# 3D SEARCHING TECHNOLOGY

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## ABSTARCT

The World Wide Web is full of digital information and as the Web grows the number of 3D models also grows in the corporate database. Traditional text based searching technique is not always effective to search 3D data. So there is a great need for searching techniques to search 2D, 3D models available on web. 3D searching generally includes: query formulation, search process and finally search result. Typically web search engine Google uses Google Doodle for searching and retrieving 3D objects.

**KEYWORDS:** Search engine, Voxelization, 3D objects, search query, Computer Aided Design

## I. INTRODUCTION

Designers and programmers or the normal users spends most of their time in searching appropriate contents available on the web. Hence there is a need of search engine which retrieves the related contents efficiently and effectively. Google is one of the most popular and widely used search engine from past decade. At the beginning of the introduction of search engines, users just using text queries to retrieve the web contents. But now the technology has grown and as the web contents grows the number of 2D and 3D models or data also grows. This leads to the development of 3D searching technique. There is a wide scope for searching the 3D objects available on the World Wide Web in an efficient manner. Shape matching retrieval is generally based on the method that compares the similarities between 3D models. There are plenty of tools in which users can formulate search queries by drawing the shape of the objects such as car, house or sofa and the search result would be the similar object retrieved from the web.

## II. LITERATURE SURVEY

The internet and world wide web is full of digital information and it includes various formats of information. Among these various kinds of information 3D object is gaining prominence. In this paper [1] author describes about how computer aided design have occupied the web. Automatic conversion from 2D model to 3D model

plays an important role in filling the gap between the increasing number of 3D displays and the still scant 3D content. [2] A fast automatic 2D to 3D conversion is discussed. It uses the machine learning techniques to infer 3D objects of a query color image from database with color and depth images.3D display technology, and content preparation and creation tools have been under vigorous development. Generally, they are also widely adopted by home and professional users. 3D digital repositories and databases are increasing and becoming available ubiquitously. In this paper [3] the author proposes and presented the development of a novel approach for 3D content search and retrieval system which is called Dynamic hyper linker for 3D content search and retrieval. [4] The author proposed a method for segmentation of 3D surface based on watershed cuts computed on local curvatures. The segmentation algorithm is often applied to artwork database classification using search engine based on 3D region descriptor bags. The comparison with a search engine that is based on global descriptors clearly shows an improvement of performances.

Metadata enhanced 3D content search for real-time visualization of 3D digital assets [5] is based on a virtual 3D repository that supports user activity to its content selection procedures, in order to deliver personalized and customized results on a real-time basis. This is achieved by encapsulating a metadata-based search engine to the repository interface in order to facilitate object discovery. This search mechanism takes benefit of the rich metadata describing the 3D content stored in the repository. Some of the algorithms are used to extract information from the data files in order to provide the search options, as well as the information resulting from the selections of user. The main challenges here are algorithmic efficiency, as well as the accuracy of results related to user requirements. A New Descriptor for 2D Depth Image Indexing and 3D Model Retrieval [6] is a representation of a 3D model by using a 20 depth images rendered from the vertices of a regular dodecahedron. 3D model can be transformed into sequences which is associated to a set of depth lines. The information that the depth sequence provides a more accurate description of 3D shape boundaries than using any other 2D shape descriptors. When dynamic programming distance (DPD) is used Similarity computing is performed to compare the depth line descriptors. The demand for a content-based 3D model retrieval system becomes an important issue. [7] Peak Your Frequency: Advanced Search of 3D CAD Files in the Fourier Domain is a study in which derivative elevation descriptor (DED) is proposed to extract the all the contents of 3D model. The derivative elevation descriptor (DED) and elevation descriptor (ED) RE are combined to retrieval 3D models based on the exterior shape of the content. Content-based 3D model retrieval technology [8] has become one of the important and interesting topic for the researchers. This paper proposed a method which based on 3D model distribution and surface area of 3D object and integrating with semantic features of the user's in order to improve the performance of retrieval system.

