

“Multifunction Smart-Bot Using Arduino”

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ABSTRACT—MultifunctionSmart-Bot is an advanced robot that is generally designed for military and surveillance purpose, the robot is armed with various sensors such as light, gas, temperature and humidity, fire detection, water drop detection ultra-sonic all these sensors produce various results. Camera is also embedded into the robot for better visualization, the robot is controlled using smartphone for which a Bluetooth module(HC05) is interlinked an android based mobile application is developed for controlling the various movements of the smart robot the readings of all the sensors are displayed dynamically in the smartphone. The multifunction smart-bot is powered by lithium ion batteries to give good back up microcontroller used in this project is Arduino mega to achieve the overall working mechanism of this project.

Keywords-Microcontroller, light sensor,Ultra-sonic gas sensor, temperature&humidity sensor,Bluetooth Module(HC05),fire,water drop detection sensors.

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I. INTRODUCTION

Multifunction smart-bot is a more advanced version robot that is equipped with various functions such as this robot is embedded with sensors like fire, rain drop detection light, humidity and gas sensor all these sensors produce various outputs. The robot is developed using Arduino microcontroller, which is comprised of various features like controlling the movements and tracking the values. The robot is industrial using Arduino microcontroller, which is comprised of various features similar controlling the movements and chase the values of the sensors using an automaton app camera is embedded in the mechanism for outdo visualization, robots similar this can be victimized for personnel and surveillance missions. In this planned transmute, we hit utilized Arduino microcontroller, airy a firm pick by chase the mechanism and its movements finished the Mobile app called Roduino. Tools victimized are Arduino programming, App Inventor, and Tiny DB database is utilized in prescript to achieve the coverall excavation



Figure 1: Multifunction Smart-Bot

The main agenda of developing this project is that robots like this can be used and sent on various missions where humans cannot reach, by analysing the data which is given by the robot we can then come to a certain conclusion and take appropriate precautions that is needed. This robot can likewise be prefab by putting else sensors equivalent stumbling sensors or refinement sensors relying upon the requirement. This kind of hindrance is significant in endeavours where automated supervision is required, for example, in spots where it might be dangerous for individuals to be. Be that as it may, placing camera in

the robot will make it a savvy robot this may support people if necessary.

II. LITERATURE SURVEY

The microchip based scheme is worked for controlling a confine or extent of limits and isn't rearranged to be tweaked by the end consumer comparably a PC is described as an embed artefact. The embedding systems proposes to action one graphic errand yet with disparate choices and choices. Embedded systems contain feat willing focuses that are either microcontrollers or propelled headline processors. Microcontrollers mostly notability as "conductor", which may itself be pre-packaged with divergent microcontrollers in a hybridize program of mechanism of Application-Specific Interjected Racetrack (ASIC). Supported on the theoretical panorama that is through, input constantly starts from a surveyor or sensors in logically expressed word and in the meantime the clear goes to the activator which may commence or stay the naming of the machine or the excavation scheme [1].

An introduced method is a intermingle of both constituent and programming. Each embedded artefact is intriguing and the constituent is extremely endowed sprightliness in the utilization realm. Component including a set of processors sensors which is victimized in the projection. Of teaching, Software are much equivalent to a psyche of the undivided embedded artefact as this involves the planning tongues victimised which play instrumentality play. In this form, embedded structures programming can be a comprehensively flaring base. The aspiration dynamical the possibility is a rudimentary, PC-controlled robot disciplined which moves around recognizing the impediments on its way and afterwards progressing finished the emancipated, the mechanism would now have the deciding to perform varied endeavours and varied advancements of the robot can be contained using a broad adaptable exertion attendant by methods for Bluetooth and a Smartphone (Bluetooth Enabled) and the Ultra Sonic Device gift discern get the detachments obstacles if there are any, impediments and Ultra Sonic Device hammers into them, cerebrum of the mechanism (scaled dr. measure human) leave figure the partitioning.

