

# SQL Data-Driven Analysis

 A comprehensive analysis of website traffic, marketing channels, user behavior, and product performance using SQL.

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**Date:** 4th March, 2025

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# Introduction to the Project

## Project Overview

This project focuses on analyzing and optimizing website traffic, marketing channels, and user behavior for **Maven Fuzzy Factory**, an online retailer that has just launched its first product. The goal is to leverage SQL and data-driven insights to improve business performance, enhance conversion rates, and optimize marketing spend.

As an **eCommerce Database Analyst**, my role in this project was to work with the **CEO, Head of Marketing, and Website Manager** to **analyze marketing channels, measure website conversion performance, and assess the impact of new product launches**.

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## Project Scope & Objectives

The project was structured into multiple phases, covering key areas of **traffic analysis, website measurement, and user behavior insights**. Each phase involved extracting, analyzing, and interpreting data from the **Maven Fuzzy Factory database** to support business decisions.

### Key Objectives:

- ✓ **Traffic Analysis & Optimization** – Identify top traffic sources, measure conversion rates, analyze trends, and segment data for bidding optimization.
- ✓ **Website Measurement & Testing** – Find the most-visited pages, track entry and exit points, calculate bounce rates, and analyze conversion funnels.
- ✓ **Channel Analysis & Optimization** – Compare marketing channels, evaluate performance, and develop an optimized channel portfolio.
- ✓ **Product-Level & User-Level Analysis** – Understand sales trends, assess the effectiveness of cross-selling strategies, and analyze customer behavior patterns.

Each of these components contributed to building a **data-driven strategy for improving website traffic, increasing conversions, and maximizing marketing ROI**.

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## Methodology & Tools

- ◆ **SQL Queries:** Used extensively to extract and manipulate data from the **Maven Fuzzy Factory database**.
- ◆ **Data Visualization:** Insights were derived from query results and presented in an easy-to-understand format.

- ◆ **Trend Analysis:** Evaluated weekly and monthly trends to identify key growth opportunities and problem areas.
  - ◆ **Optimization Strategies:** Provided actionable recommendations for improving traffic quality, reducing bounce rates, and increasing conversions.
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By applying data analytics to **real-world eCommerce challenges**, this project provided **practical business insights** that can help **Maven Fuzzy Factory make better marketing and sales decisions**.

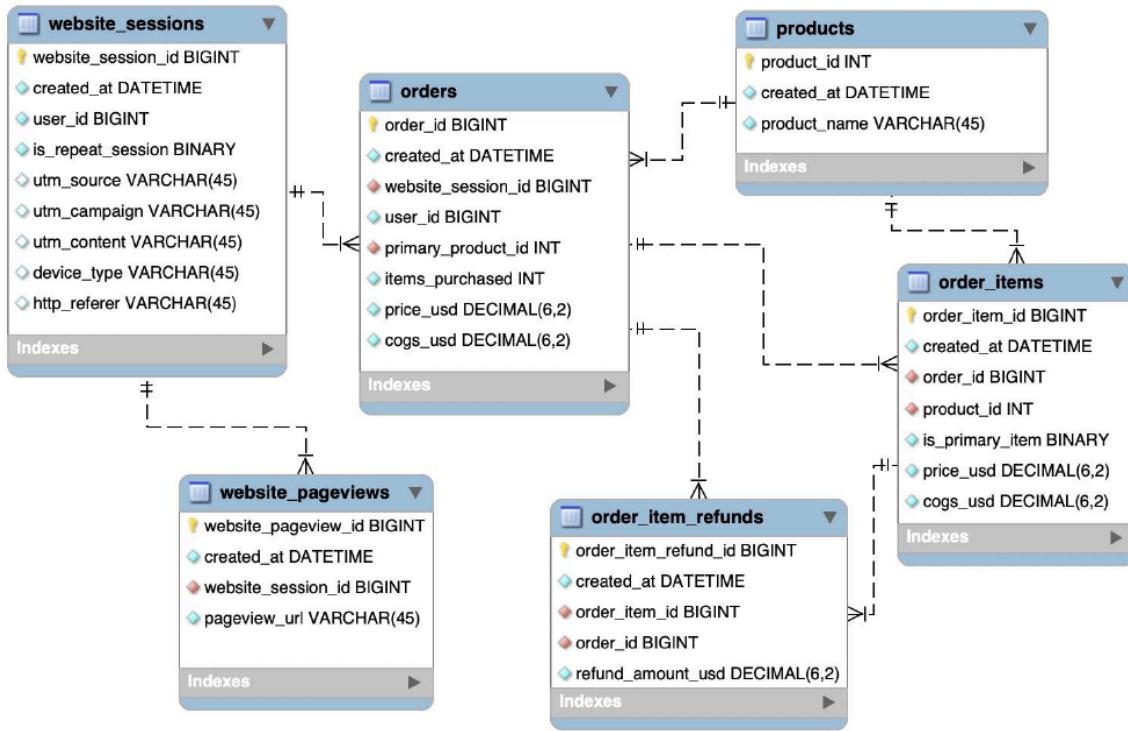
## Database Introduction: Maven Fuzzy Factory

### Overview

The **Maven Fuzzy Factory database** is designed to model a real-world **eCommerce** platform. This database contains structured information about **website activity, customer sessions, products, orders, and refunds**. The goal of using this database is to analyze how users interact with the website, measure key performance metrics, and optimize marketing efforts for better conversions and revenue growth.

The database is implemented using **MySQL**, and the full SQL script used to create it is attached to this report with the filename:

 [create\\_mavenfuzzyfactory\\_vApril2022.sql](#)



## Database Structure

The **Maven Fuzzy Factory** database consists of **six related tables**, each serving a distinct purpose in analyzing website performance and sales trends. Below is a breakdown of these tables and their functions:

### 1. website\_sessions (Tracks user activity)

- Stores session-related data such as session ID, user ID, traffic source, campaign details, and device type.
- Helps analyze how users arrive on the site and which marketing campaigns drive the most traffic.

