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Modular Based IoT Management System

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Abstract: The main goal of this paper is to describe the systems which are multiple module connected together control the devices through web portal. The Internet of Things (IoT) is a global network that links physical object using the web application and network communications. If we look at the traditional IoT device architecture. These devices are the fixed system once those devices are manufactured Its pretty much impossible to change the program of that devices. Also repairing this device is a very costly and tedious process. To avoid this, we have introduced a concept called modular IOT. Modular design is a design approach that subdivides system into smaller parts called modules. A modular system can be characterized by functional partitioning into discrete scalable and reusable modules. rigorously using well-defined modular interfaces and making use of industry standards for interfaces. This proposed system is based on the multiple modules which can be added or removed on the board and to program the microcontroller in such a way that we can change the program anytime we want. This system will be easily upgraded or enhanced by adding the new module. Because of modularity, it will ease the process of repairing the system. Proposed system helps us to develop the system which can be modified reconfigured and enhanced anytime we want. This system will be controlled and configured by the central web portal. When the device initially boots it will seek the information to the server for its configuration. We can easily change the configuration of this system from the website. This will reduce the problem of e-waste because we have to only replace the part which has the fault and upgrade the system anytime we want. The modular approach could lead to a longer useful life of the device.

Keywords: Modular System, Arduino, IoT (Internet of Thing), Cloud, Feature selection, web, Automation.

I. INTRODUCTION

Internet of Things or IOT refers to collection of things having identities that are unique and also having connection with the internet.IOT is a new and a very revolutionizing concept. So, we are developing the project modular IOT base on micro controller IOT devices. Modular IoT product design device which comprise of 2 major components controller and sensors. The controller comprises of microcontroller and the plug and play sensors. The Internet of things (IoT) is that the inter-networking of physical devices, vehicles (also named as "connected devices" and "smart devices"), buildings, and different things embedded with physics, software, sensors, actuators, and network property that change these objects to gather and exchange information. The IoT permits objects to be perceived or controlled remotely across existing network infrastructure, making opportunities for additional direct integration of the physical world into computer-based systems, and leading to improved potency, accuracy and economic profit additionally to reduced human intervention. When IoT is increased with sensors and actuators, the technology becomes associate instance of the additional general category of cyber-physical systems, that additionally encompasses technologies like sensible grids, virtual power plants, sensible homes, intelligent transportation and sensible cities. every issue is unambiguously recognizable through its embedded computer system however is ready to interoperate among the prevailing net infrastructure. within the recent years varied technologies square measure developed that helps folks to induce self-control systems. These systems initial sense the information from the detector and by process thereon offer output for dominant. we have a tendency to square measure victimisation sensible Arduino board for project during this board all blocks square measure simply connect and take away. that may be combined of bindable blocks. A base half, wherever all of the supposed Blocks square measure connected to every different allows a simple replacement and customization of all components of the device [1, 2]. this project aims at dominant all device with the assistance of Arduino Uno employing an internet portal this technique is simply upgraded or increased by adding the new module. attributable to modularity, it'll ease the method of repairing the system. planned system helps USA to develop the system which may be changed reconfigured and increased anytime we wish. this technique is controlled and designed by the central internet portal [3]. once the device ab initio boots it'll obtain the data to the server for its configuration. we will simply modification the configuration of this technique from the web site.

II. LITERATURE SURVEY

In 2014 Stephan Hankammera ,found that From Phonebloks to Google Project Ara. A Case Study of the applying of property Mass Customization by Stephan Hankammera within the Science Direct 2016, found that Project Ara was a

