

# AMAZON PRODUCT FEATURE EXTRACTION, SCORING & SUMMARIZATION

ISM 6930 – Text Analytics

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# CONTEXT – Online reviews

- **Online shopping surged 43%** during the COVID-19 Pandemic from \$571.2 billion in 2019 to **\$815.4 billion in 2020** ([www.census.gov](http://www.census.gov))
- **82% of users confirmed that reviews directly influence buying decision**, and 69% shared the reviews with others including: family, friends, and co-workers
- However, **online reviews and ratings are often biased** and tend to over-represent the most extreme views (Harvard Business Review, 2018).
- **Volume of reviews** for popular products **makes understanding and acting upon reviews a challenge** for both customers and sellers

# PROBLEM STATEMENT – Gaps in Online Reviews

- Amazon's **current product feature rating system requires manual input from the customer**, but does not necessarily capture what customers care about most
- **Features available to rate** are the **same for all products** in a category – some of which **do not correspond to actual product features**
- **Numeric (star) rating** of a product is often an **inaccurate reflection of actual reviewer sentiment**
- Amazon's “**most useful**” **positive and negative reviews** for a product do **not** provide a **holistic summary** of all reviews submitted.

# OBJECTIVE

**WHAT:** Promote customer decision making and seller insight generation by resolving discrepancies in online reviews/ratings.

**HOW:** Utilize sentiment analysis and next generation transformer models to capture the following from online product reviews:

## Features

Extract and score meaningful product features based on text reviews

## Summary

Provide a compact, holistic summary of reviews based on features



# DATA SOURCE

## 450+ Amazon reviews of 2020 Apple MacBook Air sourced via web scraping

Share

2020 Apple MacBook Air Laptop: Apple M1 Chip, 13" Retina Display, 8GB RAM, 256GB SSD Storage, Backlit Keyboard, FaceTime HD Camera, Touch ID. Works with iPhone/iPad; Gold

Visit the Apple Store

★★★★★ 13,180 ratings

589 answered questions

Amazon's Choice for "apple laptop"

Climate Pledge Friendly

-10% \$899<sup>00</sup>


List Price: \$999.00

prime Same-Day

FREE Returns

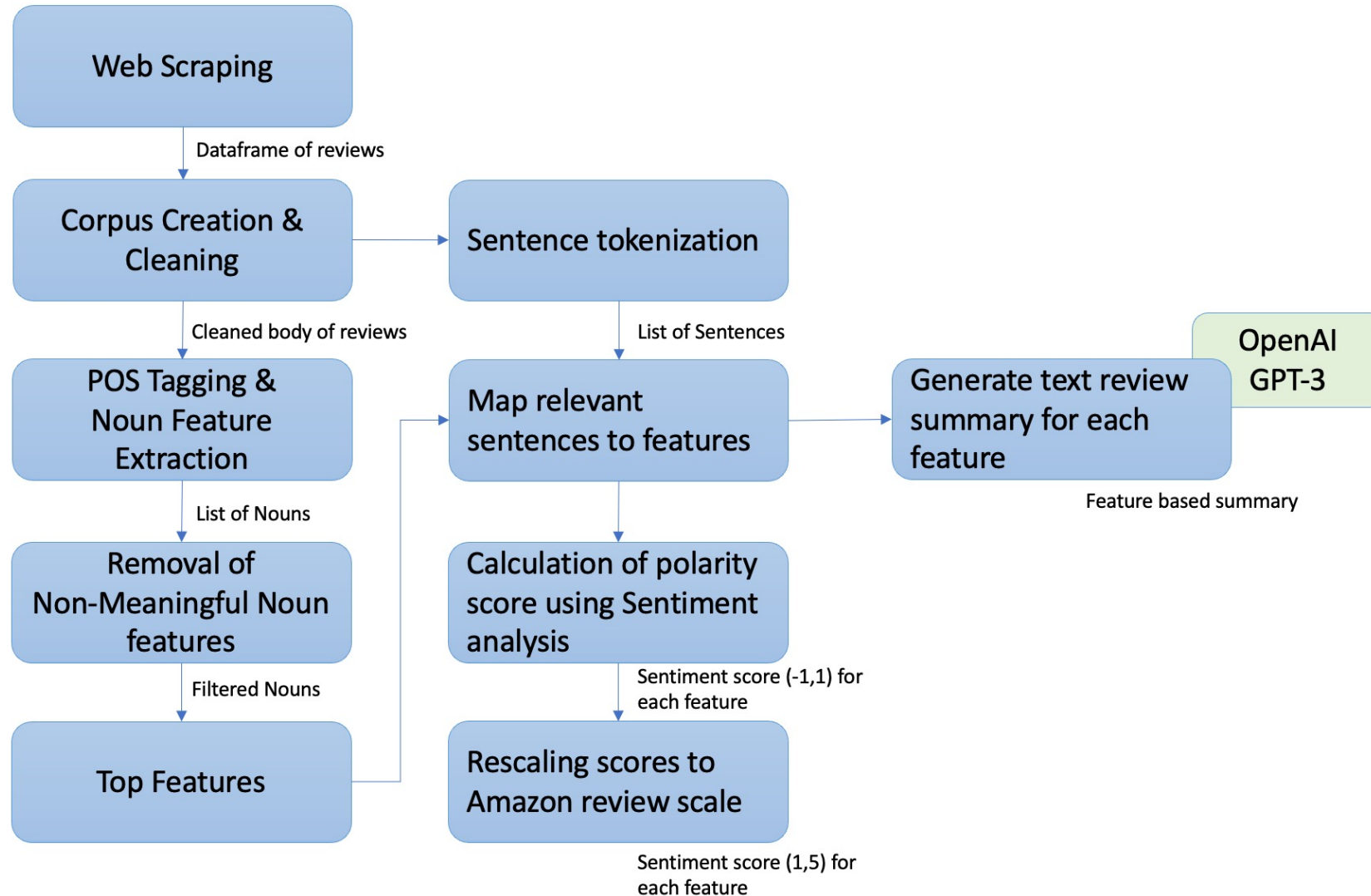
Pay \$74.92/month for 12 months (plus S&H, tax) with 0% interest equal monthly payments when you're approved for the Prime Store Card.