### 2. website\_pageviews (Records page interactions)

- Logs each pageview within a session and links it to the corresponding session ID.
- Helps analyze landing page effectiveness, bounce rates, and user navigation patterns.

### 3. products (Contains product details)

- Stores product names, creation timestamps, and product IDs.
- Useful for tracking sales trends and product-level performance.

#### 4. orders (Captures customer purchases)

- Includes order ID, session details, user ID, primary product ID, and total price.
- Helps track sales conversion rates and revenue generation.

#### 5. order\_items (Breaks down order details)

- Tracks individual products within each order, including item prices, quantities, and cost of goods sold (COGS).
- Helps measure profit margins, upselling success, and cross-selling strategies.

#### 6. order\_item\_refunds (Tracks refunds and returns)

- Captures refund amounts, order details, and timestamps.
- Helps businesses understand refund patterns and improve customer satisfaction.

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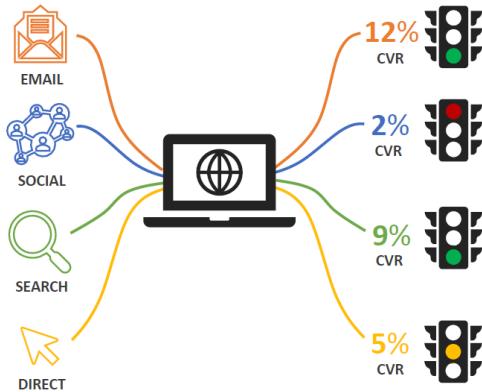
### Next Steps

- **To explore this database further**, you can execute the attached SQL script (`create_mavenfuzzyfactory_vApril2022.sql`) in **MySQL Workbench** to generate the schema.
- Once the database is set up, you can start running analytical queries to derive key insights on website traffic, sales trends, and customer behavior.

# 1. Traffic Source Analysis



Traffic source analysis is about understanding **where your customers are coming from** and **which channels are driving the highest quality traffic**



## COMMON USE CASES:

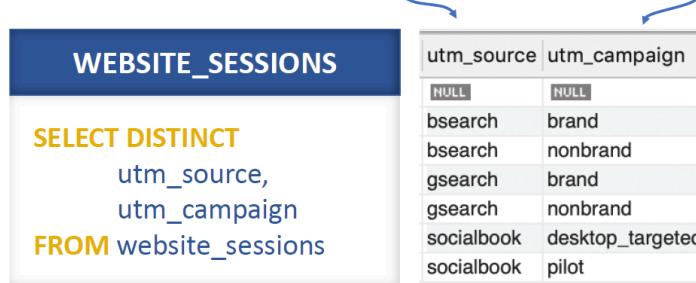
- Analyzing search data and shifting budget towards the engines, campaigns or keywords driving the strongest conversion rates
- Comparing user behavior patterns across traffic sources to inform creative and messaging strategy
- Identifying opportunities to eliminate wasted spend or scale high-converting traffic

## PAID MARKETING CAMPAIGNS: UTM TRACKING PARAMETERS

When businesses run paid marketing campaigns, they often obsess over performance and measure *everything*; how much they spend, how well traffic converts to sales, etc.

Paid traffic is commonly tagged with tracking (UTM) parameters, which are appended to URLs and allow us to tie website activity back to specific traffic sources and campaigns

www.abcwebsite.com?utm\_source=trafficSource&utm\_campaign=campaignName



We use the **UTM parameters** stored in the database to **identify paid website sessions**. From our **session data**, we can link to our **order data** to understand **how much revenue our paid campaigns are driving**.

## Traffic Analysis and Optimization Report

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Date Range: March 1, 2012 – June 9, 2012

Data Source: Google Search (Non-Brand Campaign)

For detailed code and SQL queries, please refer to the document "**1. Traffic Analysis and Optimization**" in the repository.

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## a. Traffic Source Trend Analysis

### Key Findings:

- ✓ Traffic is gradually declining from March to early May.
- ✓ The highest number of sessions was recorded on April 1, 2012, with 1,152 sessions.
- ✓ Post-April, there is a noticeable downward trend in traffic.

### Possible Causes:

- ◆ Seasonal fluctuations affecting user engagement.
- ◆ Increased competition from other advertisers.
- ◆ Changes in Google Ads rankings or bidding strategies.

### Actionable Recommendations:

- ✓ Investigate potential seasonal trends in past years to confirm if this is a recurring pattern.
  - ✓ Re-evaluate ad creatives, keywords, and targeting to maintain traffic levels.
  - ✓ Test different bidding strategies to regain lost momentum.
- 

## b. Traffic Source Bid Optimization

### Key Findings:

- ✓ Desktop has a significantly higher conversion rate compared to mobile.
- ✓ Desktop Sessions: 3,911 | Conversion Rate: 3.73%
- ✓ Mobile Sessions: 2,492 | Conversion Rate: 0.96%

### Actionable Recommendations:

- ✓ Increase bids for desktop marketing campaigns to maximize conversions.
- ✓ Reallocate budget from mobile to desktop for better efficiency.
- ✓ Analyze mobile user behavior to understand drop-offs and improve mobile experience.

### Impact of This Strategy:

- ✓ Higher ROI on marketing spend by targeting users who convert better.
  - ✓ Improved ad visibility on desktop searches, leading to more quality sessions.
-

## c. Traffic Source Segment Trending

### Key Findings:

- ✓ Desktop traffic is consistently higher than mobile.
- ✓ The highest desktop sessions were recorded in the week of May 20, 2012 (661 sessions).
- ✓ Mobile traffic peaked earlier, on May 6, 2012 (282 sessions), and then started declining.