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standard Smartphone project below development by Google. The project was originally headed by the Advanced Technology and comes team at intervals Motorola quality whereas it had been a Google subsidiary. Project ara is predicated on the multiple Modules. Modules might give common Smartphone options, like cameras and speakers, however might additionally give additional specialized options, like medical devices, receipt printers, optical maser pointers, Pico projectors, twilight vision sensors, or game controller buttons. every slot on the frame accepted any module of the right size. The front slots area unit of assorted heights and took up the total breadth of the frame. The rear slots had commonplace sizes of 1×1, 1×2 and2×2. Modules may well be hot-swapped while not turning the phone off. The frame additionally enclosed a little backup battery that the main battery will be hot-swapped. Modules were originally to be secured with electro permanent magnets, however this was replaced by a distinct technique. The enclosures of the modules were planned to be 3D-printed, however because of the shortage of Development within the technology Google opted instead for a customizable formed case [1]. once the thought of a standard Smartphone arose through Phonebloks, Google intense efforts towards developing such a tool.

They free associate degree updated Module Developers Kit (MDK) showing specifications like the phone's hardware being supported a frame, the system skeletal, wherever single modules will be another to [2 To support simple set-up of the Smartphone, Google developed the Ara configuration app. it permits simple multi dimension bottom-up configuration with one-hand gestures, beginning with the skeletal system as a base. succeeding vertical layer permits selecting specific modules and customizable shells (e.g. with graphics or pictures), whereas the highest one shows the bespoken Smartphone and therefore the home screen of the horizontal market layer. Finally, the specs layer provides some technical data like battery life or elects storage size and offers the chance to get the Smartphone. for purchasers World Health Organization don't need to or aren't ready to decide between specific modules, the configuration app can provide the Phone Maker feature that means a configuration supported user input, e.g. from social networks or when respondent some queries at the beginning of configuration [3].App primarily based Device dominant System by Tanvi G Pareek within the 2017.

Discuss the procedures concerned in dominant associate degree Arduino board with sensible phone and blynk via web. Blynk is wont to produce applications associate degreed acts as an negotiant human interface. Blynk has many widgets and tools which might be dragged and born from the toolbar. This project aims at dominant electrical appliances with the assistance of Arduino Uno victimisation associate degree automaton app. The project involves a straightforward Arduino board while not an online defends. The computer provides associate degree interface to enter the authentication code to proceed with the applying. The computer additionally ensures property to the Arduino board and also the app, to transfer the code. Temperature controlled fans are very important in sensible Energy economical IoT systems'. The communication between phone and Arduino Uno is wireless. Also, authentication token generation can make sure that solely approved users access or management the appliances within the university. This project can facilitate alter electrical appliances and this may build school rooms the school rooms the lecture rooms or cabins as sensible classrooms or sensible cabins. This IoT system designed can facilitate management electrical appliances from anyplace within the university [4 Web-Based Management of the web of Things by Lina Yao and Quan Z. Sheng within the 2015. the essential plan was to store all the info to a central server however this technique doesn't amendment device configuration once code uploaded [5]. the thought of intelligent ménage cooling appliances is additional extended to the domain of fireplace safety and mitigation. Additionally to temperature-based fan management, the circuit is provided with hearth detectors and alarms. this technique is geared toward creating the lives of senior voters and otherwise baled people easier [6]. standard Products: Smartphone style from a Circular Economy Perspective by Karsten Schischke within the 2016. "Modularity" starts with AN simply removable battery. (example for a assembly with a clearly outlined interface) and mono-material back cowl (example for a structurally freelance element) as seen within the first-generation truthful phone and alternative devices on the market. successive level may be a platform, that permits the manufacturer to ship Singly organized units.

The Re-Phone follows such a style philosophy and permits skilled and semi-professional developers to con-figure a smartphone. Among tablets the press ARM will function AN example for such a platform, wherever particularly the mainboard will accommodate varied natural philosophy modules. [7] the concept of intelligent household cooling appliances is further extended to the domain of fire safety and mitigation. In addition to temperature-based fan control, the circuit is equipped with fire detectors and alarms. This system is aimed at making the lives of senior citizens and differently abled individuals easier. It is a commonly used platform of cell phone-based control of Arduino-connected devices. The application allows remote monitoring, controlling as well as cloud-based storage and analytics [8] where the author explains the utilization of the interface with a Raspberry Pi to manage manage appliances and for security functions. this method aims at making and utterly machine-controlled sensible home, equipped with sensors, intelligent devices and security cameras. This project seeks to boost the standard of lifetime of senior and otherwise abled people, for whom manual operation of devices is tough, and whose safety may be a major concern.

