DATA ANALYTICS

Unit 5: Advanced Techniques

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DATA ANALYTICS

Unit 5: Markov chains contd.

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Expected Duration to Reach a State from Other States

The expected duration to reach a state *j* from state *i* can be calculated by solving the following system of equations:

Then, $E_{i,j}$ satisfies the following system of equations:

$$E_{i,j} = 1 + \sum_k P_{i,k} E_{k,j} \quad \forall\, i,\ i \neq j$$

$E_{j,j} = 0$

Example 16.6

The transition probability matrix calculated based on monthly data is shown in
Table 16.13. Calculate the expected duration (in months) for the process to reach state 7 from state 4.
The percentage of non-performing assets at a bank is classified into the following
seven states:

State	State Description
1	NPA is less than 1%
2	NPA is between 1% and 2%
3	NPA is between 2% and 3%
4	NPA is between 3% and 4%
5	NPA is between 4% and 5%
6	NPA is between 5% and 6%
7	NPA greater than 6%

TABLE 16.13 Transition probability matrix between NPA states

	1	2	3	4	5	6	7
1	0.95	0.05	0	0	0	0	0
2	0.10	0.85	0.05	0	0	0	0
3	0	0.10	0.80	0.10	0	0	0
4	0	0	0.15	0.70	0.15	0	0
5	0	0	0	0.15	0.65	0.20	0
6	0	0	0	0	0.20	0.60	0.20
7	0	0	0	0	0	0.10	0.90

Solution for Example 16.6

Let $E_{4,7}$ be the expected number of duration for the process to reach state 7 from state 4. Then it satisfies the following system of equations:

$$E_{4,7} = 1 + 0.15E_{3,7} + 0.70E_{4,7} + 0.15E_{5,7}$$
$$E_{3,7} = 1 + 0.10E_{2,7} + 0.80E_{3,7} + 0.10E_{4,7}$$
$$E_{5,7} = 1 + 0.15E_{4,7} + 0.65E_{5,7} + 0.20E_{6,7}$$
$$E_{6,7} = 1 + 0.20E_{5,7} + 0.60E_{6,7} + 0.20E_{7,7}$$
$$E_{2,7} = 1 + 0.10E_{1,7} + 0.85E_{2,7} + 0.05E_{3,7}$$
$$E_{1,7} = 1 + 0.95E_{1,7} + 0.05E_{2,7}$$
$$E_{7,7} = 0$$

TABLE 16.13	Transition probability matrix between NPA states						
	1	2	3	4	5	6	7
1	0.95	0.05	0	0	0	0	0
2	0.10	0.85	0.05	0	0	0	0
3	0	0.10	0.80	0.10	0	0	0
4	0	0	0.15	0.70	0.15	0	0
5	0	0	0	0.15	0.65	0.20	0
6	0	0	0	0	0.20	0.60	0.20
7	0	0	0	0	0	0.10	0.90

Solving the system of equations we get $E_{4,7}$ = 206.6667.
That is, it takes approximately 207 months on average for the process to reach state 7 from state 4.

CLV is the net present value (NPV) of the future margin generated from its customers or customer segments. CLV is calculated usually at a customer segment level.

Ching *et al.* (2004) showed that the steady-state retention probability can be calculated using

$$R_t = \sum_{i=1}^{n} \frac{\pi_i}{\left(\sum_{j=1}^{n} \pi_j\right)} (1 - P_{i0}) = 1 - \frac{\pi_0 (1 - P_{00})}{1 - \pi_0}$$

where R_t is the steady-state retention probability.

The customer lifetime value for *N* periods is given by (Pfeifer and Carraway, 2000):

$$\text{CLV} = \sum_{t=0}^{N} \frac{\mathbf{P_I} \times \mathbf{P^t R}}{(1+i)^t}$$

where

P_I is the initial distribution of customers in different states,

P is the transition probability matrix,

R is the reward vector (margin generated in each customer segments)

i is the interest rate

Note: discount rate d = 1/(1+i) is the discount factor

Example :16.7

The customers of Dubai Data Services (DDS) are classified into five categories as shown in Table 16.14 along with transition probability matrix. State 0 represents non-customers and the remaining states are different customer segments created based on the revenue generated. The average margin generated in different states is shown in Table 16.15 along with initial distribution of customers in millions.

Calculate the steady-state retention probability and CLV for 6 periods (N = 5) using a discount factor of d = 0.95.

