

# Create Google Sitelink For Google Search Ads Using Artificial Intelligence And Automation

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**Abstract-** *Information and Communication Technology (ICT) and the advent of e-commerce have left a profound imprint on various facets of the economy, driving growth, fostering job opportunities, and enhancing efficiency. These online ads are mainly in the form of videos, attractive online banners, or hyperlinks. Google ads have become one of the most promising ways to advertise products and services for other small or big companies. The global digital marketing market in 2023 is valued at \$601.8 billion because of the increase in internet connectivity and electronic devices like smartphones, tablets, laptops, and computers. Google dominates the web search market, and from here comes the Google curated format ads in existence. Google Curated format ads consist of Sitelinks, Automated Sitelinks, and Enhanced Sitelinks. Keyword searches become very popular with customers as they save their time and land on the product that they are looking for and it increases sales tremendously. It is important for companies to fall on the first page of customer's search results to maximize the chance of being viewed. In this paper, the aim is to develop an autonomous intelligent system that integrates with the Google Ads platform, utilizing the Ackerman Feedback Control Algorithm and State Transition Matrices to optimize return on investment, conversions, advertising texts, and profit.*

**Keywords-** Digital Marketing; Google Ads; Sitelinks; Google search ads; Optimization; Ackerman Feedback Control Algorithm

## I. INTRODUCTION

Sitelinks are hyperlinks from the same domain, essentially serving as shortcuts for navigating a website. They play a crucial role in helping customers save time and reach their desired products or services directly. Moreover, they contribute to boosting the click-through rate (CTR) of ads. Sitelinks are prominently featured below the text of your ads, enabling customers to swiftly find what they're seeking on your website with a single click. These sitelinks can appear both at the top and bottom of Google search results.

The motivation behind this article lies in the growing demand for autonomous systems to manage and optimize customer accounts, the errors that manual operations can introduce in existing systems, and the ambition to maximize returns within existing advertising budgets. To address these needs, a prototype system has been developed, facilitating the sale of products and services in digital media through an intelligent decision support system. This system brings the advantages of reducing the need for human intervention, minimizing errors, lowering advertising costs, improving employee efficiency, and enhancing the profitability of client companies engaged in advertising.

The initial version of the system incorporates five modules designed to scan website links for broken links, halt ads in case of emergencies, prevent revenue loss stemming from keyword conflicts and optimize the ratio of online impressions to the ad budget. The newly developed second version of the system aims to further enhance return on investment, conversion rates, advertising text effectiveness, and overall profitability, aligning itself with the objectives of Industry 4.0 compatibility.

## II. METHODOLOGY

Certainly, here are the defined concepts and terms used in the paper

**Conversions:** Conversions refer to specific actions taken by individuals who interact with your advertisements and subsequently complete an action that your business considers valuable. This can include actions like making an online purchase, signing up for a newsletter, or making a phone call to your business from a mobile phone.

**Conversion Rate:** The conversion rate is the average number of conversions achieved for each advertisement click. It is calculated by dividing the total number of conversions by the total number of clicks on the advertisement.

**Conversion Cost:** Conversion cost is the unit cost associated with achieving a conversion. It is calculated by dividing the

total cost of the advertising campaign by the total number of conversions.

**Conversion Value:** Different conversions may hold varying levels of significance for a business. To track the total value generated by advertisements across different conversion types, specific values are assigned to each conversion. This allows businesses to measure the impact of advertisements on their overall value.

**Keyword:** Keywords are words or phrases that describe your product or service and are selected to determine when and where your advertisements will appear. Keywords are essential for targeting the right audience in online advertising campaigns.

**Negative Keyword:** A negative keyword is a type of keyword that is used to prevent your advertisement from being triggered when a particular word or phrase is included in a user's search query. This helps refine your targeting and avoid irrelevant clicks.

**Clickthrough Rate (CTR):** The clickthrough rate (CTR) is a ratio that indicates how frequently people who view your advertisement end up clicking on it. It is calculated by dividing the number of clicks on the ad by the number of times it was shown (impressions).

**Impression Share:** Impression share is a metric that represents the percentage of impressions that your advertisements received in comparison to the total number of impressions they could potentially receive. It is calculated as impressions divided by total eligible impressions.

## PROBLEM STATEMENT

Creating a sitelink can be a time-consuming process, as it involves checking multiple criteria. In the past, manual creation was the only option. However, as technology continues to evolve, automation and artificial intelligence (AI) have become invaluable tools. These advancements allow us to automate the process and apply various approaches to different types of web pages (websites). By harnessing automation and AI, we can save time and increase profitability.

