



Letting Robots Guide the Way

Emily Childers
Head of Credit Cards Marketing

My Background

COLLEGE

Statistical Science



JOB 1

Research Analyst



JOB 2

Operations &
Project Management



NOW

Marketing &
Growth



THOMSON REUTERS

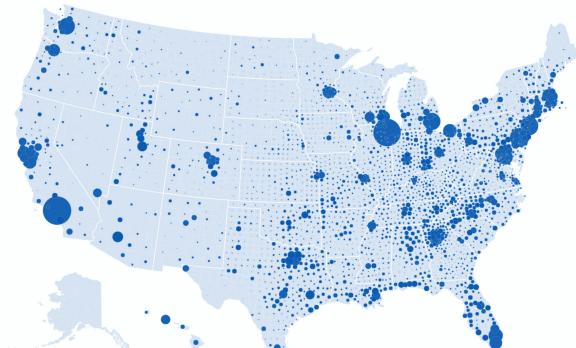


AUTODESK®

credit karma™

Credit Karma's got data

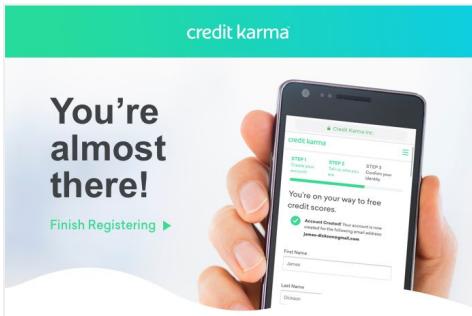
- Credit Karma is a trusted financial assistant for over **85 million members** in the U.S. and Canada. **About half of U.S. millennials are on the platform.**
- Credit Karma has insight into more than **\$4 trillion of American household debt** and **340 million lines of credit.**
- The company continues to invest in machine learning to scale its services, running nearly **eight billion model predictions daily** to provide personalized product recommendations to members.



Where my team fits in

CORE PRODUCT

Onboarding, Engagement- DAU Focus



You're almost there!

Finish Registering ▶

You're so close to your free Credit Karma account. We just need a little more info so we can confirm your identity, and you're all set.

Just a reminder: Checking your own scores won't hurt your credit, and we're committed to keeping your data secure.

Finish Registering

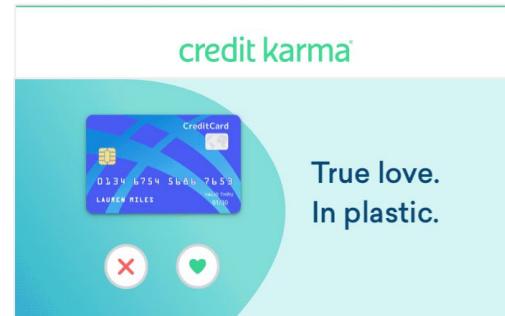
We're way more than free credit scores

Credit monitoring
Personalized recommendations
Unclaimed money

Get alerted when there's an important change on your reports.
We'll show you how to make your credit work for you.
See if there's money out there with your name on it.

CREDIT CARDS

Revenue Focus



credit karma®

True love.
In plastic.

Hi Salle,

It's never too late to find your match from credit heaven.

In fact, this is the perfect moment to get the credit card rewards you deserve. Head over to Credit Karma to see cards that can help you travel, treat your loved ones or collect cash back, all handpicked for awesome scores¹ like yours.

Find My Match

PERSONAL LOANS

Revenue Focus



credit karma®

Celebrate the end of credit card debt

Hey Salle,

Paying off high-interest debt can be challenging.