Color: Gold



id	rating	review
R3BX8WHB2MIR4A	5.0 out of 5 stars	This thing is amazing. I have owned several windows gaming laptops and this is hands down the best laptop I have ever purchased. The build quality is amazing, the chassis, hinge, keyboard, and mousepad all feel very high quality. the laptop is light and easy to carry around. The battery lasts what feels like a lifetime. The computer does not get hot at all (even after some heavy video editing and transcoding). Apple has truly made the best laptop on the market. Now to the negatives: I have read that the OS excessively uses virtual memory to speed up the system. After doing some initial tests I can confirm that this is true. What does this mean? this means that the Internal SSD might not last as long as it should because of the excessive write and read to the Solid state drive. I don't know I this is by design or what but it definitely feels kinda crummy for Apple to do this. I would still recommend this computer to anyone needing a laptop for school, creative work, or just general use. Buy it you won't regret it.
REDYTHJ9K9DX	5.0 out of 5 stars	I recently migrated to Apple after many years using a wide variety of PCs running Windows or Linux. I decided to make that move after Apple's introduction of the M1 processor, which has been proven to be an excellent hardware platform. Now, of course, the M2 has been released, but, depending on your needs, the 2020 Macbook Air with the M1 will save you some money while still delivering outstanding performance and some of the most attractively and perfectly manufactured hardware. You can search the Internet for professional reviews of the Macbook Air, but I feel confident you'll find plenty to verify what I'm saying. The Retina display is beautiful. The sound system is superior to any other laptop I have owned or used. The battery holds up all day under typical use, and I can verify that the battery holds its charge well for at least a week while the notebook is powered off. The Apple OS (Monterey) is smooth and fast, and I was able to learn my way around it quickly. When you need help, a Google search will yield tons of tips quickly, or you can avail yourself of Apple support. I will say that the Air is a little short on USB ports, lacks a built-in card slot, and, of course, is not equipped with a touchscreen. However, I have run a USB hub from one of the two Thunderbolt ports, and there seems to be enough power to support my flash drives and card readers...even a portable DVD-burner. As far as a touchscreen goes, I have that on a Dell laptop I run Linux on, but I never use it...guess I'm a mouse or touchpad guy. The aluminum housing is beautifully machined and finished, the keyboard has a very nice touch, the battery seems to charge quickly, and the Air is light at under 3 lbs. One last thing! I have been a heavy user of both Google and Microsoft services, and I have found that Apple provides ample support for integrating those services into the Mac environment. I run Google's Backup and Sync and Microsoft's OneDrive with no problems. My AVG subscription allows me to use my antivirus software on both Mac OS and Windows machines. I have no regrets for this purchase. Actually, the Air was my 3rd M1 Mac. I also have an iMac and a Mac Mini. They all work together very well!