## III. SCOPE

The 3D searching technique is only limited to 2D or 3D objects when it comes to scope and usability. The most common way of 3D content retrieval uses methods to add description text to 3D object files such as the object file name, link text, and the title of the web page so that related 3D object can be found through text

retrieval. Because of the inefficiency of manually writing 3D files, researchers have investigated ways to automate the annotation process and provide a unified and accurate standard to create text descriptions for 3D contents. The increase in 3D objects has demanded and resulted in more advanced ways to retrieve 3D information. Thus, shape matching methods for 3D object retrieval have become popular. Shape matching retrieval is based on techniques that compare and match similarities between 3D models and retrieves the result.

## IV. METHODOLOGY

The methods in 3D searching technique involves four steps: crawling, indexing, querying, and matching. The first two steps can be achieved off-line, and the last two steps are done for each user query.

The following text provides an overview of each step and highlights its main features:

- **Crawling:** A web crawler is often called as spider or search engine bot that downloads and indexes content from all over the World Wide Web. The main goal of crawling is to learn what (almost) every webpage on the web is about, so that the information can be successfully retrieved when it's needed. They're called "web crawlers" because crawling is the technical term for automatically accessing a website and retrieving data using a software program. Most of the time these bots are operated by search engines. By applying a search algorithm to the data collected by web crawlers, search engines can provide relevant contents as a response to user search queries, thus generating the list of webpages or 3D models that show up after a user search into Google or Bing.

- **Indexing:** Indexing is the process of mapping the search queries formulated by the user with the relevant piece of information available on the web. When the user draws a 3D model, the search engine will look entire web for similar objects and if the objects found then it will index with the particular site and retrieves the required result.
- **Querying:** Generally, a user will search interactively for 3D models to get desired result. In 3D searching system query methods are based on text keywords, 2D sketching, 3D sketching, model matching, and iterative refinement. It is better that both text and shape queries combine to produce accurate results than either one alone.
- **Matching:** For query formulated by the user, the search engine uses its index to return the 3D models that best match with the query.