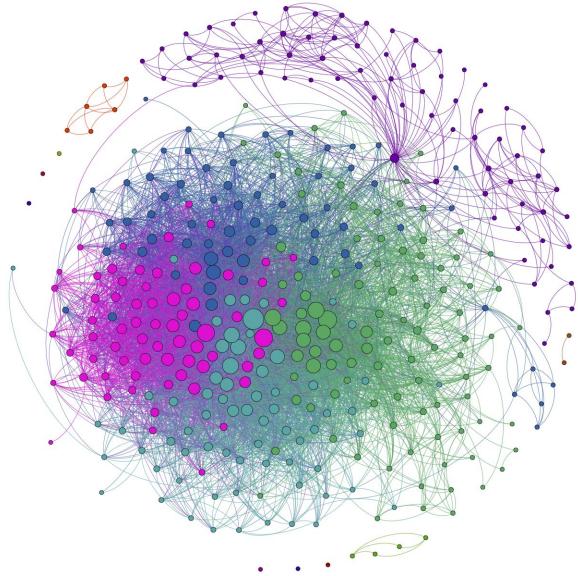
But with solid credit scores like yours, you may have a good chance of getting a personal loan at a lower interest rate. It can help keep you on track towards paying off any lingering debt and potentially save you thousands.

Credit Karma® can help you find the right loan quickly by checking for pre-qualified offers. Here's how it works:

- See your pre-qualified offers in just minutes. Just answer a few simple questions.
- Compare options from multiple lenders. We can check different lenders for prequalified offers.
- Apply with confidence. You can apply knowing you have a good chance of approval.

See if you prequalify today! It won't hurt your credit scores to look.

See My Options



So what exactly is an algorithm?

Simple Explanation

ALGORITHM: *A sequence of steps that can be applied to accomplish a task.*

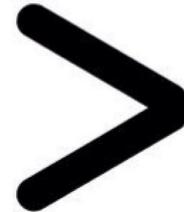
Simple things that are technically algorithms:

- Taking a shower
- A recipe
- My husband's Sunday night

So you're saying they're not that smart...

Actually, they're only as smart as their inputs (and the author).

Julia Child's recipe



My husband's recipe



Okay, so what is a machine learning algorithm

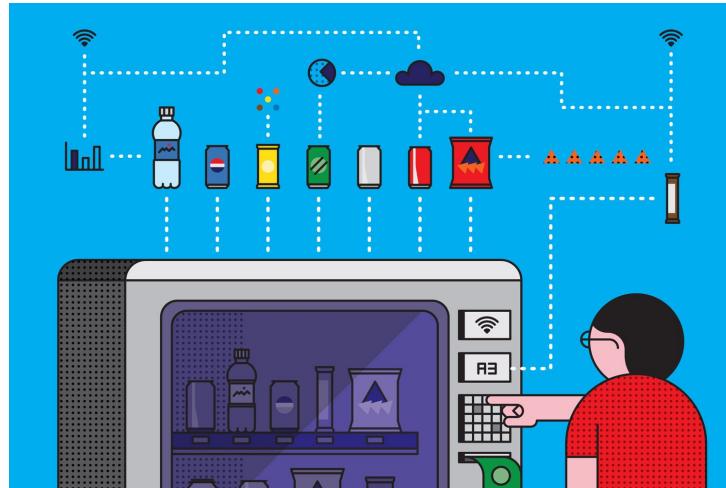
These are algorithms that use **probabilities** to give computers the ability to **iteratively learn** from data, **without being explicitly programmed**.



ML algorithms can check billions of combinations, making them much more efficient than brute human experimentation.

Wait, how is a model different than an algorithm?

A **model** is like a vending machine: given an input (money) it will give you an output (your snack).



An **algorithm** is what is used to train a model, it contains all of the decisions a model is supposed to take to get to the final output. It's the logic in the vending machine.

What inputs go into a model?

Features are the columns of data fed into a model for the algorithm to process.

description
vantage3 TUI
Average Age of Open Credit Card Tradelines
Number of bank inquiries (includes duplicates) in past 6 months
Number of bank inquiries (includes duplicates) in past 12 months
Aggregate bankcard balances with estimated effective APR > 25%
Total open to buy of open credit cards verified in past 12 months
Number of 60 days past due or worse items ever (excluding medical collection items)
Total open to buy of open credit cards verified in past 3 months
Age of top-of-wallet bankcard
Number of revolving accounts with a year-over-year high credit increase
Number of deduped inquiries
Number of revolving bankcards with estimated effective APR >= 3% and balance > \$0
Number of deduped inquiries in past 6 months (excluding auto and mortgage inquiries)
Average credit line of open revolving trades verified in past 12 months
Estimated effective APR on all revolving bankcards

Also, if you Google “model features” you may get unexpected results...