### Actionable Recommendations:

- Continue prioritizing desktop ads, as desktop users have a higher engagement and conversion rate.
- Improve mobile site experience to prevent further decline in mobile sessions.
- Test different ad placements and creatives for mobile to improve performance.

### Expected Benefits:

- ✓ Better cost efficiency by investing more in high-converting desktop users.
- ✓ Balanced traffic distribution by enhancing mobile experience and optimizing mobile ads.
- ✓ Higher overall conversions and revenue by focusing on high-performing channels.

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## Final Takeaways

- ♦ Desktop remains the best-performing traffic source – invest more in desktop ads.
- ♦ Mobile traffic is declining – investigate and optimize the mobile experience.
- ♦ Traffic is decreasing after April 1 – revisit bidding strategies to counteract this trend.

By implementing these changes, we can **increase conversions, improve ad efficiency, and ensure better return on marketing investments.** 

For a deeper dive into the data and SQL queries, please refer to "**1. Traffic Analysis and Optimization**" in the repository.

## 2. Analyzing Website Performance



Website content analysis is about **understanding which pages are seen the most by your users, to identify where to focus on improving your business**



### COMMON USE CASES:

- Finding the most-viewed pages that customers view on your site
- Identifying the most common entry pages to your website – the first thing a user sees
- For most-viewed pages and most common entry pages, understanding how those pages perform for your business objectives

### a. Analyzing Top Website Content

#### Finding Top Pages

- We can analyze our pageviews data and GROUP BY URL to see which pages are viewed most.
- To find top entry pages, we will limit to just the first page a user sees during a given session, using a temporary **table**.

July 17 Date Range: Before June 12, 2012

Data Source: Website Pageviews & Sessions

For detailed code and SQL queries, please refer to the document "**2. Website Performance Analysis**" in the repository.

### I. Identifying the Most Viewed Pages

#### 🔍 Key Findings:

- ✓ The Home Page is the most frequently visited page, making it a key entry point.
- ✓ The Products Page ranks second, indicating strong user interest in browsing product offerings.
- ✓ The Cart and Thank You pages have significantly fewer views, suggesting that users drop off before completing purchases.
- ✓ Lower-ranked pages may need improvements in navigation or marketing efforts to attract more visitors.

#### **Actionable Recommendations:**

- Optimize the Home Page with engaging content, clear navigation, and better CTAs to guide users toward purchases.
  - Improve the visibility of the Cart Page by making the checkout process more seamless.
  - Consider A/B testing alternative landing pages to see if different layouts improve user engagement.
- 

## ii. Analyzing Entry Pages

#### **Key Findings:**

- The Home Page is the top entry page, meaning most visitors start their journey here.
- Other entry points, such as product pages, have significantly fewer sessions.
- High drop-off rates from non-home entry pages indicate that users may not be engaging enough after landing.

#### **Actionable Recommendations:**

- Improve first impressions on non-home entry pages by making them more engaging, informative, and conversion-focused.
  - Ensure all entry pages have a clear path guiding users towards checkout or product exploration.
  - Consider driving traffic directly to high-converting product pages through targeted ads or SEO strategies.
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## Business Impact & Next Steps

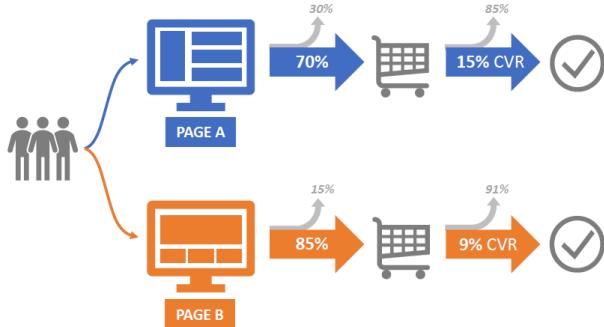
#### **Why This Matters?**

- Understanding which pages users visit the most **helps prioritize improvements**.
- Optimizing entry pages **reduces bounce rates** and improves conversions.
- Enhancing the checkout process can **increase completed orders and revenue**.

## Landing page performance & Testing



Landing page analysis and testing is about understanding **the performance of your key landing pages and then testing to improve your results**



#### COMMON USE CASES:

- Identifying your top opportunities for landing pages – high volume pages with higher than expected bounce rates or low conversion rates
- Setting up A/B experiments on your live traffic to see if you can improve your bounce rates and conversion rates
- Analyzing test results and making recommendations on which version of landing pages you should use going forward

- To analyze landing page performance and compare multiple pages, we will again use **temporary tables** and write a multi-step "data program".
- We will find the **first pageview** for relevant sessions, **associate that pageview with the URL seen**, then **analyze whether that session had additional pageviews**.

## Website Performance & Bounce Rate Analysis Report

**Date Range: January 2014 – August 2012 (Historical Data for Trend Analysis)**

**Data Source: Website Sessions & Pageviews**

For detailed code and SQL queries, please refer to the document "**2. Website Performance Analysis**" in the repository.

### i. Landing Page vs Exit Page Conversion Rate

#### Key Findings:

- ✓ Users who land on the **home page** tend to stay longer and navigate further into the site compared to other landing pages.
- ✓ **Lander-3 has the highest bounce rate (61.57%)**, indicating poor engagement or content issues.
- ✓ The **checkout funnel** experiences a **drop-off before the shipping page**, affecting

conversion rates.

- ✓ The home page conversion rate to the shipping page is the highest (3.298%), while Lander-3 performs the worst (2.00%).

