

## **ADVANCE PYTHON PROGRAMMING (ETH)**

### **IOT -DEVICE APPLICATION**

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**TOPIC: Clothing button-** that vibrates if a person receives phone call / message.

The core idea of this title is to make an IOT device useful for blind or Deaf people. This Clothing button might work well for both the cases where Deaf people can sense the vibration in the button indicating phone calls even though they are not audio to ringtones. Similarly, for blind people since they cannot see the display makes it difficult for them to sense and attend calls. Using this ideology, we can incorporate the vibrating sensors to indicate the user receives phone calls or even a small button can be placed with which they can attend the phone calls using Bluetooth systems. The advanced and cost-effective board or chip like ESP32 – where it comes up with both Bluetooth and mic acts as a perfect match for the given scenario. Therefore, we can sense, attend and even talk using the button connect us to the calls. If we want them to perform some other activities like double click to cut the call, single click to attend them, long press to increase volume etc. we can explicitly program them using python and by them a small battery life to work with. This way we can connect it to server and modify the constraints according to user ability. This can be further given with a magnetic clip so that it is easy to attach and detach from the cloth, causing no severe damage to cloth as well as the button enabling it easy to use.

Further, we can make run a short vibration pattern for messages and long ones for phone calls indicating the difference between the messages and call notifications. And also, this button can be made datable so that you can change them to various clothes necessary as you go out. This button has to be water resistant as users may forget about the button and put them for washing; to avoid such crisis we have to make a cover over it that protects it from water. Or even in cases like raining weather conditions, this button will be much suitable to use. Use rounded edges and small size so it's comfortable to use for the targeted users. It is equally important that the users are comfortable with product for long-term usage. Since the device is small, ensuring low battery usage is crucial. Using sleep modes in ESP32 or a small replaceable coin cell can extend battery life. For sustainability, the button casing can be made using biodegradable plastic or recycled materials, promoting eco-friendliness. The same button can be programmed to send an SOS vibration pattern or location alert when pressed multiple times in emergencies.

We can use touch sensors for biometrics or acknowledgement purposes, or temperature sensors to notify temperature to the users. As these activities performed using the button can be stored in the server connected, which can be continuously monitored and checked for emergency crisis like if a person is missing. We can even set GPS to track the location of the user. This continuous monitoring enhances reliability, feasibility, efficient performance and security satisfying the non-functional requirements. For deaf-blind users, use stronger haptics or distributed vibro-tactors across chest/shoulder for more perceivable feedback. Here, Distributed vibro-tactors just means multiple small vibration spots (tiny motors) placed at different body areas — like one on the shoulder, one on the chest, etc. and Haptic refers to the touch or vibration feedback.