



Assignment Project Exam Help

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Administrative Notes

Homework #3: Due Sunday the 14th (*not* original due date)

If you hit a syntax error at the last minute? Scoop up partial points! State the purpose of that particular step.

Font Bounty: “The <https://eduassistpro.github.io/>

Student: “But I can't do step X if I didn't solve Step W...”

Prof: “You can still explain Step X...” Add WeChat edu_assist_pro

Next Thursday, the 18th is a BU “Wellness Day.” No classes, no meetings, no due-outs.

Thursday the 25th: Quiz #2 (Scope defined on next slide)



Quiz #2: Scope

Class Slides from Classes 5, 6, and 7

Expect to see more open-ended problems this time
For most model metrics, remember that I will have to give you the
'positive' outcome class
"Of the people who were label <https://eduassistpro.github.io/>
Word problems are all about the setup.

Pacing: Be mindful of time -- don't leave any null s
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Basic structure will be the same as with window, etc.)

Stukent Textbook: Chapter 12

Terminology questions? Book & slides are the source
Not all questions will be a pure 'word search'



How many noodles are in this jar? Don't think too hard about this -- just write your best-guess estimate. **Do not answer in chat.**

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Use the Google Poll to answer:
[/aJCdaJA7TeX61cFm8](https://aJCdaJA7TeX61cFm8)

<https://eduassistpro.github.io/>

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as well as the closest guess as well.

My prediction? The overall class mean will be far better than most individual guesses.



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Are YOU that person? Who knows. If you think you *might* even be interested, why not apply? Here are two powerful things that I have witnessed: (1) the amount of **learning** that occurs THROUGH the job search; (2) the **networking** impact of the job search itself (by searching/applying/interviewing, you will directly meet people who work in the field).



Metrics in Our Lives

What impact does it have on you when you:

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- Track your personal spending?
- Track the number of assignments?

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When Metrics Backfire



Metrics may start the right way, but turn into a monster:

- Wells Fargo -- new account scandal
 - **Good idea:** Incentivize local branches to open more customer accounts
 - **Monster:** High pressure on local managers leads to questionable ethical decisions
- Campbell's Soup --
 - **Good idea:** Measure <https://eduassistpro.github.io/>
 - **Monster:** Strong incentive to move soup cans off the shelf ... desperate measures!
- Enron -- mark-to-market accounting/[Add WeChat edu_assist_pro](https://eduassistpro.github.io/)
 - **Good idea:** Use mark-to-market accounting to reflect fluctuations in energy asset values
 - **Monster:** Company can abuse mark-to-market when it simply decides on the value of the deal
- Inbound telephone support -- call duration as success metric
 - **Good idea:** Measure success of call center technicians by average call duration (shorter = better), because customers call them to solve problems!
 - **Monster:** Call center techs are incentivized to end calls quickly -- perhaps TOO quickly!

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Learning Objectives

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- Define <https://eduassistpro.github.io/>
- Understand firm's overall marketing strategy
- Define a number of strategic metrics for marketing

What are marketing analytics metrics?

- They are measures of a data-driven project to maximize marketing effectiveness.
- Unders s allows marketers to maximi https://eduassistpro.github.io/ marketing costs.
- Marketing analytics metric sssess a marketing analytics strategy.

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What is marketing analytics strategy?

- Planning a data-driven project to maximize marketing effect
- Allows <https://eduassistpro.github.io/> to analyze and minimize marketing costs
- Process to accurately repository, analyze the present, and predict the future

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Marketing Campaign Life Cycle

The Process of creating and running a campaign through several stages:

1. Design

- Starts with exploratory research
- Social media analytics (likes, retweets, shares, etc.)