 **Actionable Recommendations:**

- ✓ Improve Lander-3 by optimizing content, visuals, and navigation to increase engagement.
  - ✓ Reduce checkout friction by making the process easier and adding trust-building elements (security badges, progress indicators, etc.).
  - ✓ Conduct A/B testing on different landing page layouts to improve conversion rates.
- 

## ii. Bounce Rate Analysis

 **Key Findings:**

- ✓ Overall bounce rate: 59.18% (6,538 sessions bounced out of 11,048 total sessions).
- ✓ A bounce rate above 50% suggests content, navigation, or targeting issues.
- ✓ The home page has a slightly worse bounce rate (58.34%) than '/lander-1' (53.24%), indicating that visitors may not be finding what they expect.

 **Actionable Recommendations:**

- ✓ Enhance landing pages with clear calls-to-action, engaging content, and intuitive navigation.
  - ✓ Test different headlines, images, and layouts to see what keeps users engaged.
  - ✓ Improve site load speed and ensure mobile optimization to reduce immediate exits.
- 

## iii. Weekly Bounce Rate Trends

 **Key Findings:**

- ✓ The home page started with a bounce rate above 60% in June but improved over time.
- ✓ Between July 29 - August 26, traffic to the home page dropped significantly, indicating a possible shift in marketing strategy.
- ✓ The bounce rate for '/lander-1' increased in August, suggesting ineffective engagement strategies or user targeting issues.

 **Actionable Recommendations:**

- ✓ Analyze traffic sources and marketing campaigns to understand the reason behind shifts in home page traffic.
- ✓ Implement behavioral analysis tools (such as heatmaps) to see where users drop off and why.
- ✓ Ensure consistency in ad messaging and landing page content to align with user expectations.

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## Business Impact

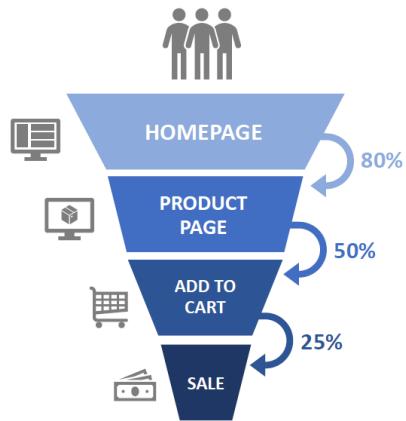
### Why This Matters?

- A high bounce rate means lost potential customers – reducing it can increase conversions and sales.
- Landing pages play a crucial role in user engagement – optimizing them can improve ad performance and reduce wasted marketing spend.
- Tracking and improving conversion funnel performance can help drive more users toward checkout completion.

## b. Analyzing & Testing Conversion Funnels



Conversion funnel analysis is about **understanding and optimizing each step of your user's experience on their journey toward purchasing your products**



### COMMON USE CASES:

- Identifying the most common paths customers take before purchasing your products
- Identifying how many of your users continue on to each next step in your conversion flow, and how many users abandon at each step
- Optimizing critical pain points where users are abandoning, so that you can convert more users and sell more products

- We will create temporary tables using pageview data to build our multi-step funnels.
- We will first identify the sessions we care about, then bring in the relevant pageviews, flag each session as having reached specific funnel steps, and finally perform a summary analysis.

# Website Conversion Funnel Analysis Report

 Date Range: June 19, 2012 – July 28, 2012

 Data Source: Website Sessions & Pageviews

For detailed code and SQL queries, please refer to the document "["2. Website Performance Analysis"](#)" in the repository.

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## i. Understanding the Conversion Funnel

The goal of this analysis is to track how users **navigate through the website, engage with key pages, and complete purchases**. By identifying **drop-off points**, we can optimize the funnel to **improve conversions**.

### Key Clickthrough Rates:

- ✓ 29.42% of users from the home page clicked through to "The Original Mr. Fuzzy" product page – a strong indicator of product interest.
  - ✓ 24.74% of users who viewed the product proceeded to the cart page, meaning a significant portion of interested users don't add to cart.
  - ✓ 100% of users who reach the billing page continue – suggesting once users reach billing, they're committed to purchasing.
  - ✓ 75% of users on the billing page complete their purchase and reach the Thank You page, meaning a quarter of users abandon at the last step.
  - ✓ Users coming from "Lander-1" engage slightly better, with 34.38% clicking through to the product page.
  - ✓ Lander-1 users also have a higher checkout completion rate, with 91.26% making it to the Thank You page.
- 

## ii. Key Takeaways & Opportunities for Improvement

- ♦ **Cart Page Drop-Off (24.74% Clickthrough Rate)**
  - **Problem:** Many users engage with the product page but **don't add it to the cart**.
  - **Solution:** Optimize the cart experience by reducing friction, adding trust signals (free shipping, secure payment badges), and including limited-time discounts to encourage conversion.
- ♦ **Checkout Funnel Optimization (75% Completion Rate)**

- **Problem:** 25% of users abandon at the final step, meaning some hesitation remains before purchase.
  - **Solution:** Improve checkout flow with fewer form fields, guest checkout options, and additional payment methods to reduce drop-offs.
- ◆ **Lander-1 Outperforms Home Page in Engagement**
- **Problem:** The home page gets more visitors, but Lander-1 converts users better.
  - **Solution:** Consider using Lander-1 in targeted ad campaigns to drive higher-intent traffic to product pages.
- ◆ **Biggest Drop-Off is from Cart to Billing**
- **Problem:** Only 24.74% of users make it past the cart, which is the biggest bottleneck.
  - **Solution:** Experiment with cart abandonment emails, exit-intent popups, and progress indicators to reassure users and improve conversion rates.