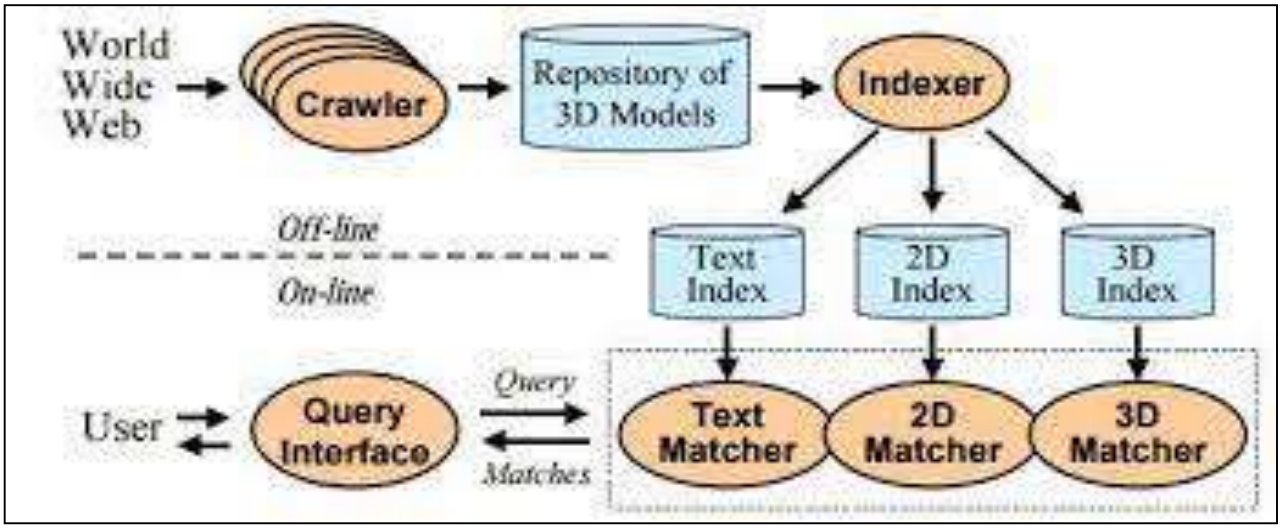


Figure 1: Block Diagram for 3D Searching

The above Figure 1 shows that the user enters a search queries in the form of 3D drawings or sketch. These queries will be matched with text, 2D or 3D matcher in order to identify the type of query. Similarly, the respective query matcher will be indexed with web contents. The indexer will search the entire 3D repository for the match using crawlers. These crawlers are nothing but search bots that examines all the contents in the World Wide Web and returns the result if any matched content is found.

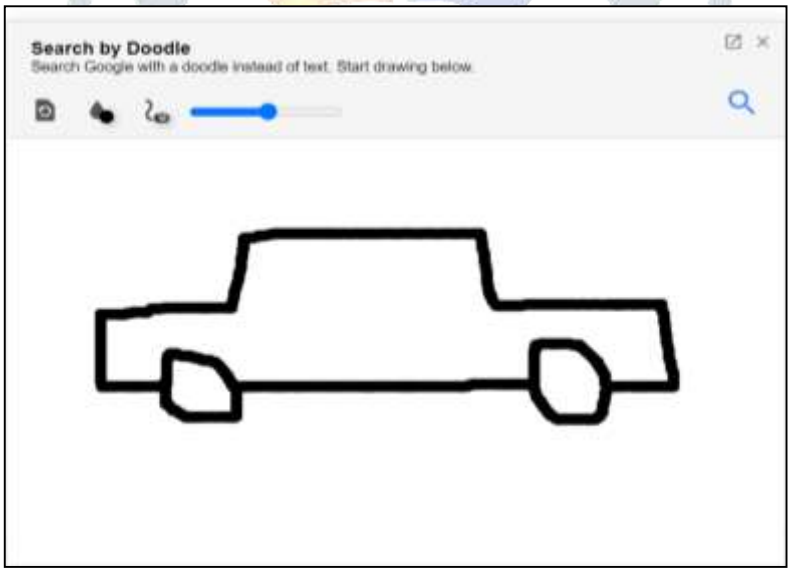


Figure 2: Search query by drawing

The Figure 2 shows the query formulated by the user in the form of drawing an object in the tool. In the above Figure 2 the user has drawn a picture of the car to retrieve 3D objects related to the shape of the car. This drawn picture will be searched in the entire web by the browser with the help of crawlers and indexers. In the Figure 3 below is the result obtained for the above query. The web browser retrieves the similar kind of 3D objects based on the query.

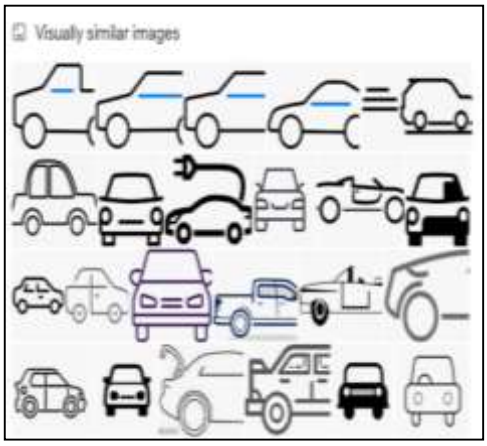


Figure 3: Search result

Figure 3 shows the similar objects retrieved by the search engine for the search query

## V. CONCLUSION

This paper is an attempt to discuss how the 3D models are searched and retrieved by the search engines based on user's queries. 3D searching technique is a topic of extreme research and development which makes it interesting and more efficient. In the matching method the queries which are formulated and submitted by the users will be matched with similar projection of the query. After the query is processed the 3D objects will be retrieved from the web and same will be provided to the users as a result.

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