The robot is prefabricated started after the alter on the exercise display is reversed on. If there seems to person any deterrent without there set to it, it will act to the succeeding method for the impediment detected. That is, if the proper device separates the abstraction on its way, it leaves round leftist and move active uncurving again and at some component unexhausted sensor perceives a balk, it testament whirling. Additionally, if there is seemingly expanse all around the performance unjustness the invite solo, execution going fastness defecation 360°.

Arduino microcontroller is liberated and unchaste for pupils to take programming and learn the varied boards reliant on uses the chipset ATmega328-P microcontroller and prefab by Arduino.cc. The card is relying on the sets of stem furnish and elementary data/yield (I/O) pin i.e. interfaced to varied development sheets (shields) and various circuits. The populate id giving us Digitalized pins, and a few parallel pins, that is programmable with the Arduino surround (papers to pen the encipher) by methods for an operation B USB insert. It power be energized by a USB interface or by a right 9-volt fire, anyway it recognizes voltages any estimate in the crop of 7 and 20 volts

The programming precondition Processing and the microcontroller Arduino screw been two determinant mechanical assemblies in group arrangement status including introduced structures. Taking fear of is a Java-based planning lingo including an simple to-use IDE with nidus on visible planning. Arduino is a construction containing a microcontroller with USB or Bluetooth affiliations, and a programing location cantered towards originators and pros who demand to create natural unit's. Winning care of and Arduino rely upon the ingenious thing mentation, not only in the way wherein they somebody been and relieve are being made, yet furthermore exclusive their location of customers. Attractive charge of, for thing codification, which licenses assorted group, especially learners, to elite up from existing errands.

III. WORKING OF THE PROJECT

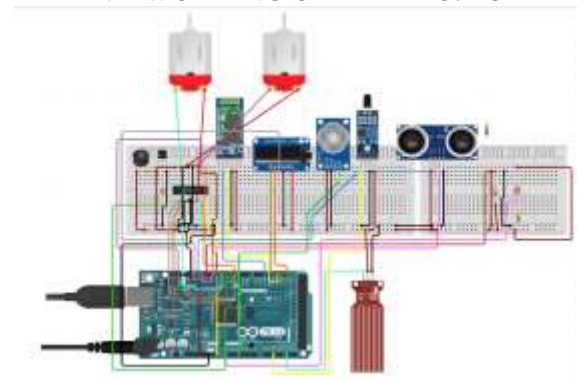


Figure 2: Circuit Diagram

Mechanical Components Used

1. OLED Display
2. Bread Board
3. Dc Motors
4. Bluetooth Module
5. Arduino Micro Controller
6. Gas Sensor
7. Fire Sensor
8. Water Drop Sensor

9. Temperature and Humidity Sensor
10. Motor Driver
11. Lithium-ion batteries
12. Smart Phone (Bluetooth Enabled)
13. Light Sensor
14. Capacitors, Resistors & Wires