### 3. Channel Portfolio Analysis & Optimization



Analyzing a portfolio of marketing channels is about **bidding efficiently and using data to maximize the effectiveness of your marketing budget**



#### COMMON USE CASES:

- Understanding which marketing channels are driving the most sessions and orders through your website
- Understanding differences in user characteristics and conversion performance across marketing channels
- Optimizing bids and allocating marketing spend across a multi-channel portfolio to achieve maximum performance

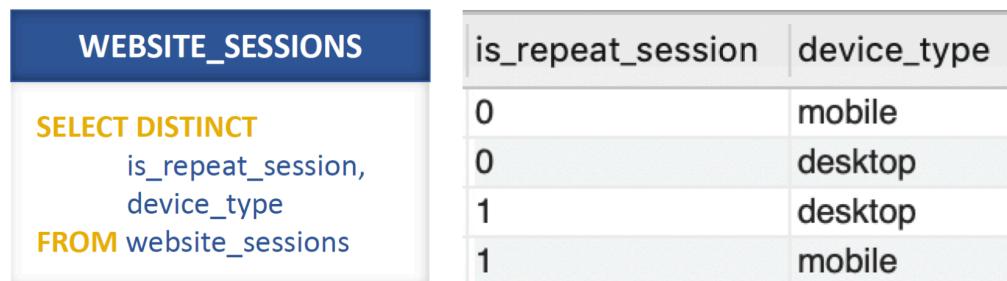
When businesses run paid marketing campaigns, they often obsess over performance and measure *everything*; how much they spend, how well traffic converts to sales, etc.

**Paid traffic is commonly tagged with tracking (UTM) parameters, which are appended to URLs and allow us to tie website activity back to specific traffic sources and campaigns**



In addition to measuring and analyzing where traffic is coming from, we can use a business' session-level data to understand user characteristics and behaviors

**For example, we can see if the user is new to our site or if they are a repeat visitor, and which type of device they used during the session (mobile or desktop)**



Here's a **non-technical report** based on the **Channel Portfolio Analysis & Optimization** findings.

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## Overview

The goal of this analysis was to assess the performance of **two paid search channels, Gsearch and Bsearch**, across mobile and desktop traffic. By examining weekly trends, mobile traffic distribution, conversion rates, and overall channel effectiveness, we identified key insights to **optimize bid strategy and marketing spend**.

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### Date Range Analyzed:

- August 22, 2012 – December 22, 2012

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### Data Source:

- Website Sessions Table (website\_sessions)
- Orders Table (orders)

For detailed SQL queries and code implementation, please refer to the document "**3. Channel Portfolio Analysis & Optimization**" in the repository.

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### a. Weekly Session Trend Analysis

We analyzed weekly traffic from **August 22, 2012 – November 29, 2012** to understand session trends across Gsearch and Bsearch.

#### Key Findings:

- ✓ Gsearch consistently outperforms Bsearch in driving website sessions.
- ✓ A significant traffic peak was observed in mid-November for Gsearch, indicating an effective campaign push.
- ✓ Bsearch remains stable but significantly lower than Gsearch, suggesting a weaker impact on website traffic.

💡

#### Actionable Insight:

Since Gsearch attracts a higher number of sessions, marketing budgets should prioritize Gsearch while re-evaluating Bsearch's role in campaigns.

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### b. Mobile Traffic Distribution

We compared how mobile users contribute to total sessions in both search channels.

#### Key Findings:

- ✓ Gsearch has a stronger mobile presence, with 24.52% of its sessions from mobile users.
- ✓ Bsearch mobile traffic is very low (only 8.62%), indicating that most of its audience uses desktops.

 **Actionable Insight:**

Bsearch campaigns may need a stronger mobile strategy or a shift in budget towards Gsearch's mobile ads, as mobile engagement is higher in Gsearch.

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### c. Conversion Rate Analysis (Bid Optimization)

We evaluated conversion rates for both mobile and desktop traffic across Gsearch and Bsearch.

**Key Findings:**

- ✓ Desktop conversion rates are significantly higher than mobile for both channels.
- ✓ Gsearch Desktop CVR: 4.52%, while Bsearch Desktop CVR: 3.73% (indicating Gsearch performs better).
- ✓ Mobile conversion rates are poor overall (Gsearch: 1.28%, Bsearch: 0.76%).

 **Actionable Insight:**

- Since Gsearch has the highest desktop conversion rate, increasing bids for desktop traffic on Gsearch could yield higher returns.
  - Bsearch's mobile conversion rate is weak, so investing in mobile-friendly ad formats or reducing spend on Bsearch mobile ads might be a better strategy.
- 

### d. Channel Portfolio Trends

We examined how desktop and mobile sessions compare across both channels over time.

**Key Findings:**

- ✓ Bsearch's desktop traffic is consistently 40% of Gsearch's traffic, meaning it has some value but is secondary.
- ✓ Bsearch's mobile traffic is consistently weak (8-12% of Gsearch's mobile sessions).
- ✓ Gsearch dominates both desktop and mobile, making it the stronger paid search platform overall.

 **Actionable Insight:**

- Increase ad spend on Gsearch desktop as it delivers the highest conversion rates and strong traffic numbers.
- Reduce reliance on Bsearch mobile ads, as they bring low traffic and poor conversions.
- Consider reallocating some Bsearch budget to Gsearch mobile, which has a larger mobile audience.

## 4. Product Analysis



Analyzing product sales helps you **understand how each product contributes to your business, and how product launches impact the overall portfolio**



### COMMON USE CASES:

- Analyzing sales and revenue by product
- Monitoring the impact of adding a new product to your product portfolio
- Watching product sales trends to understand the overall health of your business

### Product-Level Sales and Conversion Analysis

#### Overview

This report provides insights into product sales trends, revenue generation, product pathing, and conversion funnel performance. The data is derived from transactional records between **April 2012 and April 2013**, capturing key performance metrics before and after new product launches.

For detailed SQL queries and implementation, please refer to the document "**4.1. Product Sales Analysis**" in the repository.

