Using Sentiment & Telemetry Data to Predict Customer Satisfaction

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Disclaimer

All of the data and information shared by Lenovo within the scope of this class must be kept confidential as per the requirements of the NDA and is not to be shared outside of the ISE 560 class

Background

About Me

My Role at Lenovo
- Division: PC Quality

- Responsibilities
  - Data Analytics for the Quality Group
  - Creation of dashboards to present data in a meaningful way
  - Monitor new products for returns feedback
  - Work with Product Engineers to address quality issues

Life Facts
  - 2014 NC State Alumni – Industrial Engineering
  - Member of the Junior League Raleigh
  - Yorkie "Mom"

Lenovo

- Headquarters: Beijing China and Morrisville NC

- ThinkPad brand computers (Acquired in 2005)

- Lenovo brand computers

- Operations in 60 countries, sells in 160 countries

Company	2018 Shipments	2018 Market Share (%)	2017 Shipments	2017 Market Share (%)	2018-2017 Growth (%)
Lenovo	58,467	22.5	54,669	20.8	6.9
HP Inc.	56,332	21.7	55,179	21.0	2.1
Dell	41,911	16.2	39,793	15.1	5.3
Apple	18,016	6.9	18,963	7.2	-5.0
Acer Group	15,729	6.1	17,087	6.5	-7.9
ASUS	15,537	6.0	17,952	6.8	-13.5
Others	53,393	20.6	59,034	22.5	-9.6
Total	**259,385**	**100.0**	**262,676**	**100.0**	**-1.3**

Source: Zdnet.com

#1 2018 PC Vendor World Wide

Lenovo Laptops

Commercial:
ThinkPad®

Consumer:
ideapad / YOGA / Lenovo™

Gaming:
LEGION

Laptop Brands Overview

Product Portfolio

Laptops

Phones

Desktops

Servers

Smart Devices

The Project

Customer's View of a Product

- **Product features**, price, and delivery experience

- Plus:
  - Positive surprises "I didn't know it did that!"

- Minus: "Quality" concerns
  - Usability issues "ssssslllllooooooowwwww"
  - Product failures "died the first day"
  - Service problems "been at the repair depot 2 weeks"

The Big Picture & Questions

C930 is…

When we listen to customers talking to each other, we get fast feedback.
- Star ratings
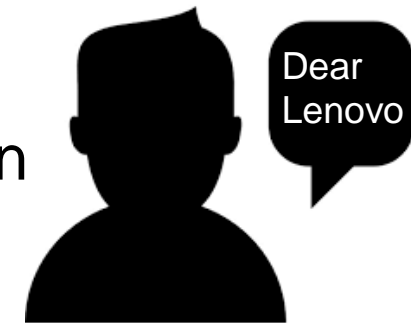- Calculated: Customer Sentiment

Can we use this:

6 Months

Product Launch

Our company has selected survey responses as our primary measurement of customer satisfaction
- Calculated: Net promoter score
- But it can arrive pretty late….

To predict this??:

Dear Lenovo

And tell us what this person will care about?

The Big Picture & Questions - Interventions

Microsoft

When customers use laptops, telemetry data is sent to Microsoft. This data is LIVE
- PC Diagnostics - Software
- Calculated: Performance Metrics
  - Battery Life
  - Wireless Connectivity
  - Reliability (Crashes)

Telemetry data starts the moment a machine is powered on

Lenovo can leverage telemetry data to take action on issues

Current telemetry data is a 30 day view of system performance

What's Telemetry?

- **Telemetry** is an automated communications process by which measurements and other data are collected at remote or inaccessible points and transmitted to receiving equipment for monitoring.

  https://gdpr-wp.com

- Microsoft collects telemetry on certain functions to help organizations asses application health and compatibility

Device Experiences

Take action leading to a quality device experience

Battery Life

Screen on battery life, application impacts, and modern standby

⚠ **OEM Critical Incidents**

Software issues impacting customer systems and root-caused to a device driver

Reliability

Get insights on the failures occurring in your ecosystem based on failure hash or driver version

Wi-Fi Connectivity

Get connected, get connected to internet, and stay connected metrics

OS Adoption

OS Install Base & Adoption

Device Performance

Measure the average boot, Microsoft Edge launch and resume from standby times for your devices

Project Objectives:

1. How can we use CID sentiment/stars data to predict pNPS Survey scores?

2. **Does Telemetry data influence pNPS Survey Scores?**

3. 5 products will be eliminated from the survey data. Can you predict their pNPS score from CID sentiment data, the influence of telemetry data?