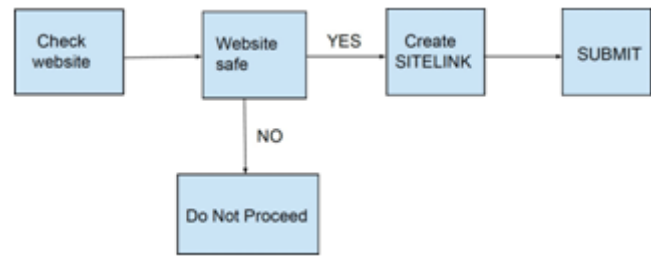


Fig 1: The basic process of creating sitelink for google search ads

After undergoing this process, the sitelinks are subjected to 2-3 levels of quality checks before they are activated and go live on Google Search Ads.

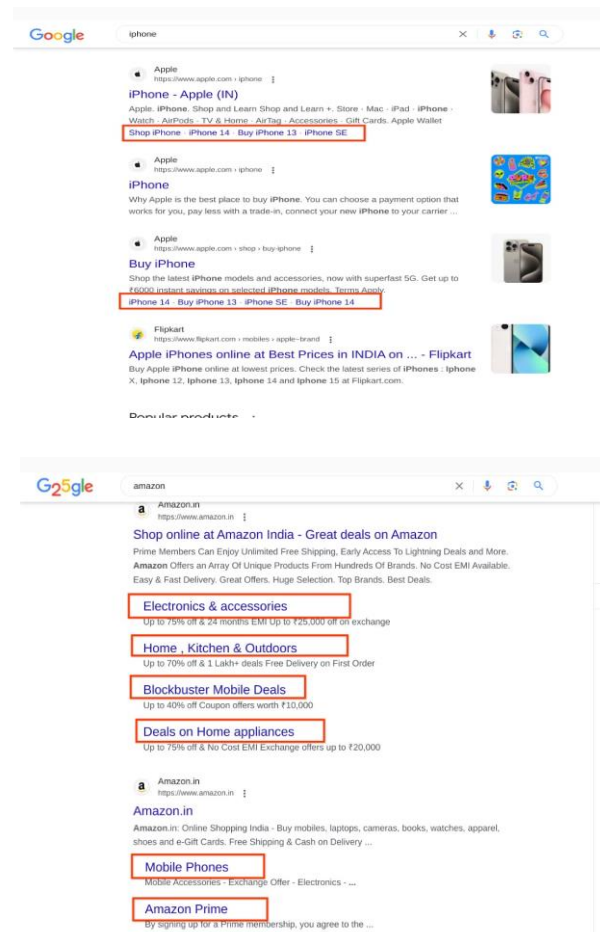


Fig 2: Web view of Google search Ads Sitelinks

Conditions for creating a site link-

- The domain of the site link and homepage should always be same.
- The site link should be small, meaningful, and easy to understand.
- Sitelinks should be created in the following order-commercial value, call to action, and general or basic value.

- No prohibited words should be used such as pornography, gambling, adult content, illegal services or products, sensitive content etc.

There are three types of sitelinks, and we prioritize their extraction in the following order: commercial, call-to-action, and, if no other values are available, general values.

### 1. Commercial Values

Commercial values are the values that create business for the website like products, and services of a website.

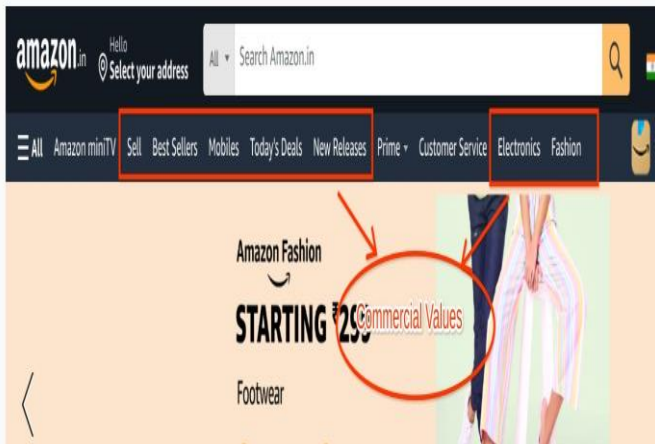


Fig 3: Commercial Values

### 2. Call-To-Action

Call-to-action values are secondary priorities, typically presented in the form of action-oriented features, such as appointment scheduling, contact forms, account creation, test drive booking, quote requests, and more.