#### a. Product Sales Trends

**Date Range:** March 2012 - January 2013

**Data Source:** Orders Table

### **Key Insights:**

- Steady Growth in Sales: Monthly sales increased from 60 orders in March 2012 to a peak of 618 orders in November 2012.
  - Revenue and Margins Increased:
    - March 2012 Revenue: \$2,999.40
    - November 2012 Revenue: \$30,893.82
    - Gross Margin Growth: \$1,830 in March to \$18,849 in November.
  - Post-December Drop: Sales significantly declined in January 2013 to 42 orders, suggesting a seasonal impact.
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### **b. Product Launch Performance**

**Date Range:** April 2012 - April 2013

**Data Source:** Website Sessions & Orders Table

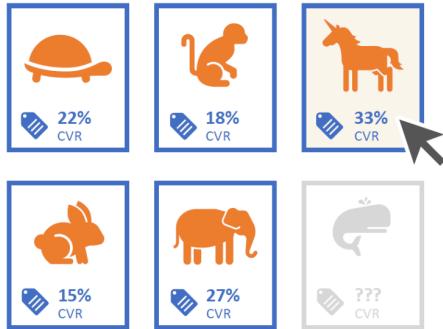
### **Key Insights:**

- Conversion Rate Growth: Improved from 2.65% in April 2012 to 5.02% in December 2012, indicating better site engagement and purchase intent.
- Revenue per Session Increased:
  - April 2012: \$1.32 per session
  - December 2012: \$2.51 per session
- New Product Performance (Product 2):
  - Gained 162 orders by February 2013, outperforming expectations.
  - Shift in sales trends after launch, impacting existing product (Product 1).

## BUSINESS CONCEPT: PRODUCT LEVEL WEBSITE ANALYSIS



Product-focused website analysis is about **learning how customers interact with each of your products, and how well each product converts customers**



### COMMON USE CASES:

- Understanding which of your products generate the most interest on multi-product showcase pages
- Analyzing the impact on website conversion rates when you add a new product
- Building product-specific conversion funnels to understand whether certain products convert better than others

### c. Product Pathing Analysis

**Date Range:** October 2012 - April 2013

**Data Source:** Website Pageviews Table

#### Key Insights:

- **Before New Product (Pre-January 2013):**
  - 72.29% of users navigated from the "Products" page to "The Original Mr. Fuzzy."
- **After New Product (Post-January 2013):**
  - 61.3% of users continued to "The Original Mr. Fuzzy."
  - 14.44% started visiting "The Forever Love Bear," showing initial traction.
- **Conclusion:** Product 2's introduction led to traffic distribution between both products.

### d. Product Conversion Funnel Analysis

**Date Range:** January 2013 - April 2013

**Data Source:** Website Pageviews Table

#### Key Insights:

- **Cart Clickthrough Rates:**
  - "Forever Love Bear": 54.85%
  - "Original Mr. Fuzzy": 43.49%

- **Checkout Funnel Performance:**
    - Shipping Page Clickthrough: ~69%
    - Billing Page Clickthrough: ~81%
    - Final Purchase Clickthrough: 63.6% (Mr. Fuzzy), 61.68% (Forever Love Bear)
  - **Conclusion:**
    - The Forever Love Bear had a **higher add-to-cart rate**, making it the more engaging product.
    - Both products had similar checkout performance, with **minor drop-offs at billing**.
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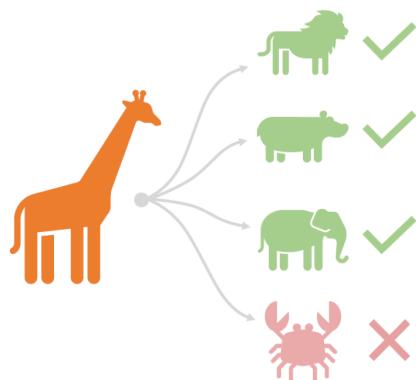
## Final Recommendations

1. Optimize Seasonal Strategy: Address post-December sales decline by offering promotions in Q1.
2. Enhance Product Visibility: Continue marketing Product 2, as it is attracting traffic.
3. Improve Checkout Process: Reduce friction at billing to increase purchase completions.
4. Focus on Cart Optimization: Since Forever Love Bear has a higher cart clickthrough, test promotions for "Mr. Fuzzy" to balance engagement.

## e. Cross selling Products



Cross-sell analysis is about **understanding which products users are most likely to purchase together, and offering smart product recommendations**



### COMMON USE CASES:

- Understanding which products are often purchased together
- Testing and optimizing the way you cross-sell products on your website
- Understanding the conversion rate impact and the overall revenue impact of trying to cross-sell additional products

## Cross-Selling Strategy Performance Analysis

## Overview

This report evaluates the impact of implementing a cross-selling strategy on customer purchasing behavior. The analysis compares key performance indicators (KPIs) before and after the introduction of cross-selling to determine its effectiveness in increasing sales and revenue.

To view the detailed SQL code used for this analysis, please refer to the document **4.2 Product Cross selling Analysis** in the repository.

- **Data Source:** Website session and order data from the *mavenfuzzyfactory* database, specifically from the `website_pageviews` and `orders` tables.
  - **Pre Cross-Selling Period:** August 25, 2013 – September 25, 2013
  - **Post Cross-Selling Period:** September 25, 2013 – October 25, 2013
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## Key Insights

### 1. Cart Clickthrough Rate (CTR)

- **Before Cross-Selling:** 67.16%
- **After Cross-Selling:** 68.41%
- **Impact:** A 1.25% increase in CTR, indicating that more customers proceeded to the next step after viewing their cart. This suggests that the cross-selling strategy encouraged customers to continue shopping.

### 2. Products Per Order

- **Before Cross-Selling:** 1.00 products per order
- **After Cross-Selling:** 1.04 products per order
- **Impact:** A slight increase, showing that customers are purchasing additional items after cross-selling was introduced.