2. Implementation

- Time to <https://eduassistpro.github.io/> s of campaign

- AB Tests are useful
doing this stage

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3. Evaluation

- Compare results to original goals

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Design

- ▷ Often starts with exploratory research
 - Coke → custom built listening software
 - <https://eduassistpro.github.io/>, shares,
- ▷ Form hypotheses about which work well and which do not
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Implementation

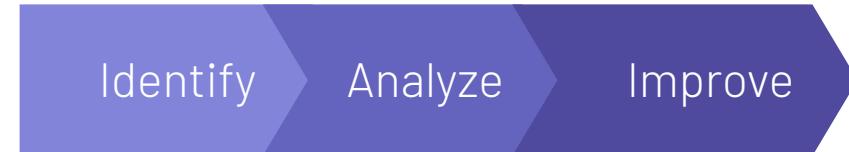
- Ensure the success of the campaign
 - Coke → using their data, generated over 30 days
- Careful making adjustments when adding WeChat edu_assist_pro

Evaluation

- Evaluate whether a campaign has met its goals or
 - Cok https://eduassistpro.github.io/incr %
- Determine how many resources spent in the future, if any

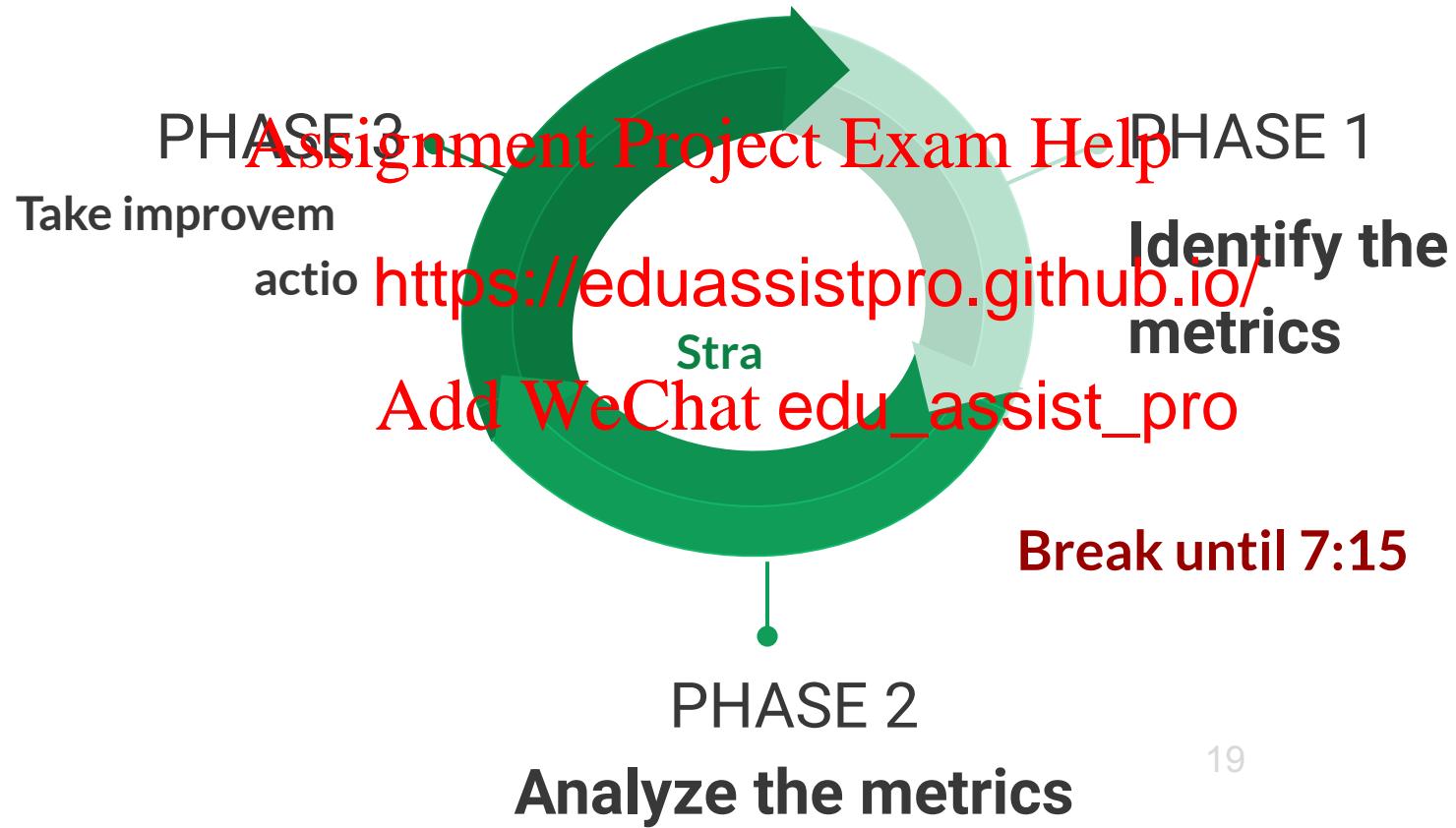
Marketing Analytics Strategy

- Success of campaigns need to be measured
 - How much money to spend on them
 - How
 - Marketing results of campaigns
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- Campaign Strategy Steps:

Or rather, it is a “rinse, lather, repeat” kind of process.



Step 1: Identity Metrics

- Have a goal in mind
- Come up with a question you need the data to answer <https://eduassistpro.github.io/>
- Metric
 - Metrics are quantitative measures used to track the status of a marketing process
- Metrics help determine if goals are being achieved

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Step 2: Analyze the Metrics

- Companies must implement systems to track the important metrics
 - Web
 - Mark <https://eduassistpro.github.io/>
- Compare current state to be
 - Historical Trends
 - Industry Average Performance
- Most important step is to determine the root cause of why metrics perform the way they do

Example: Analyzing Website
Metrics Using Google Analytics

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Example: Analyzing Email
Marketing Campaign Metrics

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EXAMPLE: Facebook Video Campaign Metrics

- **5 Metrics to track:**
 - Engagement
 - Reach
 - Likes and Follows
 - Video Retention
 - Click Through Rate (CTR)
 - **Can be accessed through your business page**
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Step 3: Take Improvement Actions

- Most difficult step in the process
- Changes aren't always obvious so marketers use analytical and creative methods