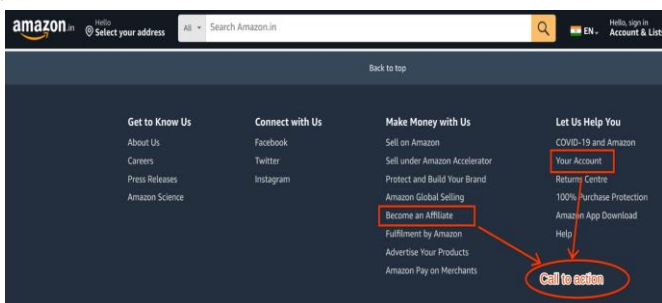


Fig 4: Call-To-Action Values

### 3. General Values

General values are the lowest values available on the website. These values are used to make a page live, but they don't provide revenue to the business. It only provides general information about a business and its services. Example- about us, contact us, blog, help, articles etc.

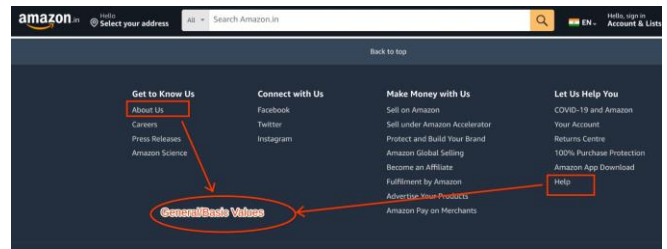


Fig 5: General Values

From all three categories, we can see that it's a very lengthy process considering the length and complexity of the process. Therefore, using artificial intelligence and automation to create google sitelinks offers long term benefits.

## III. ALGORITHM

The Ackerman Feedback Control Algorithm is a control algorithm that can be used to create Google sitelinks for Google search ads. The algorithm first determines the keywords that are relevant to the ad and then uses this information to create a series of sitelinks that are relevant to the keywords. The algorithm then uses a feedback loop to improve the sitelinks over time.

In the second version of the developed system, four new modules were added to the autonomous intelligent system: advertisement text optimization, return on investment optimization, conversion optimization, and profit optimization. The working principle of the developed system is illustrated in Figure 6. Each module is represented by a transfer function,  $Hx(s)$ . These modules make improvements to system parameters independently of other transfer functions.

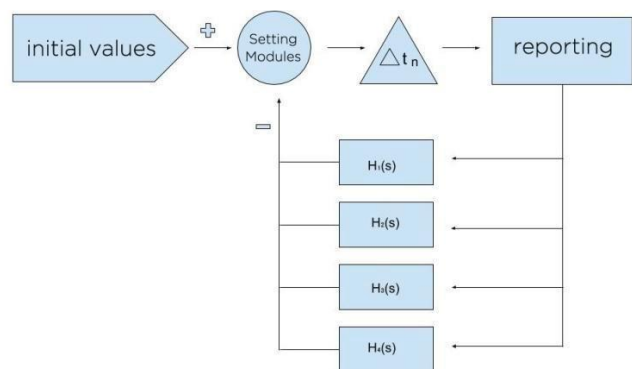


Fig 6: System block diagram

In this study, the Ackermann Feedback Control method was employed as the mathematical model, and state transition matrices were utilized to update system parameters. After each feedback, relevant system parameters were

adjusted at the end of various  $\Delta t_n$  durations. State transition matrices were defined as follows:

$$At[] = K[]At-1[]$$

$At[]$ : System parameters matrix at time t

$K[]$ : Coefficient matrix

$At-1[]$ : System parameters matrix at time t-1

In general, the designed system represents an optimization problem in which we aim to locate the system's peak point by adjusting coefficient matrix values within an N-dimensional space. The primary objective of the developed system is to identify the maximum point of this function through the modification of system parameters.

The Ackerman Feedback Control algorithm for Google sitelinks works by following these steps:

1. The algorithm first collects data on how users interact with sitelinks. This data includes how often users click on sitelinks, how long they stay on the site after clicking on a sitelink, and how likely they are to convert after clicking on a sitelink.
2. The algorithm then uses this data to create a model of how users interact with sitelinks. This model is used to predict how users will interact with sitelinks in the future.
3. The algorithm utilizes this model to determine the most relevant sitelinks to display to each user. It considers the user's search query, their previous interactions, and the current context.
4. The algorithm then shows the selected sitelinks to the user.