### 3. Average Order Value (AOV)

- **Before Cross-Selling:** \$51.42
- **After Cross-Selling:** \$54.25
- **Impact:** AOV increased by nearly \$3, suggesting that customers are either buying higher-priced items or additional products due to cross-selling.

### 4. Revenue Per Cart Session

- **Before Cross-Selling:** \$18.31
- **After Cross-Selling:** \$18.43
- **Impact:** A small but stable increase, indicating that revenue per cart session remained consistent, even as customers engaged more with additional products.

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## **Analysis & Recommendations**

The cross-selling strategy successfully improved customer engagement and sales performance with a **higher cart clickthrough rate, increased products per order, and a rise in average order value.**

### **Recommendations for Further Improvement:**

- **Refine Product Recommendations:** Optimize suggested items based on customer preferences and purchase history to further boost conversions.
- **Test Different Upsell Strategies:** Experiment with limited-time offers or bundled deals to increase revenue per cart session.
- **Enhance the User Experience:** Make cross-selling suggestions more visually appealing and seamlessly integrated into the shopping experience.
- **Monitor Customer Feedback:** Analyze customer reactions to cross-selling efforts to ensure the strategy is well-received and not disrupting the shopping flow.

By continuously refining the cross-selling approach, there is potential for even greater improvements in sales, customer satisfaction, and overall business performance.

## **f. Portfolio expansion analysis**

### **Overview**

This report analyzes the impact of the Birthday Bear event on website performance by comparing key metrics before and after the event. The goal is to understand changes in customer behavior, conversion rates, and revenue generation.

For technical details and SQL code, please refer to **document 4.3 Product Portfolio Expansion Analysis** in the repository.

### **Date Range & Data Source**

- **Date Range:** November 12, 2013 – January 12, 2014
  - **Pre-Birthday Bear:** Before December 12, 2013
  - **Post-Birthday Bear:** December 12, 2013, onward
- **Data Source:** Maven Fuzzy Factory database (**website\_sessions & orders** tables)

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### **Key Findings**

## 1. Website Traffic & Orders

- **Before the event:** 17,343 website sessions, 1,055 orders.
- **After the event:** 13,383 website sessions, 940 orders.
- **Insight:** Fewer visitors came to the site after the event, leading to a decline in total orders.

## 2. Conversion Rate (CR)

- **Before the event:** 6.08%
- **After the event:** 7.02%
- **Insight:** Despite lower traffic, a higher percentage of visitors made a purchase after the event. This suggests that post-event visitors were more engaged and likely to buy.

## 3. Total Revenue

- **Before the event:** \$57,208.96
- **After the event:** \$53,515.44
- **Insight:** Although revenue slightly declined due to fewer orders, it remained strong, likely due to higher spending per customer.

## 4. Average Order Value (AOV)

- **Before the event:** \$54.23
- **After the event:** \$56.93
- **Insight:** Customers spent more per order post-event, helping to offset the decrease in total orders.

## 5. Products Per Order

- **Before the event:** 1.05 items per order
- **After the event:** 1.12 items per order
- **Insight:** Shoppers bought more items in each purchase after the event, which contributed to maintaining revenue levels despite the lower number of orders.

## 6. Revenue Per Session (RPS)

- **Before the event:** \$3.30 per visitor
- **After the event:** \$3.99 per visitor
- **Insight:** Each website visitor generated more revenue after the event, indicating improved customer value and purchase behavior.

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## Key Takeaways & Recommendations

#### ✓ Higher Conversion & Order Value Post-Event

- The event led to more engaged visitors and increased spending per purchase.

#### ✓ Decline in Website Traffic

- Fewer visitors came to the site after the event. This might be due to marketing adjustments or reduced promotional efforts.

#### ✓ Sustaining Revenue Despite Lower Traffic

- The rise in conversion rates and spending per customer compensated for lower website traffic. Future marketing efforts should focus on **attracting more visitors while maintaining high engagement levels**.

## g. Product Refund Analysis

### BUSINESS CONCEPT: PRODUCT REFUND ANALYSIS



Analyzing product refund rates is about **controlling for quality and understanding where you might have problems to address**



#### COMMON USE CASES:

- Monitoring products from different suppliers
- Understanding refund rates for products at different price points
- Taking product refund rates and the associated costs into account when assessing the overall performance of your business

## Product Refund Rates Analysis Report

### Overview

This report provides an analysis of product orders and refund trends over time. The goal is to identify patterns in customer refunds and assess potential areas for improvement in product quality or customer satisfaction.

For technical details and SQL code, please refer to **document 4.4 Product Refund Rates Analysis** in the repository.

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## Key Findings

### 1. Order Trends

- **Product 1** had the highest number of orders, maintaining consistent demand.
- **Product 2** started gaining traction in early 2013 and continued growing.
- **Products 3 and 4** saw a notable increase in orders from late 2013, indicating new product expansion.

### 2. Refund Trends

- **Product 1** had the highest refunds, in line with its high sales volume.
- **Product 2** experienced fluctuating refund trends, with occasional spikes.
- **Products 3 and 4** had lower refunds initially, but as sales increased, their refund numbers also grew.

### 3. Refund Rates (Percentage of Orders Refunded)

- **Product 1:** Refund rate ranged from **2.3% to 9.0%** across different months.
  - **Product 2:** Initially low but showed occasional spikes, indicating possible quality issues.
  - **Product 3 & 4:** Refund rates increased as sales grew, reaching **7-8% in later months**, suggesting post-launch challenges.
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## Key Insights

- ✓ **Steady demand for Product 1**, but its refund rate remains moderate and should be monitored.
  - ✓ **Product 2's fluctuations in refunds** could indicate quality or fulfillment inconsistencies.
  - ✓ **Product 3 & 4 refunds increased with sales growth**, requiring further analysis to identify customer pain points.
  - ✓ **Overall refund rates are within an acceptable range**, but certain months had spikes that need investigation.
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## Recommendations

- ✓ Investigate refund spikes for Products 2, 3, and 4 to identify underlying issues.
- ✓ Monitor Product 1 closely as it drives the most sales and refunds.