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III. IMPLEMENTATION DETAILS

Our system will have divided in to two parts hardware part will be consist of microcontroller and the sensor and the software and will be consist of the website where user can reconfigure the board any time he wants and that changes will reflected once the device is rebooted.
The hardware will consist of controllers and the sensors and the which we can plug and play any time. The controller can be any controller which can be programmed on the arduino ide.To make the modular board user have to go to the website portal and then he has to add the new board and then he will receive the unique id for the board and then user will add the unique id in the code and then upload the code to the arduino.

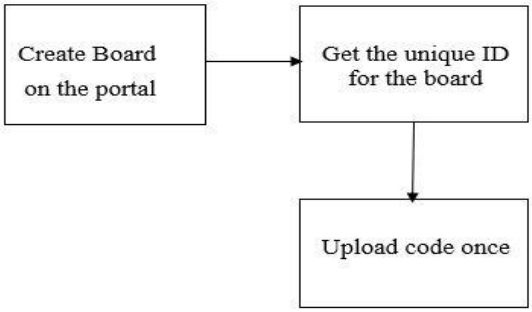
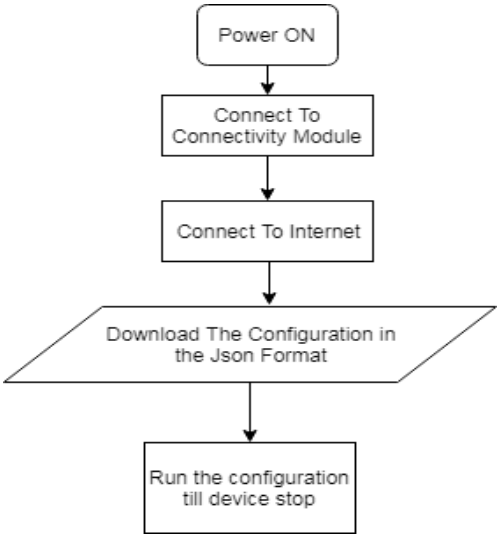


Fig. 1 Flow Diagram

After the device has been started the device will be connected to the internet through the connectivity module. Which either can be ethernet or the wifi.



After the device has been connected to the internet the it will connect to the webservice which we have created on the website. Board will send the the unique id to server. Server will send the response in the json format which will contain the pin configuration and the program logic.

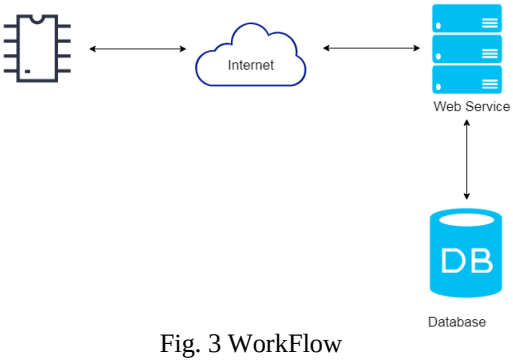


Fig. 3 WorkFlow

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IV. CONCLUSION

Modular system allows us to assemble this device after the device has been programmed. This is the simple plug and play feature which can be done by any non-technical person. So that anyone can develop his own device without any programming knowledge. This system can be also repairable. Anyone can repair this device just by replacing the faulty part. This will reduce the maintenance cost. To replace the part of the system we just have to replace the part we do not have to solder or disorder any part during repair. This reduces the maintenance cost of the project. Our Current proposed system is modular but it needs to be configured on the website manually. But this process can be using independently connected tiny microcontroller which will tell the microcontroller about the connected sensor. This will drastically reduce our work and we just have to add the logic. We can also open this platform for the developers where developer can develop the app and users can install pre-developed app and complete the setup in few minutes.

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