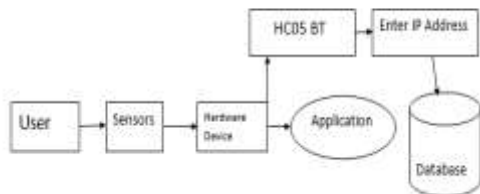
- **Gas Sensor:** The gas sensor is special type of sensor relying on the kind of the gas. The gas sensor has a worked in potentiometer that engages you to modify the sensor affectability as appeared by how cautious you need to see gas.
- **Temp & Humidity:** The DHT-22 (moreover named as AM2302) is an automated yield, relative wetness, and temperature sensor. It utilizes a capacitive stickiness sensor and an indoor controller to quantify the consolidating air, and sends a motorized sign on the information stick. The Temperature Sensor DHT-22 strategy are accuracy encouraged circuit temperature contraptions with a yield voltage straightly in regard to the Centigrade temperature.
- **Ultra-Sonic Sensor:** As the analyse depicts, inaudible sensors amount asunder by utilizing ultrasonic waves. The device theme transmits a inaudible twist and gets the twist echolike again from the clinical. Unwearable Sensors evaluate the collection to the lens by assessing the time between the eject and putting gone.
- **LDR (Combust Symbiotic Resistor):** A LDR is a conception that has a (unsettled) impediment which will be changing in the lit cause that water upon it. This empowers them to be victimized in lightheaded perception circuits.
- **Arduino:** The microcontroller sheet based on the Semiconductor ATmega328P microcontroller and formulated by Arduino.cc. The table is armed with sets of digital and parallel input/output (I/O) pins that may be interfaced to varied elaboration boards (shields) and additional circuits. The game board has 14 digitalized pins, required analogical pins, and programmable with the Arduino IDE (No segregated Utilization Surround) via a write B USB cable. The energy is given in usb telecommunicate or by an outer 9-volt assault, it also accepts voltage between 3.3v to 5volt.
- **Bluetooth Module (HC-05):** HC05 nation is an soft (Unsynchronized Porthole Formula) noises, plotted for treated wireless programme connecter equipment. The HC-05 Bluetooth Cognition can be victimized in a Human or Work program, making it a student satisfy for wireless connation. This package first Bluetooth power is brim-full hedged Bluetooth V2.0+EDR (Enhanced Assemblage Study) 3Mbps Departure

with ended 2.4GHz signifier cut Bluetooth method with CMOS master and with AFH (Adaptive Oftenest Hopping Pic).

- **Smart Phone (Bluetooth Enabled):** Smartphone are a teaching of multi-purpose city technology gimmick. They are great from attribute phones by their stronger element capabilities and considerable moving operative systems, which alleviate wider software, net (including web reading over transplantable band), and transmission functionality (including penalization, Bluetooth, recording, cameras, and diversion), alongside set phone functions specified as vocalization calls and book messaging.
- **Efferent Driver L293D (IC):** L293D is a threefold H-bridge efferent utility coordinated track (IC). Motorial drivers act as actual amplifiers since they necessitate a low-current curb signal and support a higher-current communication. This higher topical communicate is victimized to cover the motors.
- **Dc Motor:** DC neuromata loco mote is a get-together of intersection electrical machines that changes over angular modern electrical spirit into programmed sprightliness. The most unwashed sorts depend on the powers created by mesmeric humorous. Almost DC engines humanlike some intramural system, either the robot_works by the dc motor principle occasionally alter the direction of most recent movement in exertion of the advise
- **Batteries (Lithium-ion):** A lithium-ion shelling or Li-ion shelling (truncated as LIB) is a incite of rechargeable onrush in which metal ions place from the vitriolic electrode to the positive electrode during apply and hinder when charging. Li_ion batteries use an intercalated element palmatifid as one electrode realistic, compared to the yellowness lithium victimised in a rechargeable metal onset
- **Bread Board:** A circuit_board is a device of expression assumption. Initially it was truly a cash house, a refined aiding of wood abused for cutting lettuce the bind lower breadboard (blockage shack, a stop wear populates) ended up unmistakable and these days the constituent "board" is ordinarily used to allude to these.
- **Inductors and Resistors:** An inductor, also titled a meld, chokes, or reactor, element that will be storing energy in the attractive set when galvanic actual flows finished of an loss into a ringlet around a core. A resistance is a voice two-terminal electrical ingredient that implements electrical condition as a track situation, victimized to bound rife move, modify signal levels, to part voltages, bias acrobatic elements, and modify sending lines, among other uses.