 - A/B testing isolated changes until the best performing result can be achieved
- Invest their resources in areas that need the most improvement

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Twitter Marketing Examples

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STRATEGIC METRICS

Companies need an overview of the potential revenue available within the market

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- For mark <https://eduassistpro.github.io/> should be measured
 - Mar
- Return on Marketing Invest
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 - $ROI = (\text{Marketing Revenue} - \text{Marketing Expenses}) / \text{Marketing Spending}$

Explaining ROMI

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<https://www.youtube.com/watch?v=1vRx5TYTmYs>

Support Metrics

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Brand
Metrics

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Development
Metrics

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Brand Metrics

Brand Recall	Brand Recognition	Depth	Breadth
ability to retrieve the brand from memory	ability to confirm a prior exposure to a brand	ease with which a brand comes to mind	range of usage scenarios for a brand

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FLOPS

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It's easy to write a sarcastic Business Insider article making fun of product flops. BUT companies need to experiment. Failure is part of that process. If lack of breadth is impacting a brand? That sounds like a classic "good problem to have"



Support Metrics

- The ability to retrieve a brand from memory
 - Wh f Coke, Sprite, etc...
 - Wh link of McDonalds, Taco Bell
- Brand recall guides our test Add WeChat <https://eduassistpro.github.io/> edu_assist_pro

Brand Recognition

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How well can you recognize these logos without the brand name?

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Customer Metrics

Customer Satisfaction

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- renewal rates for services
- likelihood of returning to the service
- effectiveness of online customer support
- customer ratings on sites like <https://eduassistpro.github.io/> and [Add WeChat edu_assist_pro](#) on Amazon

Customer Lifetime Value

- Informs companies about how much a customer is worth to them.
 - Especially like Netflix, where they want customers to subscribe to its services.
- These metrics focus on the LONG TERM value a single customer brings to the company.

