

**SYSTEM AND METHOD FOR
ESTABLISHING A COMMUNICATION LINK
USING USER-SPECIFIC VOICE DATA
PARAMETERS AS A USER DISCRIMINATOR**

RELATED INVENTION

The present invention is related to the following invention which is assigned to the same assignee as the present invention:

(1) User-Customized, Low Bit-Rate Speech Vocoding Method and Apparatus, by Haber et al., Ser. No. 08/537,583, filed Oct. 2, 1995.

FIELD OF THE INVENTION

This invention relates generally to the field of communication systems and, more particularly, to a system and method for establishing a communication link using user-specific voice data parameters as a user discriminator.

BACKGROUND OF THE INVENTION

Unauthorized use of telecommunications subscriber units costs the telecommunications industry very significant annual revenue losses. As a consequence, this industry is continually attempting to come up with more effective subscriber authentication measures.

It is known in the telecommunications art to require the subscriber to enter a Personal Identification Number (PIN) for every subscriber unit call. However, this type of authentication system is susceptible to eavesdropping by unauthorized users who can capture the PIN and use it to make unauthorized calls. Moreover, requiring the subscriber to use a PIN imposes a burden on the subscriber, who already can have an excess of passwords and PINs to keep track of for access to various equipment and systems.

Another known approach to the problem of unauthorized calls is to require the subscriber to use a Subscriber Information Module (SIM) card containing the PIN. However, SIM cards can be lost, stolen, forgotten, or misplaced.

Thus, what is needed are an improved user-authentication system and method for granting subscriber unit access only to authorized subscribers of a communication system.

Also needed is an improved communication system which does not require the subscriber to use a SIM card or enter a PIN number before using the subscriber unit.

Further needed is an improved communication system which allows multiple subscribers to have access to a single subscriber unit without using SIM cards or entering PIN numbers.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is pointed out with particularity in the appended claims. However, other features of the invention will become more apparent and the invention will be best understood by referring to the following detailed description in conjunction with the accompanying drawings in which:

FIG. 1 illustrates a communication system in accordance with a preferred embodiment of the invention;

FIG. 2 illustrates a communication system in accordance with an alternative embodiment of the invention;

FIG. 3 illustrates a communication unit in accordance with a preferred embodiment of the invention;

FIG. 4 illustrates a control facility in accordance with a preferred embodiment of the invention;

FIG. 5 illustrates a flow chart of a connection training method in accordance with a preferred embodiment of the invention;

FIG. 6 illustrates a flow chart of a connection training method in accordance with an alternative embodiment of the invention;

FIG. 7 illustrates a flow chart of a connection training method in accordance with yet another alternative embodiment of the invention;

FIG. 8 illustrates a flow chart of a method of establishing a communication link in accordance with a preferred embodiment of the invention;

FIG. 9 illustrates a flow chart of a method of establishing a communication link in accordance with an alternative embodiment of the invention; and

FIG. 10 illustrates a flow chart of a method of establishing a communication link in accordance with yet another alternative embodiment of the invention.

**DETAILED DESCRIPTION OF A PREFERRED
EMBODIMENT**

The present invention provides, among other things, a system and method for establishing a communication link using user-specific voice data parameters as a user discriminator. In a further and more specific aspect, the invention employs user-specific voice data parameters for inhibiting unauthorized use of a communication unit in a communication system.

A preferred embodiment of the invention utilizes a stored speech characteristic model (SCM) vocoder to generate a subscriber's unique speech parameters. As will be explained in greater detail below, this vocoder uses a pre-stored speech characteristic model (SCM) table and input stimulus table containing entries from a registered subscriber. As used herein, the term "registered user" means a user or subscriber who has an SCM table or database and an input stimulus table pre-stored in the communication system. The term is not meant to refer to user registration for the purposes of billing.

The SCM table and input stimulus table can be stored within a communication unit (CU) or an external storage device (e.g., a User Information Card (UIC) or a control facility memory device). As used herein, a "transmit vocoder" is a vocoder that encodes speech samples, and a "receive vocoder" is a vocoder that decodes the speech. The transmit vocoder or the receive vocoder can be located within a CU or in a control facility that provides service to telephones which do not have vocoder equipment.

Details of the SCM vocoder are explained in the above-identified Related Invention. During call setup, the SCM table and input stimulus table for the transmit vocoder user are sent to the receive vocoder to be used in the decoding process. During the call, the speech from the transmit vocoder user is characterized by determining table entries which most closely match the subscriber's speech. Information describing these table entries is sent to the receive vocoder. Although the method and apparatus of the invention are described using SCM tables and input stimulus tables, other user-customized tables used to characterize speech are encompassed within the scope of the description and claims.

The system and method of providing user-specific access to a communication system using user-specific voice data or SCMs as a user discriminator to facilitate user-specific authorized access to a communication system is set forth in