Graphs

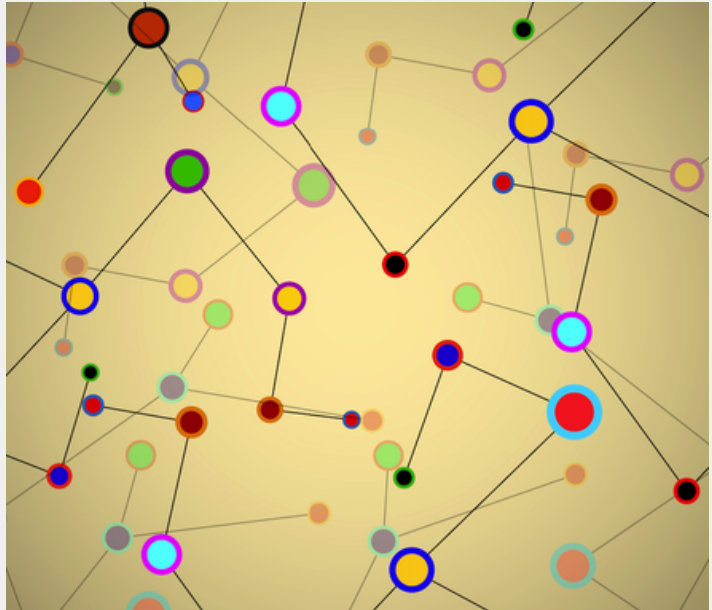## Connecting the World, One Vertex at a Time

Have you ever wondered how social networks recommend friends or how Google Maps finds the shortest route between two points? Behind these technological wonders lies a fundamental mathematical concept: Graph Theory.

What is a graph?

Imagine a set of points (called vertices) connected by lines (called edges). This simple structure, which may seem abstract, is the basis of Graph Theory. Vertices can represent anything from people in a social network to cities on a map, and edges represent the relationships or connections between them.

Graph Theory has found applications in a wide variety of fields:

Computer Science:

Search algorithms: Google uses graphs to index the web and find the most relevant pages in response to a search.

Social networks: Platforms like Facebook and Twitter model their user networks as graphs, allowing them to perform community analysis, friend recommendations, and spam detection.

Artificial Intelligence: Graphs are used in machine learning to represent structured data and solve classification and clustering problems.