TABLE 16.14 Customer states of DDS and transition matrix

	0	1	2	3	4
0	0.80	0.10	0.10	0	0
1	0.10	0.60	0.20	0.10	0
2	0.15	0.05	0.75	0.05	0
3	0.20	0	0.10	0.60	0.10
4	0.30	0	0	0.05	0.65

TABLE 16.15 Margin generated in different states

State	0	1	2	3	4
Average Margin	0	120	300	450	620
Customers (in millions)	55.8	6.5	4.1	2.3	1.6

Solution

The stationary distribution equations are

$\pi_0 = 0.8\pi_0 + 0.10\pi_1 + 0.15\pi_2 + 0.20\pi_3 + 0.30\pi_4$

$\pi_1 = 0.1\pi_0 + 0.60\pi_1 + 0.05\pi_2$

$\pi_2 = 0.1\pi_0 + 0.2\pi_1 + 0.75\pi_2 + 0.10\pi_3$

$\pi_3 = 0.10\pi_1 + 0.05\pi_2 + 0.60\pi_3 + 0.05\pi_4$

$\pi_0 + \pi_1 + \pi_2 + \pi_3 + \pi_4 = 1$

Solving the above system of equations, we get $\pi_0 = 0.4287$. The steady-state retention probability R_t is

$$R_t = 1 - \frac{\pi_0(1 - P_{00})}{1 - \pi_0} = 1 - \frac{0.4287 \times (1 - 0.80)}{1 - 0.4287} = 0.85$$

Customer lifetime value for $N = 5$ is

$$\mathbf{CLV} = \sum_{t=0}^{5} \frac{\mathbf{P_I} \times \mathbf{P^t R}}{(1+i)^t}$$

where

$$P_I = \begin{pmatrix} 55.8 & 6.5 & 4.1 & 2.3 & 1.6 \end{pmatrix}$$

Reward vector $\mathbf{R} = \begin{pmatrix} 0 \\ 120 \\ 300 \\ 450 \\ 620 \end{pmatrix}$

TABLE 16.15	Margin generated in different states				
State	0	1	2	3	4
Average Margin	0	120	300	450	620
Customers (in millions)	55.8	6.5	4.1	2.3	1.6

Substituting the values in CLV equation, we get CLV = 40181.59.

Text Book:

"Business Analytics, The Science of Data-Driven Decision Making", U.
Dinesh Kumar, Wiley 2017

Markov chains contd (absorbing states, expected duration to reach a state) [ch 16.4.5 - ch 16.8]

DATA ANALYTICS

Unit 5: AB Testing

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Department of Computer Science and Engineering

1. What is A/B Testing?

- **A/B testing** (also known as **bucket testing** or **split-run testing**) is a user experience research methodology.

- A/B tests consist of a randomized experiment with two variants, A and B.

- It includes application of statistical hypothesis testing or "two-sample hypothesis testing" as used in the field of statistics.

- A/B testing is a way to compare two versions of a single variable, typically by testing a subject's response to variant A against variant B, and determining which of the two variants is more effective.

Outline

1. What is A/B Testing?

2. A/B Testing Examples in Popular Industries

3. Why Should You A/B Test?

4. How to Perform an A/B Test?

5. What Can You A/B Test?

6. 9 Mistakes to Avoid While A/B Testing

7. 6 Challenges of A/B Testing

8. How To Make an A/B Testing Calendar?

9. Summary

1. What is A/B Testing?

- A/B test is the shorthand for a simple controlled experiment.

- As the name implies, two versions (A and B) of a single variable are compared, which are identical except for one variation that might affect a user's behavior.

- A/B tests are widely considered the simplest form of controlled experiment.

- However, by adding more variants to the test, this becomes more complex.

History

Example of A/B testing on a website. By randomly serving visitors two versions of a website that differ only in the design of a single button element, the relative efficacy of the two designs can be measured.

Conversion Rate

Let us assume that there is a web page and all the traffic is directed to this page. Now as a part of A/B Testing, you have made some minor changes like headlines, numbering, etc. on the same page and half of its traffic is directed to the modified version of this web page. Now you have version A and version B of the same web page and you can monitor the visitor's actions using statistics and analysis to determine the version that yields a higher conversion rate.
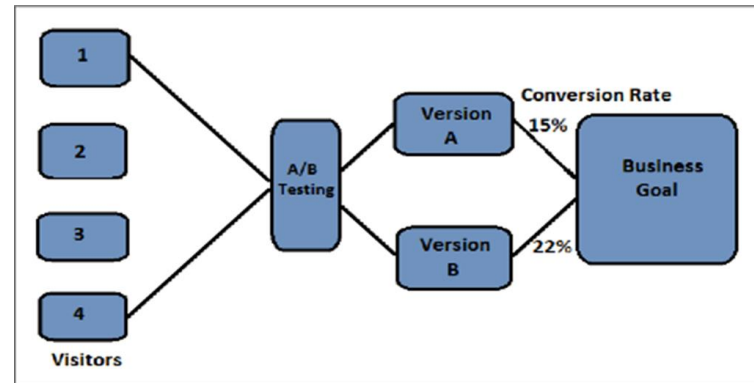
A conversion rate is defined as the instance, when any visitor on your website performs a desired action.

A/B Testing enables you to determine the best online marketing strategy for your business.

Take a look at the illustration. It shows that version A yields a conversion rate of 15% and version B yields a conversion rate of 22%.

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2. A/B Testing Examples in Popular Industries

1. A/B testing in Media & Publishing Industry

2. A/B Testing in eCommerce Industry

3. A/B Testing in Travel Industry

4. A/B Testing in B2B/SaaS Industry

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2. 1. A/B testing in Media & Publishing Industry

- Netflix uses personalization extensively for its homepage.

