



Location-Aware Communication System for Mobile Devices

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WARF: P160080US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in a visible light communication system that identifies the location of a mobile device using light intensities corrected by the device's orientation.

The new system makes use of common cell phone capabilities and could help users locate their position within a large retail store, hospital, airport terminal or other unfamiliar structure.

Overview

The proliferation of LEDs for ambient lighting is driving smart lighting technologies. Visible light communication (VLC) is an emerging technology that uses LEDs as transmitters and light sensors (e.g., iPhone camera) as receivers, thus establishing a communication link by flickering at a speed imperceptible to human eyes.

However, current VLC methods assume single point-to-point communication (i.e., one device to one LED). This can result in interference as the user moves, leading to interruptions in localization and communication capabilities. Other challenges include sharing bandwidth when multiple users are present, and shadowing of the mobile device (for example, by the user's body).

The Invention

UW-Madison researchers have developed a system that can determine the location of a mobile device by analyzing the intensity of the signals from various light fixtures (of known position), adjusted by a measured orientation of the mobile device. This location information may be used to generate dynamic clusters of light fixtures that follow the user, allowing a reduced number of light fixtures to be dedicated to a particular user while reducing shadowing and interruptions during 'handoff' between light fixtures.

Applications

- Retail stores, airports, hospitals, etc. could offer indoor navigation services to users through a mobile app
- Retail stores and shopping malls can offer location-based push notifications (e.g., advertisement, coupons) to users' smartphones

Key Benefits

- Provides reliable localization support
- Increases resistance to shadowing
- Allows mobile devices to identify their location without the need for auxiliary location hardware such as radio beacons
- Leverages multiple light transmitters for improved accuracy and reduced noise influence
- Does not require extensive infrastructure changes

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Stage of Development

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The researchers have completed early prototyping using six access point nodes.

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

Additional Information

For More Information About the Inventors

- [Suman Banerjee](#)

Related Technologies

- [See WARF reference number P170079US01 for more information about the researchers' work developing indoor navigation capabilities.](#)

Tech Fields

- [Information Technology : Networking & telecommunications](#)

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867

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