A Passive and Wireless Water Sensor

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As we know that water sensor is widely used in our daily life, industry, agriculture, building and so on. But traditional water sensors need direct electricity supply, which is power-consuming and of great volume. Can we invent a wireless and passive sensor that can find conductive liquid medium such as water, sweat, piss and feces safely without the utilization of battery or power supply line? From my childhood experience I found that RFID based sensing may be a promising solution to this question. Different from existing sensing trends of utilizing RFID tags through the comparison of two tags, I use a single tag with a deliberately produced crevice in its antenna. When a resistance variable circuit is inserted in this crevice, the antenna's impedance will be changed as the circuit has different liquid contact status. This in turn leads to different sensing intensities of the reformed RFID tag—my single tag based water sensor. After the success sensing of water and other conductive liquids with this passive and wireless water sensor, I am extending this mechanism to the sensing of other physical quantities like temperature and displacement. Test results indicate that this passive and wireless water sensor has advantage over the existing RFID based sensors. It can even be produced to be human body wearable and maintenance free.