- Based on each user's profile, [Netflix personalizes the homepage to provide the best user experience to each user](#).

- They decide how many rows go on the homepage and which shows/movies go into the rows based on the users streaming history and preferences.
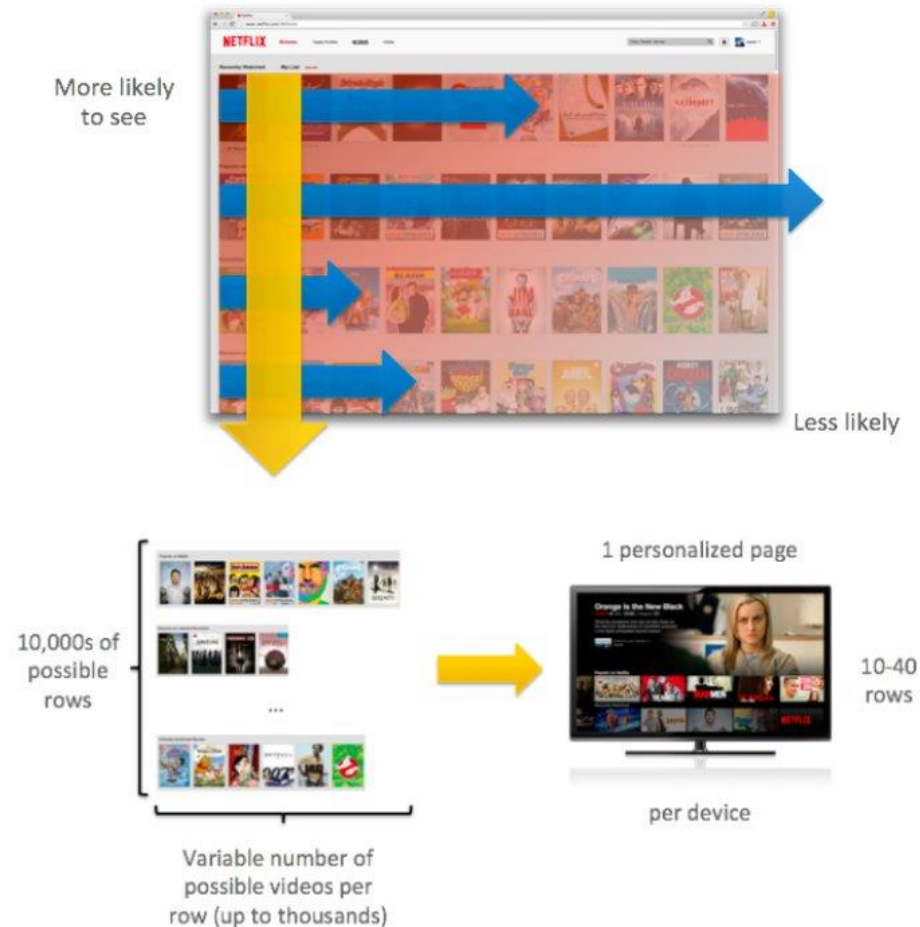
2.2 A/B Testing in eCommerce Industry

Amazon is at the forefront in conversion optimization partly due to the scale they operate at and   partly due to their immense dedication to providing the best customer experience.

Amongst the many revolutionary practices they brought to the eCommerce industry, the most prolific one has   been their '1-Click Ordering'.

This change had such a huge business impact that Amazon got it patented (now expired) in 1999. In fact, in 2000, even Apple bought a license for the same to be used in their online store.

Subtotal (1 item): $8.79

☐ This order contains a gift

Proceed to checkout

or

Sign in to turn on 1-Click ordering.

2. 3. A/B Testing in Travel Industry

- In the travel industry, Booking.com easily surpasses all other eCommerce businesses when it comes to using A/B testing for their optimization needs.

- They test like it's nobody's business.

