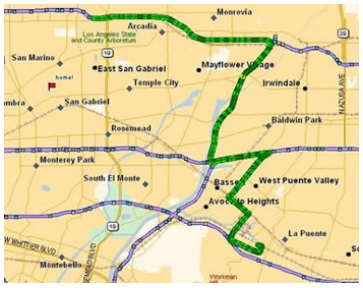
TIGHT OPTICAL INTEGRATION (TOI) OF IMAGES WITH GPS RANGE MEASUREMENTS

TECHNOLOGY 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.

POTENTIAL FIELDS OF USE

The technology can have beneficial applications in areas such as vehicle tracking, surveying, mapping and navigation systems. GPA based devices have progressed from vehicle based equipment to applications in mobile hansets, 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.



BENEFIT ANALYSIS

The technology has several beneficial features:

- 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.

STAGE OF DEVELOPMENT

Currently, research is being pursued to determine the sensitivity of the TOI to inertial and camera errors. Other areas of research include the design of the equivalent equations for TOI. These equations are required to determine the grade of service (GOS) performance and perform an analysis to establish the efficiency of algorithm.

FUTURE DEVELOPMENT

Future research will focus on the field-testing and sensitivity analyses of the TOI algorithm. This will help to reduce error sources that have not been addressed by the technology in its present state. The algorithm will be used in a demonstration to prove its suitability for field applications.

LICENSING OPPORTUNITIES

A patent for this technology has been filed. Licensing opportunities are available.

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