Customer Lifetime Value

Informs companies about how much a customer is worth to them

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(retention rate)

Customer Lifetime Va

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(1 - retention rate)

Margin = customer revenue - cost of the customer

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Retention rate = percentage of customers who remain loyal over time

Discount rate = cost of capital for the organization

Retention rate = percentage of customers who remain loyal over time

NETFLIX

- Lifetime Value calculations drive pricing and marketing decisions
- Average subscribers
 - \$150 to acquire and maintain each customer
 - Year 1: 12 m

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<https://eduassistpro.github.io/>

- Solidifies budget for marketing expenses
- Netflix has truly mastered Customer “down to the penny”
- Track each individual subscriber’s tastes and preferences
- When a customer is about to leave, Netflix:
 - Knows they watch less
 - Uses profile information to maximize Retention Rates by finding ideal shows and movies

NETFLIX

The average Netflix customer subscribes for 25 months at \$10.99 per month.

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- Calculate the Average Lifetime Value of a subscriber and subtract 20% for overhead costs.
- As a marketing team <https://eduassistpro.github.io/> is revenue to expand and maintain Netflix's subscriber base.
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 - How much (in dollars) goes toward overhead costs?
 - How much goes toward adding new content?
 - Which metrics would you track to determine if your approach was successful?



RETENTION Assignment Project Exam Help

"Netflix has now captured <https://eduassistpro.github.io/households, and in the last quarter, subscriber base has canceled.> Add WeChat edu_assist_pro

Customer Profit

- The profit a company makes off a customer or customer group over a period of time
- Seeks to acknowledge customer value

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Customer Profit = customer revenue - customer costs

EXAMPLE: Sephora's Beauty Insider Program

- Customer loyalty programs are often used to increase cus
 - Point-b <https://eduassistpro.github.io/> points for each dollar spent
redeem them for beauty su
at checkout



Digital Marketing Metrics

- *Total Conversions:* number of people who have taken a desired marketing outcome, as defined by the marketing team. Examples include completing a checkout on an ecommerce site; filling out a lead form; signing up for a newsletter.
- *Impressions:* content has been displayed, including the same content multiple times and regardless whether there is any response to it.
- *Total Reach:* the number of people who received impressions. Or the total number of followers, retweets or friends.

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Digital Marketing Metrics

- *Conversion Rate*: the total conversions divided by the total reach.

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- *Micro Conversion Rate*: the conversion rate at the campaign or platform level (a particular marketing video delivery).
- *Conversion Funnel Rates*: the percentage of users who make it through to the next level of each step in the journal from impression to conversion (e.g., from impression to click-through; then from click-through to placing an item in the shopping cart; then from the shopping cart to checking out).

Digital Marketing Metrics

- *Lead to Close Ratio:* total number of sales leads by the total number of sales (important for sales analytics)
 - *Total Visits:* the count of visits to a website, including unique, including unlimited visitors.
 - *Unique Visitors:* Total unique visitors to a website per day (monitored by IP address)
 - *New Sessions:* The total number of new site versus recurring visitors.
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Digital Marketing Metrics

- *Site Time*: the amount of time a customer spends on a site (e.g., important for media providers).
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- *Direct Traffic*: number of people who typed in the URL to get to the website.
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- *Referrals*: number of people who came to the website from another website to get to the website.
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- *Organic traffic*: number of people who reached the website by performing a search from sites like Google or Bing.
- *Social traffic*: number of people who found the website through social media.

Digital Marketing Metrics

- *Bounce Rate*: Percentage of people who leave the webpage after viewing only one page
- *Click Through Rate (CTR)*: Ratio of people who click on a link compared to the total number of people who saw the link.
- *Customer Retention*: of customers who return to buy again.
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- *Customer Acquisition Cost (CAC)*: Total marketing costs over a period of time/ Total amount of new customers in that same time period.
- *Open Rate*: the number of people who open an email that has been sent to them dividing by the total number of people to whom the email was sent.

