HANDHELD ELECTRONIC NOSE (HEN)

An Embedded System for Miniaturized and Portable E-Nose

A Sub-project under the eAgriEn Program funded by DeitY, Govt. of India

Implementing Agencies:

C-DAC, Kolkata & SENSOR HUB, KOLKATA

OBJECTIVES

- Assessment of finished tea quality.
- Determination of optimum fermentation time for tea during manufacturing.
- Additional test beds such as cheese ripening or fruit ripening will also be targeted at trial stages.

DELIVERABLES

- A simple 16-bit Embedded platform with low-power sniffing unit.
- System is equipped with 4.3" TFT (480 X 272) display with touch screen for HMI.
- Miniature, low power, battery operated, portable, easy to use.
- SD Memory card (~8GB) interfaced to the system for on-line and off-line data storage.
- Rechargeable Li-ion Battery (7.2V).

DEVELOPMENT PLATFORM

HARDWARE:

- Microchip 16-bit Controller
- TFT Touch Screen
- SD Card Interface
- In-built graphics support

SOFTWARE:

- Firmware in C
- Touch screen based GUI Interface

DESIGN IS BASED ON:

- The PIC 24FJ256DA210 (100pin) processor interfaced to a 4.3" (480*272) Display with touch screen support.
- Sensors developed by Sensor Hub, Kolkata.
- 16 bit RGB interface.
- Processor is clocked from an 8MHz crystal with a secondary oscillator of 32 KHz.
- A rechargeable Li-ion Battery (3.7 V).

HEN Sensor Array

HEN sample holder attachment

Handheld E-Nose (HEN) with sniffing attachment and sample holder

Inner view of HEN with PIC Controller Card and Miniature pump

FEATURES

- User friendly and easy to operate.
- Instant Data Acquisition.
- Simple Statistical Correlation Algorithm for Embedded Platforms in absence of OS, the event-driven structure of the application is designed using a carefully devised State Machine.
- Interfacing of Graphics, Touch-screen, SD-Card, Memory, etc.
- On-screen keyboard for data entry.
- File based database management in absence of DBMS.
- Small footprint algorithm.

APPLICATIONS

Reliable prediction of Tea-Taster like Score of Finished Tea.

Online Plot of Fermentation profile for end-point detection.

Portable E-Nose (PEN)

AWARD RECEIVED

Portable Electronic Nose (PEN) is an intermediate portable version and was contested at the Intel India Embedded Challenge 2011 Contest held at Intel Technology India Private Ltd., Bangalore during August 18-19, 2011.

Among 31 final participants from across the nation, the team of C-DAC, Kolkata was adjudged the WINNER in the "Rural IT, e-Governance and Citizen Services" category.

C-DAC, Kolkata team receiving Winner Award of the Intel India Embedded Challenge – 2011.

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