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A REVIEW OF APPLICATION OF GRAPH THEORY

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Abstract

In different fields, the field of mathematics plays a vital role in .Graph theory, which is used in structural models, is one of the important areas in mathematics. This structural arrangement of different objects or technologies leads to new inventions and changes for improvement in those fields in the existing environment. The theory of field graphs began its journey from the Koinsberg bridge problem in 1735. This paper gives to some extent an overview of the applications of graph theory in heterogeneous fields, but mainly focuses on the applications of computer science using graph theoretical concepts.

Introduction

Across various fields, the field of Mathematics played a key role. Graph theory, which is used by structural models, is one of the important areas of mathematics. The functional design of various objects and innovations leads to new developments and improvements to these fields in the existing environment. The field map theory started in 1735 with the problem of the bridge of Koinsberg. This paper provides an overview of graph theory applications in heterogeneous fields but focuses primarily on computer science applications using graphic conceptual principles.

History

The roots of graph theory began with the problem of Koinsber bridge, in 1735, Which refers to the Eulerian Map principle. Euler studied the problem of Koinsberg Bridge and built a structure to solve the problem called Eulerian map. In 1840, A. F Mobius gave the concept of complete graph and bipartite

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graph and Kuratowski proved that they are planar by means of recreational problems. Gustav Kirchhoff introduced the theory of a circle, a linked loop without loops, in 1845, and he used graphic theoretical ideas of electrical network and circuit estimation. In 1852, Thomas Gutherie found the popular four color problem. So Thomas P. Kirkman and William R. Hamilton research Polyhydra cycles in 1856 and develop the Hamiltonian chart theory in order to study journeys to certain locations precisely once. H.Dudeney responded to a question with a puzzle in 1913. While Kenneth Appel and Wolfgang Haken had discovered the four colored problem, it was not solved until a century later. The advent of visual philosophy is this period considered.

To order to study plants, Caley learned other quantitative methods of differential calculus. This has many implications for conceptual chemistry. This refers to the development of listing theory. In 1878, Sylvester coined the word "Map" and made a comparison between "Quantum invariants" and co-variations in algebra and molecular diagrams. In 1941, Ramsey focused on colorations that contribute to the discovery of the extremist graph theory. Heinrich's machine solved the 4-color problem in 1969. The study of asymptotic graphic communication contributed to a wild hypothesis of charts.

Applications of Graph Theory

In the world of computer science, graphic design plays an increasingly important role. Any technology to be created, every system to be tested allows the use of graphs simple. The value is based on the fact that information flow control and flow can be represented in guided graphs for any system. Theory of graphs is used to create microchips, circuits, operating system design, file storage and information server systems and software flow control network. The philosophy of graphs has developed its own graph mathematical algorithms in the world of computers. Such algorithms are used in many projects in the world of computer science. Some algorithms are as follows:

1. Shortest path algorithm in a network.
2. Algorithms to find the cycles in a graph.
3. Algorithms to find the connectedness.
4. Kruskal's minimum spanning tree.
5. Algorithms to find adjacency matrices.

6. Algorithms for searching an element in a data structure (DFS, FBS).

7. Finding graph planarity.

Database Design

Graphs are used for server layout. The Server uses a graph screen with nodes, borders, and properties for representing and storing data. Such visual framework plays an important role in the layout of the system because it easily implements the method utilizing various functions and properties of the map. A graph database requires a method to test the interconnections, an efficient socket for chart-like query, and a graph database with associative databases is often slower, so that it can visualize the layout of object-oriented systems more explicitly.

Data Structure

There are various ways in which information can be structured. The "data architecture" is defined as the conceptual or computational framework of a certain software organization. Two deliberations rely on the choice of the data model:

1. The design of the actual data partnership in the real world has to be extremely strong.

2. The architecture should be adequate for the storage of information efficiently when necessary.

The design philosophical principles satisfy these two criteria. The conditional relationship between the data can also be described by a diagram and its matrices, operations done using these measures are further useful for differential relationships and data connections.