Summary of terms

ALGORITHM: A sequence of steps to accomplish a task.

MACHINE LEARNING ALGORITHM: An algorithm that uses probabilities to give computers the ability to iteratively learn from data.

MODEL: The final deployment entity for an algorithm (the vending machine).

FEATURES: The columns of data fed into a model.



Getting smarter about email targeting

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Manually connecting data with intent

Hypothesis: Mortgage Hard Inquiry = Intent



credit karma

Hey Salle,

Looks like a mortgage lender may have recently checked your credit. Even if you already got a rate, they're always changing.

[Here's a credit hack to help you find the lowest one.](#)

Once you've applied for a loan, you generally have 14 days to apply for more loans **without additional impact to your score**.

Now that you have the inside scoop, make sure you get the best rate possible for your unique financial situation. With Credit Karma, you can compare rates from multiple lenders and see how much you'll save in just minutes.

Log in today to see what kind of options are available to you.

[See If I Can Save](#)

41% click/open ↑

47% revenue click ↑

Create Intent → Capture Intent → Optimize Funnel → Cross Marketing → Follow Up

Moving beyond manual insights

There are only so many obvious signs of Intent (*every person with intent to shop doesn't abandon a cart*)

So we need to trust the robots!



Objectives of model targeting

User Coverage - Expand our reach while at least maintaining the same email performance

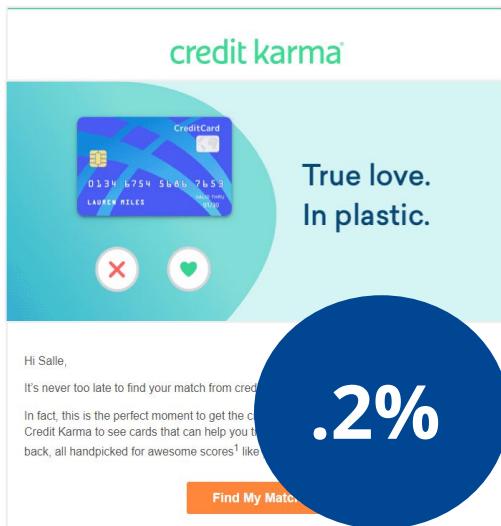
User Selection - Pick the users with high probability of engaging and converting

Email Performance - Improve email performance and set the expectation of revenue lift

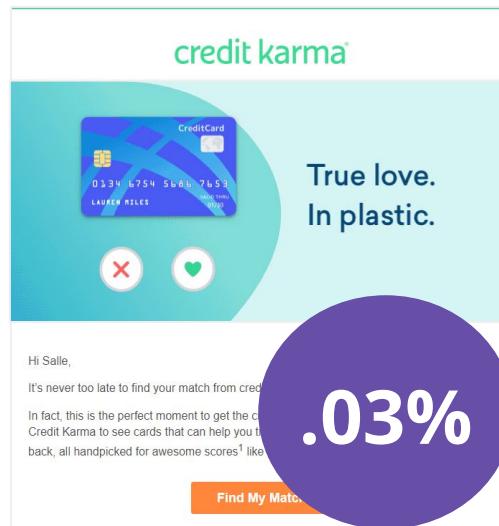
Deciding where to apply ML models

Identical emails have very different results across credit score bands:

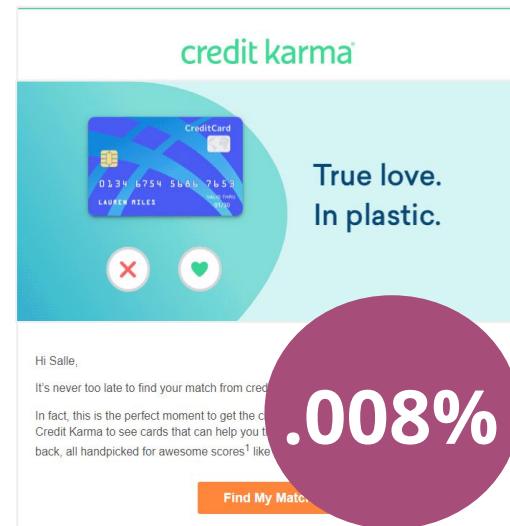
Subprime Credit



Fair/Good Credit



Excellent Credit



Full Funnel Model

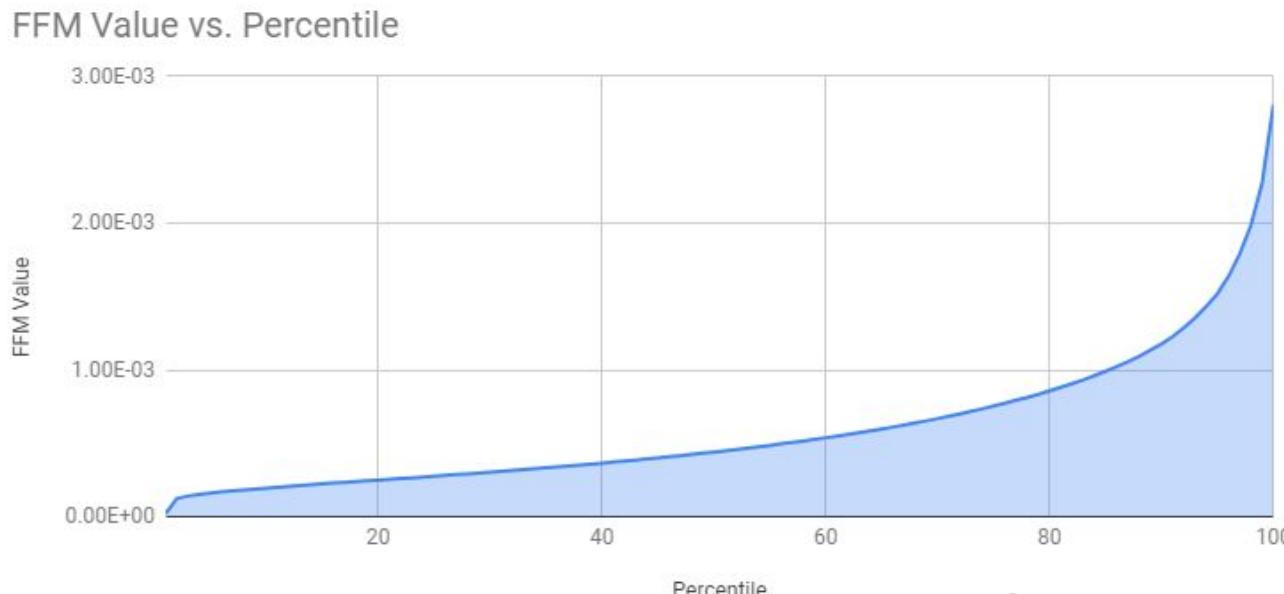
Who will interact with this email, take the offer, and get approved?

Probability of: Send to Open to click \times Click to application \times Approval



Full Funnel Model score distribution

We scored our active member base using our Full Funnel Model and looked at the distribution of scores:



Full Funnel Model- Performance by percentile

Open Rate																								
Percentile		1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	Grand Total		
22%	20%	22%	23%	25%	27%	28%	28%	29%	30%	30%	31%	32%	33%	33%	34%	36%	38%	41%	48%	31%				
Open-to-Click																								
Percentile		1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	Grand Total		
16%	12%	11%	11%	11%	11%	12%	13%	13%	13%	14%	15%	16%	18%	19%	21%	23%	26%	29%	32%	41%	20%			
Click-to-Application																								
Percentile		1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	Grand Total		
4.8%	3.0%	2.3%	2.2%	1.5%	1.6%	1.8%	1.5%	1.8%	1.4%	1.4%	1.6%	1.4%	1.7%	1.3%	1.4%	1.4%	1.5%	1.7%	1.8%	2.2%	1.8%			
Conversion Rate																								
Percentile		1	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	Grand Total		
0.03%	0.02%	0.02%	0.02%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%	0.03%	0.04%	0.03%	0.03%	0.04%	0.05%	0.06%	0.09%	0.16%	0.04%			