Digital Marketing Metrics

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Development Metrics

Measures a company's ability to leverage competitive advantage and product or service development.

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t into:

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1. Low co

2. Customiz

3. Quality-oriented development

4. Responsiveness

5. Product innovation

Low Cost Metrics

Measure the ability to deliver goods
and services at a low cost

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Customization Metrics

- Measure the ability to tailor products and services to customers

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- Can inc ion system <https://eduassistpro.github.io/> inventor
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- Dell allows customers to configure and customize their PC to their liking, using online configuration tools.



Quality Metrics

Ensure that companies produce
high quality products and services

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- Includes certifications, training, involvement,
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 - Hospitals often conduct ongoing training for surgical staff to ensure that they are constantly delivering top-quality healthcare.

Responsiveness Metrics

Measure whether companies are attentive to
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customer needs

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development speed,
, and market feedback

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• Many com new updates in the
App Store to better the users experience.

Innovation Metrics

Measure a company's ability to innovate and develop a mix of new offerings

- Measure level of innovation by tracking new product launches, patent filings, and market share growth.
- Measure innovation culture by tracking employee satisfaction with work environment and opportunities for professional development.
- Measure innovation output by tracking the number of new products or services developed and launched over time.
- Measure innovation impact by tracking the financial performance of new products or services and their contribution to overall company revenue.

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Walmart collects metrics about consumers, analyzes that information in complex ways, and use the results of that analysis to track consumers on and offline while shaping the company's marketing efforts

- Has exhaustive data on at least 145 million Americans – more than 60% of U.S. Adults
- Walmart shares customers' data gathered online with more than 50 third parties
- Ingests just about every clickable action on Walmart.com: what individuals buy online and in stores, trends on Twitter, local weather deviations, and o
 - Intelligently tease out individually personalize

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- Maintains the ability to track customer movement in stores
Wi-Fi

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We want you to know that, when you access or use [wireless networks and associated services], Walmart will receive information that may identify you or the device you are using. That information may include MAC address, IP address, and unique device identifier such as a name or number assigned to the device. If you were required to login in order to access or use the Service, then registration information we obtain from you may include your name, phone number and email address. We also will receive the real-time location of your device while it is accessing the Service.



- The “personalized shopping experience” doesn’t sound like a bad thing. Do you think it is a good one?
- Many companies information and d uncomfortable?
- What other ways do you believe com information on customers?

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ersonal customer

st make you

to get personal

University of Michigan

- Quality Metrics: Customer Satisfaction
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- American Customer Sa
- More important for ser <https://eduassistpro.github.io/>
- Short-term earnings or long-term satisfaction
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University of Michigan

- What can companies do to increase customer satisfaction?
 - Think of companies that you are loyal to - why do you like them

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- What types of businesses do you think would not be as concerned about long-term customer satisfaction?

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Forecasting

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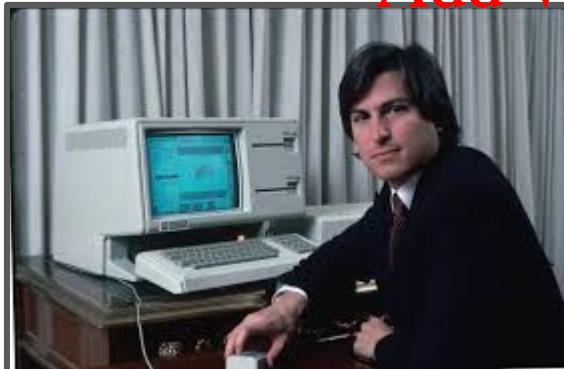
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Qualitative Forecasting: Overview

These are forecasts that rely on judgement, experience, and opinions
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In some cases, it may be suggested that “if the data is garbage, then remember” <https://eduassistpro.github.io/>” ut.”