- From the day of its inception, Booking.com has treated A/B testing as the treadmill that introduces a flywheel effect for revenue.
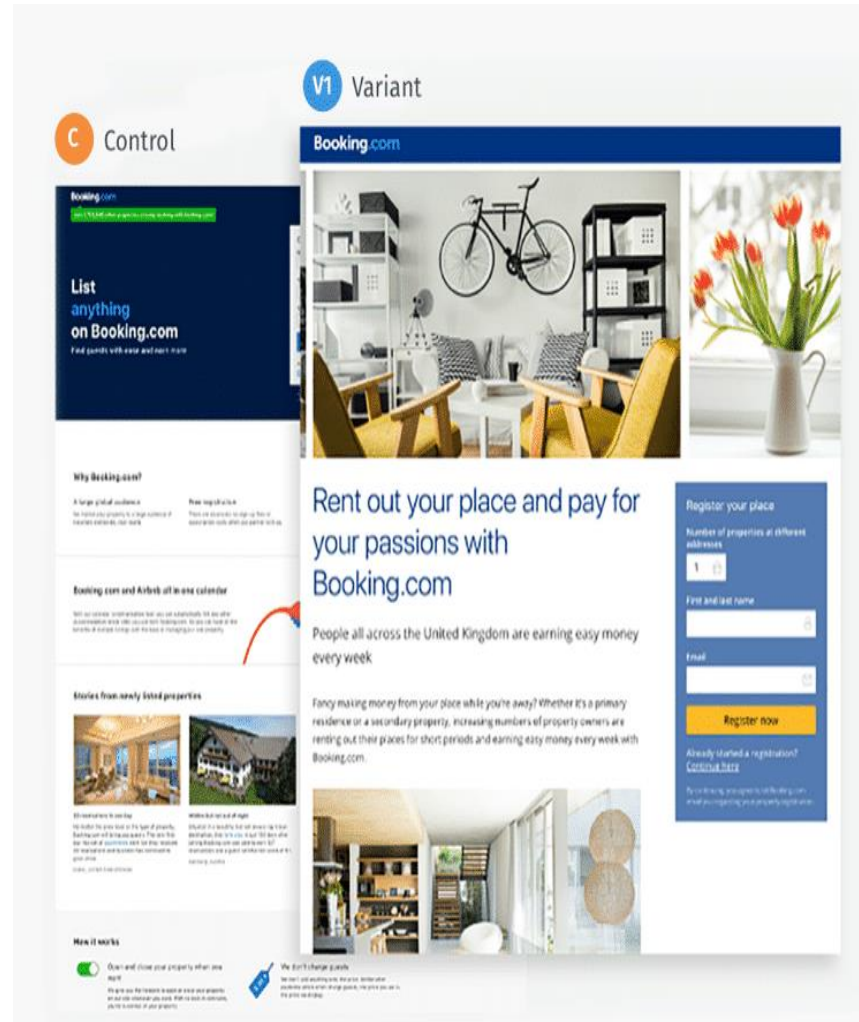
2.4 A/B Testing in B2B/SaaS Industry

Generate high-quality leads for your sales team, increase the number of free trial requests, attract your target buyers, and perform other such actions by testing and polishing important elements of your demand generation engine.

POSist, a leading SaaS-based restaurant management platform with more than 5,000 customers at over 100 locations across six countries, wanted to increase their demo requests.

C Control
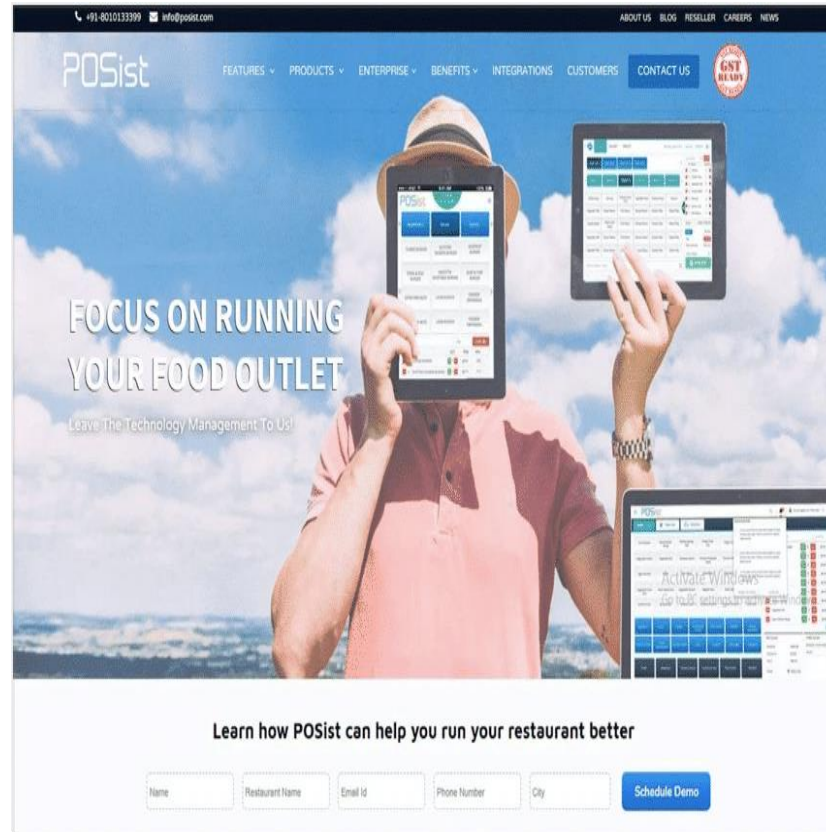
3.Why Should You A/B Test?

If B2B businesses today are unhappy with all the unqualified leads they get per month, eCommerce stores, on the other hand, are struggling with a high cart abandonment rate.

Meanwhile, media and publishing houses are also dealing with low viewer engagement. These core conversion metrics are affected by some common problems like leaks in the conversion funnel, drop-offs on the payment page, etc.

Let's see why you should do A/B testing to deal with all these problems:

| Solve visitor pain points | Get more conversion by investing less | Reduce bounce rates | Make low risk modifications | Redesigning your website | Changing the product pricing | Feature change |

How do you Perform an A/B Test?