Some benefits of using AI and automation for creating sitelinks:

- Increased efficiency: With AI and automation, you can create and update sitelinks faster and more easily.
- Improved relevance: AI can help you create sitelinks that are more relevant to your target keywords and phrases.
- Higher click-through rate: AI can help you create sitelinks that are more likely to be clicked by potential customers.
- Improved conversion rate: AI can help you create sitelinks that are more likely to convert prospects into customers.
- Reach a large audience: Google Ads can help you reach a large audience of potential customers searching for products or services like yours.

- Target your ads: You can target your ads to specific locations, demographics, and interests to ensure they are seen by the people most likely to be interested in your business.

In this paper, one of the working principles of the developed system, which is an optimization problem, is explained in detail using the Ackermann feedback control algorithm.

Advertisement text optimization:

The primary goal of this module is to generate an optimal number of ads for each product or service and build a mathematical model that selects the best options based on their utility, comparing them through A/B tests.

First, user behavior and website conversions need to be fully modeled. Each website conversion is assigned a value, enabling an accurate measurement of the commercial benefit of the ads for the company. Subsequently, the data is analyzed to determine if there is enough information to make improvements in uptime. Finally, ad performance is assessed, with the measured conversion cost of each advertisement serving as an evaluation criterion. Once the system has made decisions regarding the ads, it can automatically initiate or halt ad campaigns or send notifications about new ad production. To provide a more detailed explanation of the module's benefits through automation, let's consider an example of three advertisement texts from a company, as shown in Figure 7. The performance criteria of these texts are presented in Table 1 Over a six-month period, with a budget of \$54,886.00, a total of 6,672 conversions were obtained for the three advertisement texts. The average conversion cost is \$8.82. Notably, as indicated in the table, the third advertisement text is the costliest but yields the fewest conversions.



Fig 7: Advertisement texts

Table I: Advertisement performance criteria

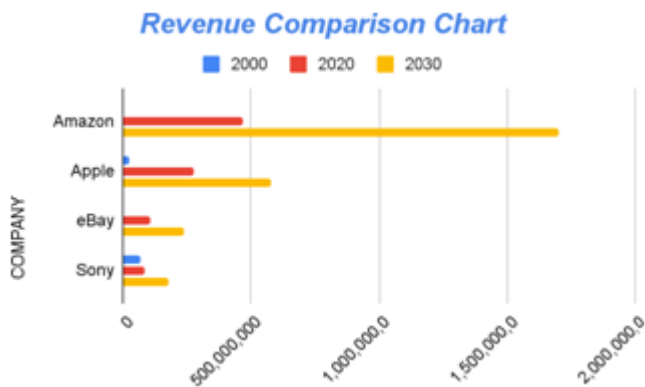
Ad no	Cost	Conversion	Cost/con version	Conversion ratio	CTR click-through-rate	Ad-served percenta %
1	\$10,640	2721	\$3,91	%19,15	%4,42	%19,85
2	\$17,360	2851	\$6,09	%15,061	%7,06	%31,32
3	\$26,886	1100	\$24,43	%2,87	%11,06	%48,83

#### IV. RESULT

In this paper, we developed an autonomous intelligent system using the Ackerman feedback control algorithm to optimize various modules. These modules encompass advertisement text optimization, ROI optimization, conversion optimization, and profit optimization. We conducted a revenue comparison study for four different companies, employing artificial intelligence and automation to assess their revenue potential in the near future.

COMPANY	2000	2020	2030 (With AI & Automation)
Amazon	2.4 billion	469.8 billion	1.7 trillion
Apple	24 billion	274.5 billion	578.7 billion
eBay	4.7 billion	107.2 billion	237.9 billion
Sony	66.7 billion	86.6 billion	175.7 billion

Table II: revenue comparison chart



Amazon has been the clear leader in revenue growth over the past two decades, and it is expected to continue its rapid growth over the next decade, reaching a projected \$1.7 trillion in revenue by 2030. Apple is another company that has experienced substantial growth, with an anticipated revenue of \$578.7 billion by 2030.

Therefore, Google Sitelinks represent a potent tool for companies aiming to reach a wide audience and expand their online presence.

#### V. CONCLUSION

Integrating AI and automation into the creation of Google Sitelinks for Google Search Ads offers advertisers the potential for improved efficiency, personalization, and campaign performance. However, it also demands meticulous

planning, quality control, and compliance with privacy regulations. Those who embrace these technologies and adhere to best practices can gain a competitive edge in the dynamic realm of online advertising. As AI and automation continue to advance, their role in Sitelink creation is poised to become even more crucial for advertisers seeking to maximize the impact of their Google Ads campaigns.

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