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Steve Jobs is a well-known example of a business leader who innovated without necessarily relying on some else's metrics, data, polling, etc.



Qualitative Forecasting: Pros

This method may be particularly useful/helpful/appropriate when sufficient numerical data is not available

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Some experts may have developed intuition over years of studying a particular field, or being involved in a particular business



Qualitative Forecasting: Cons

Subjective judgements are very prone to biases:
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Overconfidence bias

"I know I'm right... no one else gets this."

Anchoring bias Add WeChat edu_assist_pro

"What was last year's number?"

Groupthink

"I don't want to rock the boat here..."



Wisdom of Crowds: Collective Forecasts

“Collective decisions are most likely to be good ones when they’re made by people with diverse opinions reaching independent private information.”

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Four conditions for wise crowds:

- Diversity of opinion
- Independence
- Decentralization
- Aggregation

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THE NEW YORK TIMES BUSINESS BESTSELLER
“As compelling and thought-provoking as *The Tipping Point* by Malcolm Gladwell.... *The Wisdom of Crowds* ranges far and wide.”
—The Boston Globe

THE WISDOM
OF CROWDS
JAMES
SUROWIECKI

WITH A NEW AFTERWORD BY THE AUTHOR





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t this jar question!

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PageRank and Collective Wisdom

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Time Series Data: Overview

Time series data involves measurements that contain both numeric values and a meaningful timestamp associated with each of those values.

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That timestamp might be <https://eduassistpro.github.io/>, or any other repeating period. By including info but also about *when* it happened, time series data lets us better particular phenomenon that we want to study across a period, such as stock price movement, weather patterns, or demographic trends.

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Time Series Data

Time Stamps -- particular moments in time

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Time intervals / periods
point.

specific beginning and end

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Time delta / duration -- an exact *length* of time

AD654 Takeaways: Delta just comes from a Greek symbol meaning “change.” It might seem like the second two definitions are redundant, but the distinction is whether the specific beginning and endpoints matter. See the next slide for an example.

Duration vs. Interval

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When we talk about the 100m dash, we care mainly about time duration.

When we measure stock market performance, we care about intervals -- not just duration. (think about a comparison to something like the S&P 500)

Time Series Components

Level: The average value of the time series.

Trend: The direction of movement in the data across time. A time series can show an uptrend, a downtrend, or no trend.

Seasonality: A pattern of activity that repeats at regular intervals.

Cyclicalty: A pattern of activity in a time series that involves seasonal fluctuations that occurs across irregular intervals.

Noise: The random variation in a time series that is caused by either measurement error or irregular movement in the value being measured.



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erview

Simple

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Naive Method (Last Observation Carried Forward)

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The naive method for forecasting is Carried Forward.

While the naive method might sound t instances in which it is quite handy. For example, look at weather forecasting. Suppose you are assume that you're an amateur weather forecaster who lacks any s tomorrow's weather. (Let's also Add WeChat [edu_assist_pro](https://eduassistpro.github.io/)) To estimate the high temperature for tomorrow, you could simply use today's high te

Let's take a look at how this would have done for any particular 7-day period.



	Actual	Forecast	AD (Absolute Deviation)	Error (Observed - Forecast)
Day 1	Assignment Project Exam Help			
Day 2				
Day 3		https://eduassistpro.github.io/		
Day 4		Add WeChat edu_assist_pro		
Day 5				
Day 6				
Day 7				

Naive Approach / LOCF: Summary

Useful if you need to make a quick forecast/prediction in the absence of any other data/info

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Can be applied seasonally

red. For example, in sales, it doesn't

sales

Land could use this to p

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Not very useful in a practical way. Think about it: if you're going on a trip, could you use this for weather data?

Particularly ineffective for anything that tends to fluctuate up and down over periods, such as stocks.



