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Geographic Information System for Agriculture

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Introduction

A geographic information system (GIS) is a conceptualized framework that provides the ability to capture and analyze spatial and geographic data. GIS applications (or GIS apps) are computer-based tools that allow the user to make interactive queries (user-created searches), store and edit spatial and non-spatial data, analyze spatial information output, and visually share the results of those operations by presenting them as maps

Geographic informatics-the scientific study of geographic concepts, applications, and systems-is commonly initialized as GIS, as well.

Geographic information systems are utilized in multiple technologies, processes, techniques and methods. They are attached to varied operations and various applications, that relate to: engineering, planning, management, transport/logistics, insurance, telecommunications, and business.[2] For this reason, GIS and site intelligence applications are at the foundation of location-enabled services, that rely on geographic analysis and visualization.

GIS provides the capability to relate previously unrelated information, through the use of location as the "key index variable". Locations and extents that are found within the Earth's space time, are ready to be recorded through the date and time of occurrence, alongside x, y, and z coordinates; representing, longitude (x), latitude (y), and elevation (z). All Earth-based, spatial–temporal, location and extent references, should be relatable to at least one another, and ultimately, to a "real" physical location or extent. This key characteristic of GIS has begun to open new avenues of scientific inquiry and studies.

Modern GIS technologies use digital information, that various digitized data creation methods are used. The most common method of data creation is digitization, where a hard copy map or survey plan is transferred into a digital medium through the use of a CAD program, and geo-referencing capabilities. With the wide availability of ortho-rectified imagery (from satellites, aircraft, Helikites and UAVs), heads-up digitizing is becoming the most avenue through which geographic data is extracted. Heads-up digitizing involves the tracing of geographic data directly on top of the aerial imagery rather than by the normal method of tracing the geographic form on a separate digitizing tablet (heads-down digitizing). Heads-down digitizing or manual digitizing, uses a special magnetic pen, or stylus, that feeds information into a computer to make a uniform, digital map. Some tablets use a mouse-like tool, called a puck, rather than a stylus. The puck features a small window with cross-hairs which allows for greater precision and pinpointing map features. Though heads-up digitizing is more commonly used, heads-down digitizing is still useful for digitizing maps of poor quality.

Geo processing may be a GIS operation wont to manipulate spatial data. A typical geo processing operation takes an input dataset, performs an operation thereon dataset, and returns the results of the operation as an output dataset. Common geo-processing operations include geo-graphic feature overlay, feature selection and analysis, topology processing, raster processing, and conversion. Geo-processing allows for definition, management, and analysis of data wants to form decisions.

GIS accuracy depends upon source data, and the way it's encoded to be data referenced. Land surveyors have been able to provide a high level of positional accuracy utilizing the GPS-derived positions. High-resolution digital terrain and aerial imagery, powerful computers and Web technology are changing the quality, utility, and expectations of GIS to serve society on a grand scale, but nevertheless there are other source data that affect overall GIS accuracy like paper maps, though these could also be of limited use in achieving the specified accuracy.