4. What should Lenovo focus on to improve pNPS?
   - For the bottom 3 Consumer and bottom 3 Commercial products?

5. Extra Credit:
   - What impact do product stars have on the analysis?
   - Do you recommend any changes to our data collection methods?
   - Anything else you discover…

Product NPS	Product
9	X1 CARBON 2017
9	X270
0	THINKPAD TABLET
8	
0	P50
8	T460s
9	X1 YOGA (2ND GEN)
6	T470p
10	X1 YOGA (2ND GEN)
-	T460
10	T470p

Metric Overview

Calculation Methods

pNPS (Product Net Promoter Score)

- Lenovo given Surveys
- How likely are you to recommend T480 to a friend?

- Customer scores 0-10 scale
    - 0 bad, 10 good

9,10 scores / total = promoter %

0-6 scores / total = detractor %

(Promoter%*100)-(Detractor%*100) = NPS Score

Example: 100 surveys returned

70   9,10 Promoters (70%)

10   0-6   Detractors (10%)

20   7,8   Neutral

- 70 – 10 = +60 pNPS score

-100 ⬅➡ **+100**

PSI – Product Sentiment Index

- Using text analytics, determines subject and sentiment of comment

- Web Scrape from online Sources (Excluding Blogs- Forums)

Formula

- [(positive mentions – negative mentions)/(positive mentions + negative mentions)] * 10

CID Sentiment/Stars Example

Customer Feedback (Amazon.com)

- I've had my Yoga 930 for a couple of weeks. It performs in every manner as I want it to with the exception of the fingerprint reader. It's a bit touchy and does not always recognize my fingerprint.
- I like this computer a lot and on the positive side, I can actually close this one unlike my old Lenovo Flex which had a broken hinge and was stuck in the tent position.
- This Yoga works well in tablet mode, tent mode and standard laptop mode.
- My purchase was on sale. So yes I believe I got a great value.

Sentiment	Category	Sub-category	Terms	Business Group	Product	Stars Rating
NEGATIVE	AUTHENTICATION	FINGERPRINT READER	FINGERPRINT READER	LENOVO - CONSUMER	YOGA 730 15	4.0
NEGATIVE	BODY	HINGE	HINGE	LENOVO - CONSUMER	YOGA 730 15	4.0
NEUTRAL	FORM FACTOR	MODE	NOTEBOOK MODE	LENOVO - CONSUMER	YOGA 730 15	4.0
POSITIVE	FORM FACTOR	MODE	TABLET MODE	LENOVO - CONSUMER	YOGA 730 15	4.0
NEUTRAL	FORM FACTOR	MODE	TENT MODE	LENOVO - CONSUMER	YOGA 730 15	4.0
NEUTRAL	PRICE	SALE	SALE	LENOVO - CONSUMER	YOGA 730 15	4.0
POSITIVE	PRICE	VALUE	VALUE FOR MONEY	LENOVO - CONSUMER	YOGA 730 15	4.0

Hints and Warnings

- The files contain information from and links to the internet.
  - Feel free to follow the links and read more for context.
  - It is the internet, people can and do write anything there that is not Lenovo's responsibility.
  - Do **not** contact any customers

- Formulas for PSI, Stars, and pNPS use industry standard calculations. If "industry standard" got the job done, we wouldn't be here.

- Lenovo works hard at fixing customer problems.
  - We almost never add features to a product, but we always try to solve "quality" issues.
  - Consumer products have a slower close loop for fixes than commercial products.

- Timing of the data.
  - Surveys (pNPS Surveys) are sent to customers in the first 30 days of their purchase. It can take some time to get their responses, process them, and collect enough to be relevant.
  - Web scrapes (CID Starts/Sentiment) are done at least weekly and the data is available immediately

thanks.