A/B testing offers a very systematic way of finding out what works and
what doesn't work in any given marketing campaign.
Most marketing efforts are geared toward driving more traffic.
But, as traffic acquisition becomes more difficult and expensive, it becomes paramount to offer
the best experience to your users who come to your website.
This will help them achieve their goals and allow them to convert in the fastest and most
efficient manner possible.
A/B testing in marketing allows you to make the most out of your existing traffic.
Broadly, it includes the following steps:
Step 1: Research
Step 2: Observe and Formulate Hypothesis
Step 3: Create Variations
Step 4: Run Test
             Split URL Testing
             Multivariate Testing (MVT)
             Multipage Testing
Step 5: Result Analysis and Deployment

Step 1: Research

Before building an A/B testing plan, one needs to conduct thorough research on how the website is currently performing.

Collect data on everything related to how many users are coming onto the site, which pages drive the most traffic, what are the various conversion goals of different pages etc.

The A/B testing tools used here can include quantitative website analytics tools such as Google Analytics, Omniture, Mixpanel, etc., which can help you figure out your most visited pages, pages with most time spent or pages with the highest bounce rate.

For example, to start by shortlisting pages which have the highest revenue potential or the highest daily traffic.

Step 2: Observe and Formulate Hypothesis

- Get closer to business goals by logging research observations and creating data-backed hypotheses aimed at increasing conversions.

.
- The qualitative and quantitative research tools can only help with gathering visitor behavior data.

- Analyze and make sense of that data.

- The best way to utilize every bit of data collated is to analyze it, to make keen observations on them, and then to draw website as well as user insights to formulate data-backed hypotheses.

- Once is hypothesis ready, test it against various parameters like how much confidence you have of it winning, its impact on macro goals, and how easy it is to set up and so on.

Step 3: Create Variations

- The next step in the testing program should be to create a variation based on your hypothesis, and A/B test it against the existing version (control).

- A variation is another version of the current version with changes that you want to test. Test multiple variations against the control to see which one works best.

- Create a variation based on the hypothesis of what might work from a UX perspective.

- For example, enough people not filling forms? Does the form have too many fields? Does it ask for personal information? Maybe try a variation with a shorter form or another variation by omitting fields that ask for personal information.

Step 4: Run Test

Before we get to this step, let's first explore how many kinds of testing methods are there and when to use which method.

- A/B Testing,
- Multivariate Testing,
- Split URL Testing, and
- Multipage Testing are 4 different types of testing.

Step 5: Result Analysis and Deployment

Once the test concludes, analyze the test results by considering metrics like percentage increase, confidence level, direct and indirect impact on other metrics, etc.

If the test succeeds, deploy the winning variation.

If the test remains inconclusive, draw insights from it, and implement these in your subsequent tests.

Research

Hypothesis formulation

Creating a variation

Testing

Analyzing results and drawing conclusions

5. What Can you A/B Test?

- Website's conversion funnel determines the fate of your business.
- Therefore every piece of content that reaches your users via your website must be optimized to its maximum potential.
- This is especially true for elements that can influence visitor behavior and conversion rate.
- When undertaking an optimization program, the following key elements should be A/B tested (the list, however, is not exhaustive):
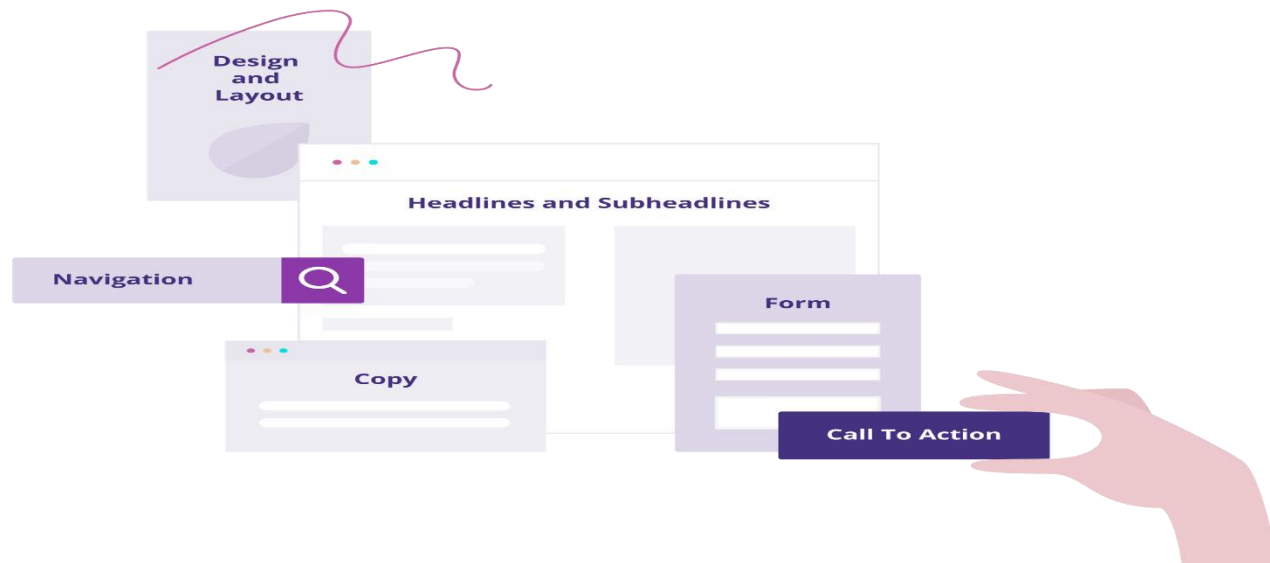
5. What Can you A/B Test?