Trend

Forecast value for the next period equals the last observed value in the series, plus or minus
Assignment Project Exam Help st two observed values
in the series.* <https://eduassistpro.github.io/>

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* Not the only way this can be done.



Our Mission

Together, let's make some stock market predictions for tomorrow, using the trend method.

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What I need: Volunteers to gi

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Trend

Forecast value for the next period equals the last observed value in the series, plus or minus the difference between the last *two* observed values in the series.*

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09MAR	\$30
10MAR	\$35
PREDICTED 11MAR	\$40

* Not the only way this can be done.



Mean Method

The mean method is a simple, but sometimes effective, approach to forecasting -- as its name suggests, it involves taking the average of all previous observations to predict the value for the next observation. <https://eduassistpro.github.io/> Add WeChat edu_assist_pro

Mean Method: Is it Simple? Or Complex?

This approach is straightforward, and completely free of fancy notation, but it actually captures quite a bit of underlying information. Think about using it to predict the number of runs a baseball team will score in its next game -- what are some of the factors that influence this number? Good hitters would help to push that number upwards. If positive intangible factors like "good team chemistry" are present, then these will push the number upwards, too. Injuries to key players might push

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<https://eduassistpro.github.io/>

But how would we capture all the s

news here is that we don't have to overthink it! Since all of thos
in" to the game statistics from earlier in the season, we could use

o generate the prediction? The good

aph above are already "baked
edict something like the

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Simple Moving Averages

When an analyst wishes to use the mean method for forecasting, but with only the most recent observations used as inputs, she may decide to use a moving average, which is sometimes referred to as a simple moving average.

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When using a moving average for <https://eduassistpro.github.io/> k value (with k representing the number of periods) to use. The k window. Using a smaller window means that the prediction will be based on newer data, which means that older data will be included. A larger window also generally means that outliers will be included. A larger window tends to generate smoother forecasts. Larger windows tend to generate smoother forecasts. Larger windows tend to generate smoother forecasts.

In stock market analysis, a commonly-used window is 200 days. Viewers of CNBC will often hear the term “trailing moving average.” Such an average uses the most recent data point, and then moves backwards to a specified point to capture the data that will be used in the forecast.



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Exponentially-Weighted Moving Averages

$$F_{t+1} = F_t + (\alpha)E_t$$

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Single Exponential Smoothing (SES), also sometimes known as Simple Exponential Smoothing, is used for time series forecasting when the data enables the modeler to use a constant α . The advantage of SES is that it forecasts when making a prediction. This weighting adds a disadvantage to simple moving averages, as a simple moving average uses a constant window size, where each observation inside that window.

The equation shown above this paragraph is how we will represent our single exponential smoothing forecast for a given period. In this equation F_{t+1} is the forecasted value for the next period. F_t is the forecasted value for the current period. Alpha is the adjusting constant, and E_t represents the error, which is found by taking the observed value (i.e. the actual value) for this period and subtracting the predicted value.



Where Does Alpha Come From?

The larger the alpha value goes, the more weight will be placed on recent observations. Smaller alpha values will show the longer term tendency of the time series.

To see this, let's think about the naive approach we have. If alpha is zero, we're just really using the naive approach. If alpha is one, we are adjusting as much as possible based on the error that we saw with the most recent observation.

How might we do this in the real world? We could experiment with different alpha values, see how we do, and then adjust accordingly.



Our Mission: Simple Exponential Smoothing Example

Year	1	2	3	4	5
Revenue	65,000	80,000	90,000	70,000	98,000
Forecasted Revenue	75,000	7	https://eduassistpro.github.io/		
SES Forecast Error	-10,000	8,000	15,600	-9,080	Add WeChat edu_assist_pro

$$F_{t+1} = F_t + (\alpha)E_t \quad \text{ALPHA} = 0.3$$



Python Scripts

Our Mission:

Assignment Project Exam Help

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