CAPACITIVE SENSOR-BASED DEVICE

IITM Technology Available for Licensing

Problem Statement

- The problem statement discussed in the present invention is ***how to implement a capacitive sensor-based device which can easily integrated into appliances*** *without any shortcomings of prior sensor based electronic appliances.*
- Hence, the subject matter provides the solution efficiently by addressing the issues.

Technology Category/ Market

Technology: Capacitive sensor-based Device;
Industry: Clean Energy Sector, Environmental Engineering, Electronic System & Design Manufacturing (ESDM), **Application:** Smart Taps;
Market: The global **capacitive sensor** market is projected to reach at a **CAGR** of **6.2%** during the forecast period **(2024-32).**

Technology

❑ Present patent describes a **capacitive sensor-based device** comprising of:

1. **a sensing electrode for monitoring its capacitance with respect to ground;**
2. **a processing unit connected to the sensing electrode for determining a change in the capacitance of the sensing electrode beyond a first pre-defined threshold and activating the capacitive sensor-based device upon determining the change in the capacitance, wherein the change in the capacitance occurs when a user brings their hand near the sensing electrode,**

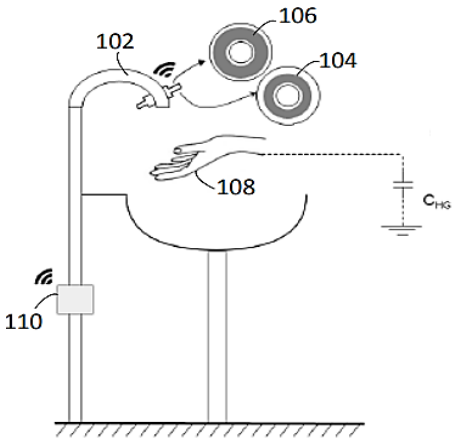

Fig.1 shows a schematic diagram of a smart tap integrated with a capacitive sensor;

❑ Further, a **shield electrode** is positioned above the sensing electrode for **preventing detection of the hand** when brought above the sensing electrode.
❑ The **sensing electrode** and the **shield electrode** are maintained at the same excitation potential through a power source.
❑ The **change in the capacitance** of the sensing electrode corresponds to a **leakage current flowing** from the excitation electrode to the ground through the hand of the user.
❑ The **capacitive sensor-based device** further comprises a **wireless module** for connecting the processing unit with an electronically controlled valve for **controlling the operation of the capacitive sensor-based device**.

Intellectual Property

IITM IDF Ref. 2479; IN Patent No. 536392

TRL (Technology Readiness Level)

TRL-4, Technology validated in Laboratory

Research Lab

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Images

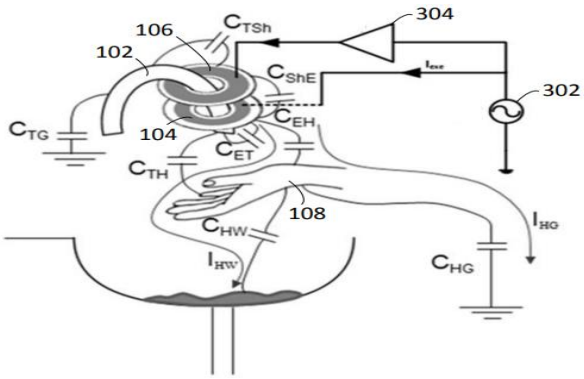


Fig.2 shows an electrical equivalent circuit of the capacitive sensor fitted in the smart tap in presence of a hand of a user.

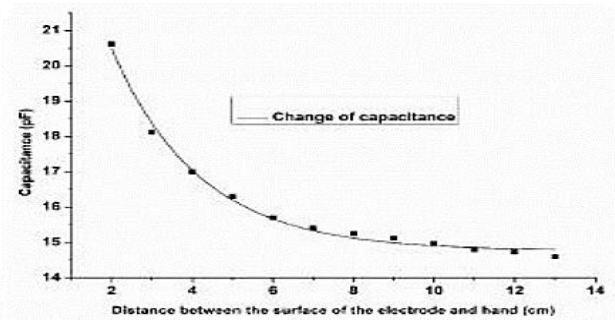


Fig.3 depicts a plot of change in capacitance with the increase in perpendicular distance between an electrode surface and the hand of the user

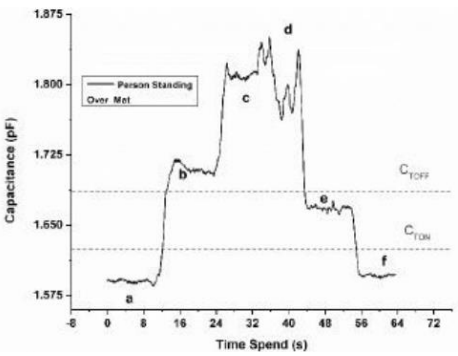
Key Features / Value Proposition

❖ ***Technical & Industrial Perspective:***

- Provides a **cost-effective capacitive sensor** that can be easily **integrated** into an **existing/new electronic** or **non-electronic appliance** during **manufacturing & controls flowrate** of **discharge of air or liquid** from the electronic appliance, upon **sensing** the hand of the user.

❖ **Functionality of the Claimed Device:**

- The **capacitive sensor** is fitted **onto the tip of the tap,** the sensor is used to sense the presence of the **user's hand** only by the **underneath tap**.



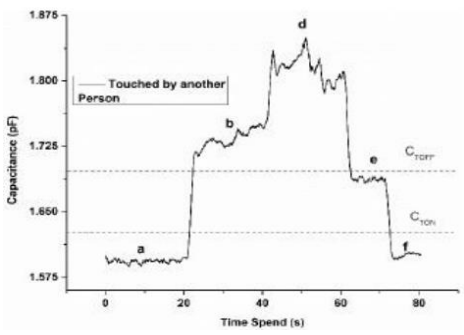


Fig. 4a shows change in capacitance recorded from the capacitive sensor when the person was standing on the mat, & Fig. 4b illustrates change in capacitance recorded from the capacitive sensor when the person was touched by another person;

- **Fabrication** of the **sensor is easy** and **less expensive.**

- The proposed device may be fitted to a **liquid dispensing tap**, a **soap dispenser**, a **sanitizer dispenser**, an **oil dispenser**, and a **hand air dryer**.

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