Copy

1. Headlines and Sub-headlines

Headline is the first thing that visitors see on any page. The headline is what defines your first impression in a visitor's eyes.

Make sure the headline catches the visitors' attention as soon as they land on the website. Keep it short and to the point, ensuring it talks clearly about what your product or service is and its benefits.

Try A/B testing various fonts, sizes, copy, and messaging.

2. Body

The body of your website should clearly state what the visitor is getting – what's in store for them. It should also resonate with your page's headline.While writing content for your page's body, keep in mind these two parameters:

Writing style: Use the right tonality based on the target audience. Your copy should directly address the end-user and answer all their questions. It should consist of key phrases that improve usability and stylistic elements that highlight important points.

Formatting: Use relevant headlines and subheadlines, break the copy into small and easy paragraphs, and format it for skimmers using bullet points or lists.

5. What Can you A/B Test?

Design and Layout: Along with the copy, the design and layout of a page include images (product images, offer images, etc.) and videos (product videos, demo videos, advertisements, etc.).

- **Provide clear information:** . Write clear copies and provide easily noticeable size charts, color options, etc.

- **Highlight customer reviews:** Add both good and bad reviews for your products. Negative reviews add credibility to your store.

- **Write simple content:** Avoid confusing potential buyers with complicated language in the quest to decorate your content. Keep it simple and fun to read.

- **Create a sense of urgency:** Add tags like 'only 2 left in stock', countdowns like 'offer ends in 2hours 15 minutes', or highlight exclusive discounts and festive offers, etc. to nudge the prospective buyer to purchase immediately.

5. What Can you A/B Test?

Navigation

- Another element of your website that you can optimize by A/B testing is your website's navigation. It is the most crucial element when it comes to delivering excellent user experience. Each click should direct visitors to the desired page.

- For example, as an eCommerce store, you may be selling a variety of earphones and headphones. Some of them may be wired, while others may be wireless or ear-pods.

- Bucket these in such a way that when a visitor looks for earphones or headphones, they find all these varieties in one place rather than having to search for each kind separately

5. What Can you A/B Test?

Forms
- Forms are mediums through which prospective customers get in touch with you. They become even more important if they are part of your purchase funnel.
- Just as no two websites are the same, no two forms addressing the different audience is the same.
- While for some businesses, a small comprehensive form may work, for other businesses, long forms might do wonders for their lead quality.
- You can figure out which style works for your audience the best by using research tools/methods like form analysis to determine the problem area in your form and work towards optimizing it.

5. What Can you A/B Test?

CTA (Call To Action)
The CTA is where all the real action takes place – whether or not visitors finish their purchases and convert if they fill out the sign-up form or not, and more such actions that have a direct bearing on your conversion rate.

With A/B testing, you can A/B test different copies, placement, colors & sizes, etc. for your CTA till you find the winning variation – and then test the winning version further to optimize it even more.

5. What Can you A/B Test?

Social Proof

Social proof may take the form of recommendations and reviews from experts of the particular fields, from celebrities and customers themselves, or can come as testimonials, media mentions, awards and badges, certificates, and so on.

The presence of these proofs validates the claims made by your website. A/B testing can help you determine if adding social proof is a good idea, what kinds of social proof if it is a good idea and how many should be added.

6. What are the Mistakes to Avoid While A/B Testing?

Mistake #1: Not Planning your Optimization Roadmap

•**Invalid hypothesis:** In A/B testing, a hypothesis is formulated before conducting a test. All the next steps depend on it: what should be changed, why should it be changed, what the expected outcome is, and so on. If you start with the wrong hypothesis, the probability of the test succeeding decreases.

•**Taking others' word for it:** Sure, someone else changed their sign-up flow and saw a 30% uplift in conversions. But it is their test result, based on their traffic, their hypothesis, and their goals. Here's why you should not implement someone else's test results as is onto your website: no two websites are the same – what worked for them might not work for you. Their traffic will be different; their target audience might be different; their optimization method may have been different than yours, and so on.

6.What are the Mistakes to Avoid While A/B Testing?

Mistake #2: Testing too Many Elements Together

Industry experts caution against running too many tests at the same time. Testing too many elements of a website together makes it difficult to pinpoint which element influenced the success or failure of the test most. Apart from this, more the elements tested, more needs to be the traffic on that page to justify statistically significant testing. Thus, prioritization of tests is indispensable for successful A/B testing.

