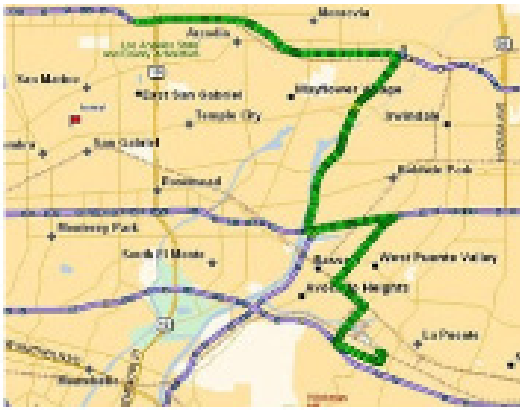
Tight Optical Integration (TOI) of Images with GPS Range Measurements

OU ID: #09001

Overview

The technology is an advanced Tight Optical Integration (TOI) algorithm that integrates optical information and GPS range measurements for navigation purposes. It uses the pixel domain to represent optical information, and the range domain to represent GPS measurements. A geographic location can be determined using the information from both domains. The device integrates angular measurement from a digital camera with the range measurements from a GPS receiver. The measurements are processed by an algorithm implemented using the MATLAB software. TOI performs an integration of visual and GPS measurements, and maintains the capability of absolute positioning. This is of particular use when vehicles are traveling in urban areas, and lack sufficient
GPS coverage due to signal blockage or denial. TOI automatically transits to operate with relative navigation in reference to the last known absolute position even when the GPS constellation becomes completely blocked.



OHIO UNIVERSITY

Tight Optical Integration (TOI) of Images with GPS Range Measurements

OU ID: #09001

Commercial Application

The technology can have beneficial applications in areas such as vehicle tracking, surveying, mapping, and navigation systems. GPS based devices have progressed from vehicle based equipment to applications in mobile handsets, laptops, pagers, personal digital assistants (PDA) and other wireless devices. The Frost & Sullivan North American GPS Equipment Market Report shows that the current revenue from GPS sales exceeds $8 billion annually (2008 forecast data). The global market for GPS is worth $22 billion currently and is growing at a rate of 30% annually.

Benefits

- Eliminates the requirement of range information from the optical sensor, unlike in other systems.
- Enhanced system availability even in areas of urban congestion and poor signal strength.
- Greater accuracy of the results as compared to stand-alone GPS.
- Improvement of 40% in the mean position error magnitude of the camera weighing factor.
- Elimination of inertial measurement error that improves device accuracy.

Inventor

Thomas Arthur, Ph.D. is a professor of Avionics at Ohio University's Stocker Center. Dr. Arthur originally conceived the idea for this technology in June of 2007 and had reduced it to practice by September of the same year. Licensing opportunities are available.

Contact Us

Mark Foley
Technology Commercialization Manager
P: 740.593.0813
E: foleym@ohio.edu

OHIO UNIVERSITY