Alberto Andrés Valdés González.
Degree: Mathematical Engineer.
Work position: Data Scientist.
Mail: anvaldes@uc.cl/alberto.valdes.gonzalez.96@gmail.com
Location: Santiago, Chile.

Graph Models

Graph Structure: A graph structure is a mathematical representation of a network consisting of nodes or vertices and edges that connect them. Graph structures can model complex systems and relationships between entities, making them a fundamental tool in computer science, mathematics, and many other fields.

In a graph structure, each node represents a discrete entity or object, and each edge represents a relationship or connection between the nodes. For example, in a social network graph, a node would represent each person, and an edge would represent each connection or friendship between them.

Graph structures can be directed or undirected, depending on whether or not the edges have a specific direction. In a directed graph, the edges have a specific direction, which means there is a distinction between each edge's start and end points. In contrast, undirected graphs do not have a specific direction for their edges, meaning that each edge is bidirectional and can be traversed in either direction.

What is Graph Model?

A graph model is a way of representing complex relationships between entities visually and intuitively. It is similar to a graph structure in that it uses nodes and edges to represent objects and their connections, but a graph model takes this idea a step further by adding attributes and labels to the nodes and edges.

In a graph model, nodes represent entities, such as people or objects. Edges represent relationships or connections between the nodes. These relationships can be of many types, such as friendships, transactions, or dependencies.

Difference between Graph Model and Relational Model

The relational and graph models are two different ways of organising and representing data. While both models are used to manage and analyse data, they differ in structure, organisation, and functionality.

The relational model is a data model that organises data into tables or relations. Each table consists of a set of columns, each representing a different attribute or characteristic of the data, and a set of rows, each representing a different instance of the data. The relationships between the tables are defined through primary and foreign keys, which link related data across tables. The relational model is widely used in database management systems, such as MySQL, Oracle, and Microsoft SQL Server.

On the other hand, the graph model is a data model that organises data into nodes and edges. Nodes represent entities, whilst edges represent relationships between entities. The relationships between the nodes and edges are defined by their properties and labels, which describe the characteristics of the entities and relationships. The graph model is widely used in graph databases, such as Neo4j, Amazon Neptune, and Microsoft Azure Cosmos DB.