6.What are the Mistakes to Avoid While A/B Testing?

Mistake #3: Ignoring Statistical Significance

If gut feelings or personal opinions find a way into hypothesis formulation or while you are setting the A/B test goals, it is most likely to fail. Irrespective of everything, whether the test succeeds or fails, you must let it run through its entire course so that it reaches its statistical significance. For a reason, that test results, no matter good or bad, will give you valuable insights and help you plan your upcoming test in a better manner.

6. What are the Mistakes to Avoid While A/B Testing?

Mistake #4: Using Unbalanced Traffic

Businesses often end up testing unbalanced traffic. A/B testing should be done with the appropriate traffic to get significant results. Using lower or higher traffic than required for testing increases the chances of your campaign failing or generating inconclusive results.

Mistake #5: Testing for Incorrect Duration

- Based on your traffic and goals, run A/B tests for a certain length of time for it to achieve statistical significance.
- Running a test for too long or too short a period can result in the test failing or producing insignificant results.
- Because one version of your website appears to be winning within the first few days of starting the test does not mean that you should call it off before time and declare a winner.
- The duration for which you need to run your test depends on various factors like existing traffic, existing conversion rate, expected improvement, and so on.

What are the Mistakes to Avoid While A/B Testing?

Mistake #6: Failing to Follow an Iterative Process

- A/B testing is an iterative process, with each test building upon the results of the previous tests. Businesses give up on A/B testing after their first test fails. But to improve the chances of your next test succeeding, you should draw insights from your last tests while planning and deploying your next test.

- This improves the probability of your test, succeeding with statistically significant results.

- Additionally, do not stop testing after a successful one. Test each element repetitively to produce the most optimized version of it even if they are a product of a successful campaign.

6. What are the Mistakes to Avoid While A/B Testing?

Mistake #7: Failing to consider external factors

Tests should be run in comparable periods to produce meaningful results. It is wrong to compare website traffic on the days when it gets the highest traffic to the days when it witnesses the lowest traffic because of external factors such as sale, holidays, and so on.

Mistake #8: Using the Wrong Tools

With A/B testing gaining popularity, multiple low-cost tools have also come up. Not all of these tools are equally good. Some tools drastically slow down your site, while others are not closely integrated with necessary qualitative tools (heatmaps, session recordings, and so on), leading to data deterioration.

Mistake #9: Sticking to Plain Vanilla A/B Testing Method

In the long run, sticking to plain vanilla A/B testing method will not work wonders. For instance, if you are planning to revamp one of your website's pages entirely, you ought to make use of split testing. Meanwhile, if you wish to test a series of permutations of CTA buttons, their color, the text and image of your page's banner, you must use multivariate testing.

7. What are the Challenges of A/B Testing?

The ROI from A/B testing can be huge and positive. It helps you direct your marketing efforts to the most valuable elements by pinpointing exact problem areas. The 6 primary challenges are as follows:

Challenge #1: Deciding What to Test
You can't just wake up one day and decide to test certain elements of your choice. A bitter reality that marketers are now coming to realize is that not all small changes that are easy to implement are always the best when you consider your business goals and often fail to prove significant. The same goes for complex tests. This is where website data and visitor analysis data come into play. These data points help you overcome the challenge of 'not knowing what to test' out of your unending backlog by generally pointing to the elements which may have the most impact on your conversion rates or by directing you to pages with the highest traffic.

7. What are the Challenges of A/B Testing?

Challenge #2: Formulating Hypotheses

In great resonance with the first challenge is the second challenge: formulating a hypothesis. This is where the importance of having scientific data at your disposal comes in handy. If you are testing without proper data, you might as well be gambling away your business. With the help of data gathered in the first step (i.e., research) of A/B testing, you need to discover where the problems lie with your site and come up with a hypothesis. This will not be possible unless you follow a well structured and planned A/B testing program.

Challenge #3: Locking in on Sample Size

Not many marketers are statisticians. We often make the mistake of calling conclusive results too quickly because we are more often than not after quick results. As marketers, we need to learn about sample sizes, in particular, how large should our testing sample size be based on our web page's traffic.

7. What are the Challenges of A/B Testing?

Challenge #4: Analyzing Test Results

With A/B testing, you will witness success and failure at each step. This challenge, however, is pertinent to both successful and failed tests:

• **Successful campaigns:** Interpreting test results after they conclude is extremely important to understand why the test succeeded. A fundamental question to be asked is – why? Why did customers behave the way they did? Why did they react a certain way with one version and not with the other versions? What visitor insights did you gather, and how can you use them? Many marketers often struggle or fail to answer these questions, which not only help you make sense of the current test but also provide inputs for future tests.

• **Failed campaigns:** Sometimes, marketers don't even look back at failed tests. They either have a hard time dealing with them, for example, while telling the team about the failed tests or have no clue what to do with them. No failed test is unsuccessful unless you fail to draw learnings from them. Failed campaigns should be treated like pillars that would ultimately lead you to success.

