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Diagnosing Low-Level Failure Information in Electronic Devices

Abstract: A technique is disclosed that communicates to a user detailed diagnostic information about a failure in an electronic device in a detailed and convenient manner using simple hardware. A light-emitting or sound-emitting component of the device encodes characters of a textual description of the failure. A smartphone app captures and decodes the description, and presents a corresponding textual message about the failure on the smartphone display.

This disclosure relates to the field of electronic devices.

A technique is disclosed that communicates to a user detailed diagnostic information about a failure in an electronic device in a detailed and convenient manner using simple hardware.

Many electronic devices implement some form of auto-diagnostics or failure detection. It is common to use light-emitting components (e.g. LEDs) or sound-emitting components (e.g. a speaker or buzzer) to communicate the detected failure to a user. These components are simple and low-cost hardware which is often included in the devices for other purposes. A number and/or pattern of flashes of the light, or beeps from the speaker, are emitted. A user can then consult a failure table which maps the number and/or pattern to a particular failure. However, communicating more than a small number of distinct failures can require the user to count or remember the number or pattern, and so it may not be possible to provide detailed information about a particular failure. Furthermore, if the failure table is lost or misplaced, the user may not be able to tell what failure the device is indicating.

According to the present disclosure, the light-emitting or sound-emitting components encode the characters of a textual description of the failure. For example, a binary pattern defining ASCII characters of the textual description could be emitted. In some examples, the language in which the failure description is emitted by the electronic device may be user-selectable.

A smartphone app then decodes the emitted textual failure message. The camera or the microphone of the smartphone can be aimed at the light- or sound-emitting component, and the app then decodes the textual description of the failure and presents it to the user on the display of the smartphone.

Even if the language of the light or sound pattern is not selectable, the app may perform a translation of the failure message from the emitted language into a user-selected language.

The disclosed technique advantageously communicates failure information to a user in an intelligible way, via a simple and inexpensive hardware mechanism, and without requiring a failure table. A large variety of detailed diagnostic messages can be communicated in this manner. The disclosed technique can be beneficial even in electronic devices with sophisticated user interfaces for communicating low-level failures which prevent these user interfaces from operating.

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