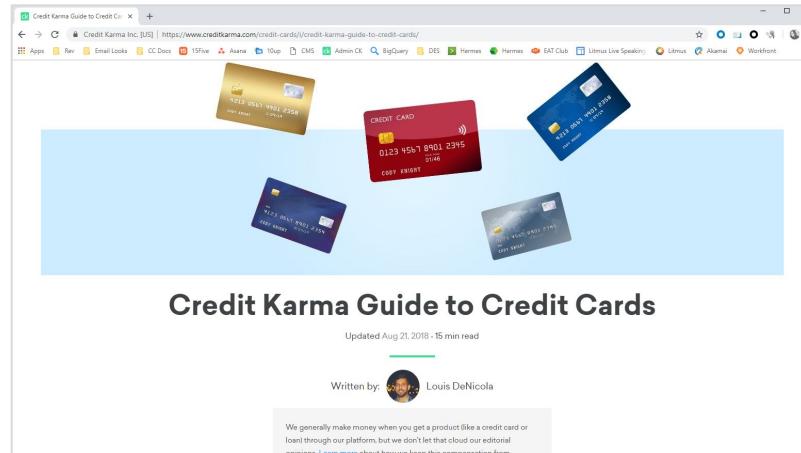
Actual performance

We saw huge improvement in both populations:

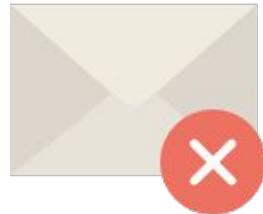


How we're improving the Full Funnel Model

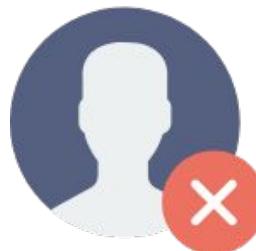
- Combining human insight with data
 - Reviewing the top weighted features on each model
- Improve data quality
- Adding additional features (more site interaction data, search data, etc.)



Other areas we're using models to improve



Unsubscribe



Sunset
Policy



Send Time



Shopping
Intent



Best Practices and Useful Tips

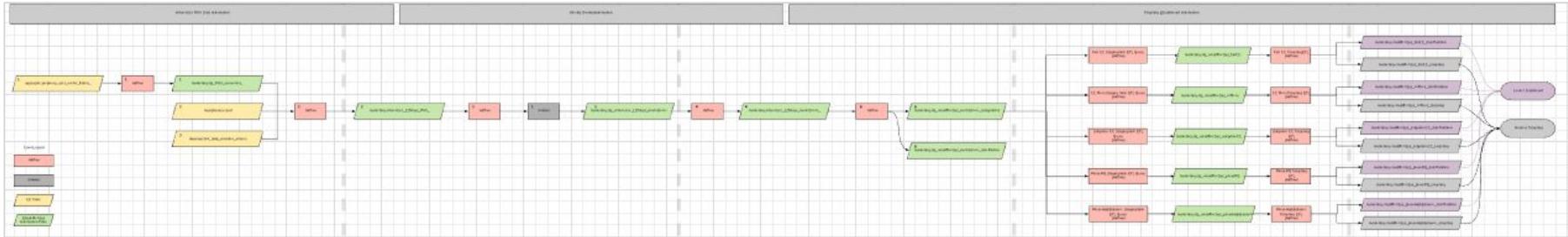
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Partnering with data science

Remember: Algorithms are only as effective as their inputs.

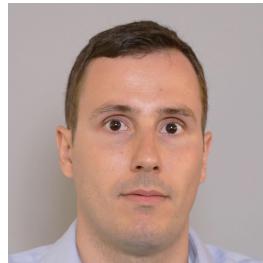
Best Practices

- Focus on the business need first
- Set a Key Performance Indicator (KPI)
 - Know your business!
- Don't get stuck in the weeds (Type of model? Area under the curve? This might not be important for you)



Always thank your partners!

A lot of teams pitched in to help: Data science, business intelligence, data engineering, growth, legal... The list goes on!



Thank you!



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Archive