(SD2016-062) A portable, reconfigurable, multi-technique electrochemical biosensor (US Patent No. 11,166,653)

Tech ID: 25627 / UC Case 2016-062-0

TECHNOLOGY DESCRIPTION

Electrical engineers from UC San Diego have patented (US Patent No. 11,166,653) a reconfigurable, multi-technique electrochemical biosensor intended for direct integration into smartphone and wearable technologies that enable point-of-care (POC) diagnostic applications with improved convenience and speed. This technology conforms to the Google ATAP Project Ara Modular Developers' Kit (MDK), which permits users to easily swap out different phone components in order to customize the phone's hardware.

More specifically, this invention is a reconfigurable potentiostat module that is able to perform various electrochemical detection techniques and its interface allows for swapping in several types of interchangeable electrochemical sensors, all with a minimal number of components. This biosensor module offers high-speed communication with its host device (smartphone or wearable) and has the flexibility to interface with most external test chips or electrodes designed for specific tasks. Using this smartphone module and its swappable external test chips, a user can run different molecular detection tests, based on amperometric, potentiometric, or impedance spectroscopy techniques in the field without a hospital or centralized laboratory.

This platform is ideal for biosensor integration because of its open and high-speed interface as well as its modularity that enables the POC smartphone (or other wearable device) to have multiple bio-sensing capabilities.

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OTHER INFORMATION

KEYWORDS

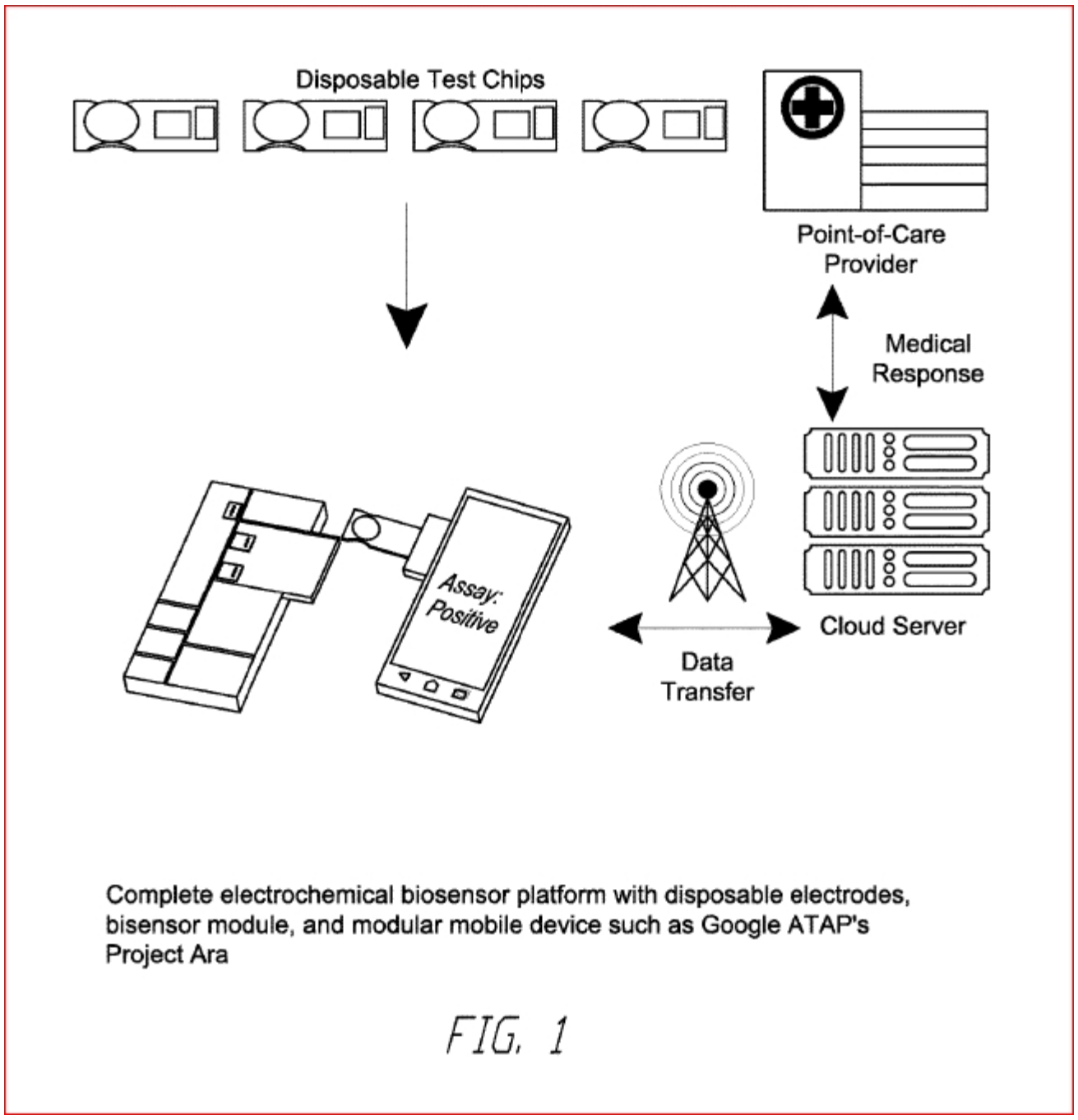
biosensor, electrochemical biosensor, detector, instrument

CATEGORIZED AS

- **Communications**
  - Wireless
- **Medical**
  - Devices
  - Diagnostics
- **Sensors & Instrumentation**
  - Biosensors
- **Engineering**
  - Other

RELATED CASES

2016-062-0



Complete electrochemical biosensor platform with disposable electrodes, bisensor module, and modular mobile device such as Google ATAP's Project Ara

FIG. 1

STATE OF DEVELOPMENT

A prototype of the module was developed with discrete components and compared against benchtop measurement instrumentation. Glucose assays and pH measurements obtained with the module were comparable to benchtop measurements.

Features:

1)While existing external bio-sensing peripherals for interface via the I/O ports on smartphones (audio port, USB, etc.), none integrate directly into the phones internal hardware. Furthermore, this is the first to be specifically designed to enable detection of molecular biomarkers.

2)And existing potentiostat devices are limited to a single family of electrochemical techniques, the circuit design of this new potentiostat offers digital configuration to change among its three measurement modes (*i.e.* amperometric, potentiometric, and impedance spectroscopy).

INTELLECTUAL PROPERTY INFO

UC San Diego is seeking partners to commercialize this patented technology. (US Patent No. 11,166,653) https://patents.google.com/patent/US11166653B2

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20180303386	10/25/2018	2016-062
Patent Cooperation Treaty	Published Application	2017066347	04/20/2017	2016-062

RELATED MATERIALS

- Point-of-Care and High-DensityArray Electrochemical Biosensors | A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of Philosophy in Electrical Engineering (Electronic Circuits and Systems) | Alexander Chuan Sun | UNIVERSITY OF CALIFORNIA SAN DIEGO - 06/01/2018

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