- ✓ Review customer complaints and return reasons to improve product experience.
- ✓ Enhance quality control and after-sales support for newly launched products.

By addressing these insights, we can improve **customer satisfaction, reduce refunds, and enhance product reliability**.

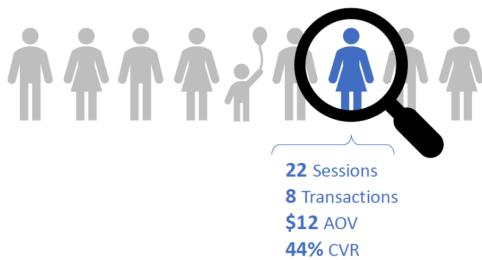
📌 For detailed SQL analysis, please refer to document 4.4 Product Refund Rates Analysis in the repository.

## 5. User Analysis

### BUSINESS CONCEPT: ANALYZE REPEAT BEHAVIOR



Analyzing repeat visits helps you **understand user behavior and identify some of your most valuable customers**



#### COMMON USE CASES:

- Analyzing repeat activity to see how often customers are coming back to visit your site
- Understanding which channels they use when they come back, and whether or not you are paying for them again through paid channels
- Using your repeat visit activity to build a better understanding of the value of a customer in order to better optimize marketing channels

### Overview

This report analyzes user behavior, focusing on repeat customers, session patterns, and retention trends. The goal is to identify opportunities for increasing user engagement, improving conversion rates, and maximizing revenue from returning customers.

For technical details and SQL code, please refer to **document 5. User Analysis** in the repository.

## TRACKING REPEAT CUSTOMERS ACROSS MULTIPLE SESSIONS

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Businesses track customer behavior across multiple sessions using **browser cookies**

Cookies have unique ID values associated with them, which allows us to recognize a customer when they come back and track their behavior over time

website_session_id	created_at	user_id	is_repeat_session	utm_source	utm_campaign	utm_content	device_type	http_referer
237966	2014-04-28 23:02:55	204524	0	gsearch	nonbrand	g_ad_1	desktop	https://www.gsearch.com
319940	2014-09-11 12:38:39	271374	0	bsearch	nonbrand	b_ad_1	desktop	https://www.bsearch.com
326645	2014-09-22 13:50:39	271374	1	gsearch	brand	g_ad_2	desktop	https://www.gsearch.com
325116	2014-09-19 11:42:44	275579	0	socialbook	desktop_targeted	social_ad_2	desktop	https://www.socialbook.com
349691	2014-10-26 19:24:17	275579	1	gsearch	brand	g_ad_2	desktop	https://www.gsearch.com
357769	2014-11-06 22:10:25	275579	1	NULL	NULL	NULL	mobile	https://www.gsearch.com
367395	2014-11-19 14:56:33	275579	1	NULL	NULL	NULL	mobile	NULL

### Date Range & Data Source

- **Date Range:** January 1, 2014 – November 1, 2014
  - This period was selected to analyze user behavior and repeat session trends before the assignment deadline.
- **Data Source:** Maven Fuzzy Factory database
  - The analysis is based on data from the **website\_sessions** and **orders** tables, tracking user visits, conversion rates, and revenue metrics.

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### Key Findings

#### 1. User Sessions & Engagement

- **128,424 users had only one session**, meaning most visitors interacted with the site just once.
- **Only a small percentage of users (14,391) returned for a second session**, with even fewer engaging beyond that.
- **Opportunity:** Increase user retention by improving engagement strategies, such as personalized email marketing and remarketing campaigns.

#### 2. Time Between Repeat Visits

- **Minimum time between first and second session: 1 day**
- **Maximum time between first and second session: 69 days**
- **Average time for a repeat visit: 33 days**

- **Insight:** The average revisit time is quite long, meaning users take over a month to return. This suggests a need for proactive re-engagement strategies, such as retargeting ads or loyalty incentives.

### 3. Traffic Sources: New vs. Repeat Visitors

- **Paid Nonbrand Ads:** Attracted the highest number of new visitors (**119,950 sessions**) but had **zero repeat sessions**, indicating low retention.
- **Organic Search & Direct Traffic:** Drove more repeat visitors than paid channels, showing stronger long-term engagement.
- **Paid Social Ads:** Generated some new users but failed to bring them back for future sessions.
- **Action Plan:**
  - Focus on organic and direct traffic sources to build a loyal user base.
  - Improve retargeting and nurture campaigns for paid nonbrand users to encourage repeat visits.

### 4. Conversion & Revenue: New vs. Repeat Users

- New users converted at a rate of 6.8%, while repeat users converted at 8.11%—a noticeable improvement.
  - Revenue per session was higher for repeat users (\$5.16) compared to new users (\$4.34).
  - **Key Takeaway:**
    - Returning visitors are **more likely to convert and spend more per visit**.
    - **Recommendation:** Invest in customer retention efforts such as loyalty programs, follow-up emails, and personalized offers to drive repeat visits.
- 

## Recommendations for Growth

- ✓ **Retarget first-time visitors** through email campaigns, push notifications, and remarketing ads.
- ✓ **Improve paid campaign strategies** by increasing focus on organic and direct traffic sources, which show better long-term engagement.
- ✓ **Reduce the revisit gap** by offering incentives (discounts, rewards) within the first 30 days of a user's first visit.
- ✓ **Capitalize on repeat visitors** by enhancing loyalty programs and personalized promotions, as they drive higher conversion rates and revenue.

By focusing on **retention and engagement strategies**, the business can **increase conversions, reduce acquisition costs, and maximize revenue per visitor**.