and full-time positions

jobs.groupon.com/university
Check out the Groupon Engineering blog:
engineering.groupon.com