7. What are the Challenges of A/B Testing?

Challenge #5: Maintaining a Testing Culture

One of the most crucial characteristics of optimization programs like CRO and A/B testing is that it is an iterative process. This is also one of the major obstacles that businesses and marketers face. For your optimization efforts to be fruitful in the long run, they should form a cycle that roughly starts with research and ends in research.

Challenge #6: Changing Experiment Settings in the Middle of an A/B Test

When you launch an experiment, you must commit to it completely. Try and not change your experiment settings, edit or omit your test goals, or play with the design of the control or the variation while the test is running. Moreso, do not try and change the traffic allocations to variations as well because doing so will not only alter the sampling size of your returning visitors but massively skew your test results as well.

8. How To Make an A/B Testing Calendar – Plan & Prioritize
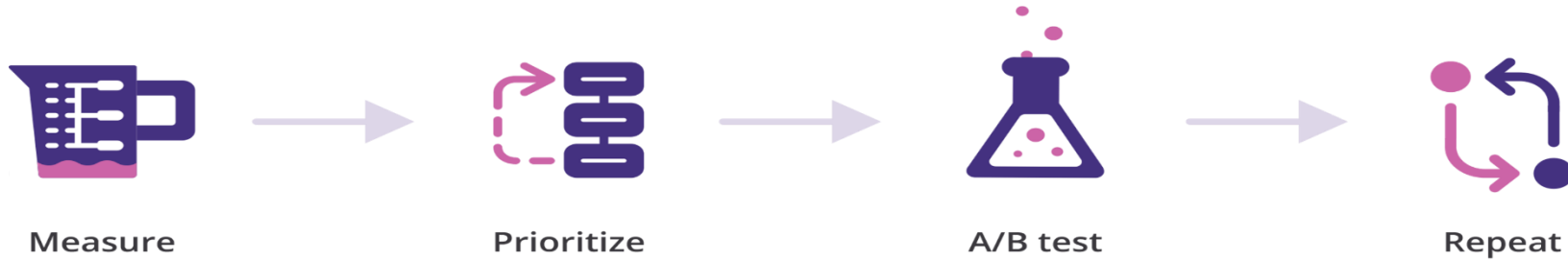
Stage 1: Measure	Stage 2: Prioritize	Stage 3: A/B Test	Stage 4: Repeat

8. How To Make an A/B Testing Calendar – Plan & Prioritize

Stage 1: Measure

This stage is the planning stage of your A/B testing program.

Everything that goes on in your website should correspond to your business goals. So before everything else, you need to be sure what your business goal/s is (are).

Tools like Google Analytics can help you measure your goals. Once you have clearly defined goals, set up GA for your website and define your key performance indicators.

1. Define your business objectives.
2. Define your website goals.
3. Define your Key Performance Indicators.
4. Define your target metrics.

8. How To Make an A/B Testing Calendar – Plan & Prioritize

Stage 2: Prioritize

- The next stage involves prioritizing your test opportunities.
- Prioritizing helps you scientifically sort the multiple hypotheses.
- By now, you should be fully equipped with website data, visitor data, and be clear on your goals.
- With the backlog you prepared in the first stage along with the hypothesis ready for each candidate, you are halfway there on your optimization roadmap.
- Now comes the main task of this stage: prioritizing.

8. How To Make an A/B Testing Calendar – Plan & Prioritize

Stage 3: A/B Test

- The third and most crucial stage is the testing stage.
- After the prioritization stage, you will have all the required data and a prioritized backlog.
- Once you have formulated hypotheses that align to your goal and prioritized them, create variations, and flag off the test.
- While your test is running, make sure it meets every requirement to produce statistically significant results before closure, like testing on accurate traffic, not testing too many elements together, testing for the correct amount of duration, and so on.
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8. How To Make an A/B Testing Calendar – Plan & Prioritize

Stage 4: Repeat

This stage is all about learning from your past and current test and applying them in future tests.

There can be 3 outcomes of your test:

1. Your variation or one of your variations will have won with statistical significance.
2. Your control was the better version and won over the variation/s.
3. Your test failed and produced insignificant results. Determine the significance of your test results with the help of tools like the A/B test significance calculator.

Summary

1. **What is A/B testing definition?** A/B testing is the process of comparing two variations of a page element, usually by testing users' response to variant A vs variant B, and concluding which of the two variants is more effective.
2. **What is A/B testing in digital marketing?** In digital marketing, A/B testing is the process of showing two versions of the same web page to different segments of website visitors at the same time, and then comparing which version improves website conversions.
3. **Why do we do A/B testing?** There are various reasons why we do A/B testing. A few of them include solving visitor pain points, increasing website conversions or leads, and decreasing the bounce rate. Read our guide to know the rest of the reasons.
4. **What is A/B testing and multivariate testing?** In A/B testing, traffic is split amongst two or more completely different versions of a webpage. In multivariate testing, multiple combinations of a few key elements of a page are tested against each other to figure out which combination works best for the goal of the test.

DATA ANALYTICS
Additional References

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THANK YOU

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