Cryptology and Security

Hiding Information In A Digital Environment

Professor Shujun Li is the inventor of this technology.
Reference: 063
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Summary: Information is hidden in a digital environment by translating the information into one or more activities according to an encoding scheme in which the manner in which the one or more activities are performed conveys information to an intended recipient. The encoded information is then sent by controlling one or more entities to perform the encoded one or more activities. In some embodiments, a marker can be included to signal a start point of the concealed information. The recipient can continuously monitor the activities performed by one or more entities known to be controlled by the sender, to detect the marker that signals the start of hidden information.

Background: Various methods exist for hiding information in a digital environment, to enable parties to share information securely or obscurely. Traditional information hiding methods allow hiding information within other data (which is called the carrier), such as multimedia files or Voice-over-Internet Protocol (VoIP) packets. For example, in image-based information hiding, data bits of the information to be hidden are set embedded in the pixel values of an image file as least significant bits (LSB). Since the LSB of a pixel value has very little effect on the appearance of the pixel, the presence of the embedded data may go unnoticed by an individual viewing the image. However, it may still be possible to infer the presence of the data by detecting any deviation from natural statistics of LSBs of digital images. The invention is made in this context.

Technology: According to the present invention, there is provided a method of sending hidden information in a digital environment, the method comprising: translating the information to be hidden into one or more activities to be performed in the digital environment, according to a predefined encoding scheme in which the manner in which the one or more activities are performed conveys information to an intended recipient; and sending the hidden information by controlling one or more entities to perform the encoded one or more activities.

Radio frequency identification tag

Dr John Batchelor is among the principal inventors of this technology.
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Summary: The present technology concerns wearable ultra-high frequency tags for the identification and tracking of objects, which can be used irrespective of their mounting platform (e.g. can be attached to either metal or liquid).

Background: The need to track and identify items of concern arises in manufacturing, distribution and inventory systems. For convenient identification and tracking, it is desirable to communicate information about such items wirelessly and preferably passively. Radio Frequency Identification Devices (RFID) is a well-known method of identifying and tracking objects by attaching an active or passive transponder that responds to radio frequency commands. The transponder is typically incorporated into a tag or label. When an object with an RFID tag is put in a read zone of an RFID reader, the reader transmits an interrogation signal to the RFID tag by modulating a Radio Frequency (RF) signal, having a specific carrier frequency. The RFID tag responds to the interrogation of the RFID reader by retransmitting a switch-modulated form of the original illuminating wave back to the reader. The switch-modulation of the response encodes data about the item to which the tag is attached. The necessary signal processing is carried out in an Integrated Circuit (IC) in the tag.

Technology: The present technology concerns wearable Ultra High Frequency (UHF) passive tags, in which electromagnetic waves received by the tag antenna are rectified and used as the power source for operation. The RFID tags consist of an antenna and a microchip directly integrated with no intermediate transmission line. The antenna is formed of balanced lines wrapped around conducting rectangular patches and separated by a gap. The elements are usually above ground planes which lie entirely, or partially, beneath them and read ranges close to the quoted maximum can be obtained even when the tag is mounted over a lossy or conducting body. The antenna is flexible so that the tag can be attached to curved surfaces. The present tag is robust, easy to manufacture and, very importantly, independent of the mounting platform (e.g. can be attached to either metal or liquid). It ensures efficient energy transfer to the RF front-end of the tag IC, and therefore offers high performance and a long-range, which is particularly important in environments that are complex and difficult for radio transmission.