Artificial Intelligence

The final objective to be trained through an Intelligent Tutoring System (ITS) is to create a model to turn the term "moving problems" into an algorithmic type. First and last, a framework for classifications was created, the attributes of the movement questions should be defined. With an intention to tackle all problems classes, graphic research, like artificial intelligence reverse and forward binding approaches, was used. Through

integrating visuals into the movement questions, the design shows that the majority of the traveling things were unravelled.

Google map

Google Maps now is a very useful tool to navigate all over the globe for a few days. For Google maps, both roads can be seen from anywhere else and the fastest path can be identified. For the Google map, the positions can be viewed as vertices, and the paths as the sides. Then the Google map code provides the shortest edge as the shortest path when it seeks routes between two points, all the edges between these two locations and vertices.

Internet

The Web is a valuable modern science innovation. The definition of graph theory is used in the operating methodology of the Web. For internet connectivity, both users are known as vertices and the connections between them are edges.

Then all internet users create a very complicated graph and data and information is exchanged from one individual to another via the shortest route. Often, a person is linked to all his peers and his mates are also associated with others in the case of social networking sites. When they look at friends as map vertices and put the edge between them if they're buddies, then that's going to be a line.

Data Mining

The primary technology area of data mining is graph theory. The structural dimensions of information are described by graph mining. Theoretically, graph-based data mining methods are used. It is subgraphs, isomorphism of the subgraph, graph invariants, mining procedures and methods of solution. The tremendous growth in electronic files, for instance, has brought great interest to Automated Text Analysis and Data Mining approaches. At the time, without looking at written papers, they can automatically store, handle and retrieve information from text documents. Software systems are increasingly automated in text analysis and data mining. The models are depicted in the map, but they do not take into consideration the semantine relationships between terms.

Network Flow Problem

Throughout graph theory, a flow network is a guided map, in which each edge has the potential to stream. The flow quantity on the edge can not surpass the edge strength. Throughout Operations Research, a circuit is often referred to as a network, vertices as knots and boundaries as circles. A stream shall fulfill the constraint that the flow quantity to a node is equivalent to that flow, except where it is an origin with more flow production or sink with greater flow. A network may serve as a model for the traffic in a road system, piped water, electric circuit currents or something specific where a network of nodes runs.

The easiest and most important challenge with flow networks is to locate the peak current, which offers the highest potential cumulative stream from source to sink in a certain graph. Many challenges can be overcome by using total flow algorithms if they are properly designed as flow networks, such as bipartisan matching, task allocation and transport.

Map Colouring and GSM Mobile Phone Networks

The GSM mobile telephone network splits the network's geographical area into hexagonal areas called cells. Each cell has a contact tower that links to cellular mobile telephones. Through looking for neighboring cells, all the mobile phones link to the GSM network. Since GSM is working across four different frequency bands, only four colors can be used in colouring wireless regions through the graph theory principle. For the right shading of the areas these four different colors.

The vertex color equation can therefore be used to distribute at most 4 different frequencies to any GSM mobile phone network. Drawing from a planet or globe ground graph, the four color rule suggests the system can always color a map field using at most 4 distinct colors so that two neighboring areas are not given the same colors. It's possible to color the map at all times.

Image processing

The technique by which image analysis information are collected is the picture review. The digital image processing methods were used for the most part of image analysis. Using a graph-theoretical approach, image processing methods can be enhanced. Segmentation, sorting, grouping and clustering are

graph-based approaches of image processing. The implementations of the image processing diagram are: edge boundaries are used in segmentation by graph search algorithms.

1. To measure the image alignment.

2. Detection of minimal spanning tree with computational constraint such as entropy.

3. To measure the distance between the internal pixels, the shortest path algorithm is used.

Software Engineering

For software engineering, the diagram has many applications. For example, information flow diagrams are used when defining specifications, where vertices reflect transformations. During the design phase, the graphic contour is used to display interactions between the modules; during a trial, a software flow is guided by a multifaceted metric of the McCabe type which utilizes clear charts to tackle the series of executed instructions and so on. Also Application Process Management also utilizes network diagrams that include visual algorithms.

Conclusion

The key reason for this article is to show the importance of scientific design thoughts for the analysis of graphic theoretical concepts in various fields of computer use. In addition, a contour is given to expand the concept of graphs. Analysts may motivate graph theory information and its implementations in the computer field and describe some of their areas of study.

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