R2XA6KR3RQGRMA	5.0 out of 5 stars	I have two MacBook Airls (MBA), a 13" and a 11", both with the previous form factor (the wide, body colored bezel around the screen, 1280x800 resolution) and this new 13" MBA improves upon it in every way (almost) and makes it nearly perfect. Good:- SCREEN looks great!! 2560x1600 resolution is bright and sharp and looks good with the thin black bezel. I usually don't go above 50% brightness. - KEYBOARD is good. Some have mentioned that it still sucks, but I find it much better than the older MBAs that I own and better than say, the Magic Keyboard. Even with a thin silicone keyboard cover I find the typing experience to be much better and I can type faster and with fewer mistakes. - BATTERY LIFE is fantastic. Haven't done any real testing yet and obviously it depends on a lot of factors (wifi usage, video streaming, HD vs 4k video viewing/processing/etc., screen brightness, type of app being used, etc.) but for my usage (mostly web browsing, video viewing on YouTube, accessing VPN for work (Citrix, EPIC), etc., it has been great. Easily tops 10 hours and super impressed so far. - LOOKS GREAT. Love the newer (I know that the actual exterior design is a few years old by now) design, looks and feels great. Form factor is nice and it is a reasonable weight. - NO FAN. That's awesome, as it not only stays quiet all the time but you also do not need to worry about blocking any fan vents on the bottom or back of the case while you have it on your lap. Pretty amazing really for a laptop to have no fans. - PERFORMANCE. It works great so far on what I have used it for, which is not terribly a lot, but it is what it is for a laptop using Apple silicon for the first time. For just day to day use and things like Chrome, Office (Word, Excel), Citrix, EPIC, etc., it has been super smooth and fast. Have not tried gaming yet but do not have high hopes given it is the base model with 7-core GPU. Also, things like start up are noticeably faster with the M1 versus my 2020 iMac 27" (top end) with Intel chips. - TOUCH ID is great still. Works very fast and the button does not get greasy (which makes it not work well) like the old iPhone home buttons. On the other hand, it should really have Face ID at this point. - APPLE ECOSYSTEM is great as usual and a real reason to get this MBA. Apple Watch easily unlocks it (so you do not really need Face ID if you have the watch). You can easily send/receive files using AirDrop or cast using AirPlay. And so on and so forth. - BIG SUR comes preinstalled but you need to update to get 11.0.1. NOT GOOD:- WEBCAM still sucks. Still low resolution and just does not look good in FaceTime, Teams, etc. Shame that Apple is so slow to upgrade webcams on the Macs (the 27" iMac FINALLY upgraded to 1080p front cams only a couple months ago... I got one and it looks so much better than this MBA's camera). - ONLY 2 PORTS. Sad that this thing has only 2 USB-C ports (that cover thunderbolt 3, USB 3.1, charging, DisplayPort). Given that it is used to charge, it leaves only one USB-C port for other use, pretty lame. I wish they had squeezed (I think it would fit) a USB-A port so that I could plug in my wireless mouse USB-A dongle as I have never liked any bluetooth mouse, or at least one more USB-C port. - NEW TECH (Apple silicon) means the M1-optimized apps are still being rolled out, e.g. Photoshop still not available at release. - BATTERY still cannot be removed, no surprise here, but means that like all Apple mobile tech it will have a useable lifespan determined at least partly by the non-removable battery. Easier to have an iPhone's battery replaced than a MBA I would imagine but hopefully it maintains a high level of performance for 4 years at the minimum. OVERALL: A few negatives (mostly the webcam) but enough significant improvements that this MBA is really a no-brainer for anyone needing a non-power notebook compute, especially if s/he is already in the Apple ecosystem. Love it so far!

# METHODOLOGY



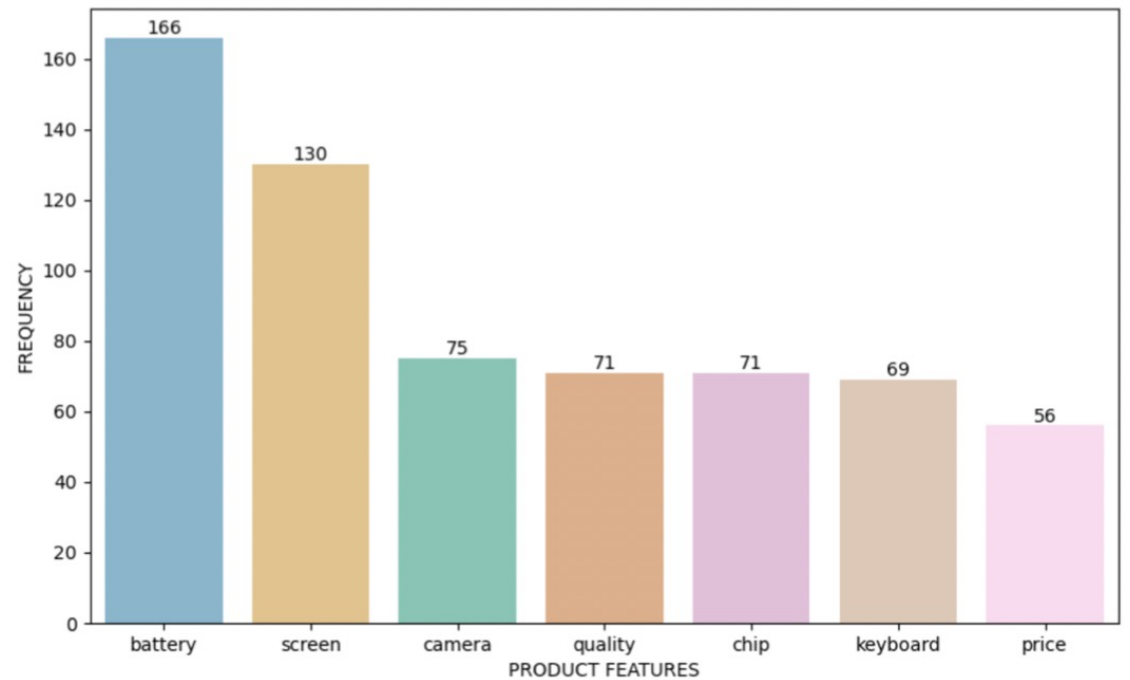


# RESULTS (A) - Feature Extraction and Scoring

## Amazon Features vs Extracted Features

By feature		Extracted Features & Score	
		feature	rescaled_score
Battery life	★★★★★ 4.7	battery	3.62
Portability	★★★★★ 4.7	screen	3.61
Screen quality	★★★★☆ 4.7	camera	3.28
Camera quality	★★★★☆ 4.2	quality	3.62
Touch Screen	★★★★☆ 4.0	chip	3.54
For gaming	★★★★☆ 3.8	keyboard	3.79

## Frequency of Extracted Features



# RESULTS (B) – Review Summary By Feature

Feature	Generated Summary
Battery	The MacBook Air's battery life is much less than advertised. The battery life of the Surface is better. I am mulling over upgrading to the MacBook Pro 13 because of its bigger battery, but do not know if I want to spend the extra money.
Screen	The Apple MacBook Air is a beautifully designed and well-crafted laptop with a great screen and amazing battery life. However, it is not without its flaws. One of the most common complaints is that the screen is susceptible to cracking, even with normal use.
Camera	The only thing is that the camera could be better.
Quality	The build quality on the 2020 MacBook Air is amazing--chassis, hinge, keyboard, and mousepad all feel very high quality. The screen quality is great, the touch screen is easy to use, and the webcam quality is crystal clear.
Chip	The MacBook Air is a beautifully designed laptop with a great keyboard, trackpad, and screen. I think the new keyboard is great. I love the haptic feedback on the trackpad, it feels very natural.
Keyboard	The new Apple M1 chip is extremely powerful and efficient, running cool and silent. So far it has been able to handle everything I have thrown at it with ease. Some apps are not yet available or compatible with the new chip, but running through.
Price	The M1 MacBook Air is a great laptop for the price. It is thin, light, and has a great retina display. The battery life is incredible and the performance is great for the price.



# IMPLICATIONS

## FEATURE EXTRACTION & SCORING:

### Customers:

- ✓ Reduce manual input
- ✓ Provide scoring for most relevant features
- ✓ Feature scores are more accurate

### Sellers:

- ✓ Identify features to highlight/improve/include

## SUMMARY:

### Customers:

- ✓ Provide holistic summary that is feature focused
- ✓ Provide compact, consumable summary of reviews

### Sellers:

- ✓ Provide explanation of sentiment-based ratings

# FUTURE SCOPE

1. Extending to multiple products on multiple platforms
2. Extracting and scoring secondary level product features
3. Exploring effectiveness of other pretrained text models for tasks including
  - a. Summarization
  - b. Query Response
  - c. Translation
4. Creating an interactive dashboard for customers/sellers

**Thank you for your time!**