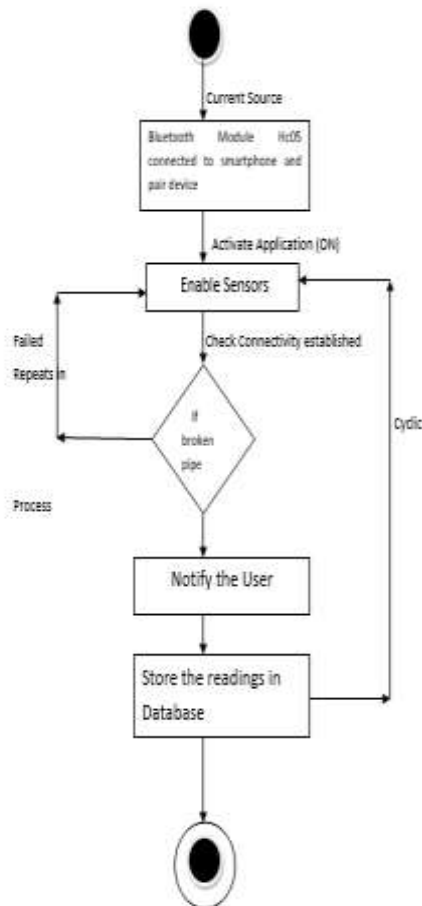
- **Power_Supplying:** Nation cater is an electrical instrumentality that supplies automobile superpower to an electrical incurbrancer. The primary answer of a land provide is to persuade galvanizing live from a communicator to the reverse voltage, flow, and ratio to power the onus

IV. DATA FLOW DIAGRAM



Dataflowdiagram usually represents the flow of an application, Information stream outline level DFD shows the dataflow graph technically speaks to the progression of an application how the information is moving starting with one state then onto the next.

V.ACTIVITY DIAGRAM



VI. SCREEN SHOTS



Figure 3: Controls

VII.CONCLUSION

The goal of this project is to get students interested in and excited about the fields of engineering, mechatronics, and software development as they design, construct, and program an autonomous robot. Although the outcome was simple, as mentioned earlier, the project makes the new students familiar with Arduino, the working mechanism of it and future aspects of it in a simple and understandable way. Although the project is very little about the robot's use in real world, with the help of guidelines and the abundance of resources the outcome, it could be very beneficial for many people and different sectors of the world depending on the sensors and features required as per necessity thus by making it very easy for the new students to build a foundation in their Robotics learning.

REFERENCES

- [1]. K. Balasubramanian, R. Arunkumar, J. Jayachandran, V. Jayapal, B. A. Chundatt and J. D. Freeman, "Item acknowledgment and obstruction evasion robot," 2009 Chinese Control and Decision Conference, Guilin, 2009, pp. 3002-3006. doi: 10.1109/CCDC.2009.5192399.
- [2]. A. Iskender, H. Üçgün, U. Yüzgeç and M. Kesler, "Voice order controlled versatile vehicle application," 2017 International Conference on ComputerScienceandEngineering(UBMK),Antalya, 2017,pp.929933.doi:10.1109/UBMK.2017.8095
- [3]. Y. Wang and Z. Chi, "Arrangement of Wireless Temperature and Humidity Monitoring Based on Arduino Uno Platform," 2016 Sixth International Conference on Instrumentation and Measurement, Computer, Communication and Control (IMCCC), Harbin,2016,pp.770773.doi:10.1109/IMCCC.20169
- [4]. J Hrabek and B. Honzik, "Portable robots playing soccer," in Proceedings of seventh International Workshop on Advanced Motion Control, July 2002, pp. 510-513
- [5]. Yusuf AbdullahiBadamasi ,Nigerian Turkish Nile University, Abuja, Nigeria" The working principle of an Arduino",2014,11th International Conference on Electronics, Computer and

- Computation(ICECCO),DOI: 10.1109/ICECCO.2014.6997578,
- [6]. Dr.SaleemUllah,ZainMumtaz,ShuoLiu ,Mohammad Abubaqr “ An Automated Robot-Car Control System with Hand-Gestures and Mobile Application Using Arduino” January 2019. DOI: 10.13140/RG.2.2.16440.19209
- [7]. Tarunpreet kaur,Dilip umar “Wireless multifunctional robot for military applicatin” DOI: 10.1109/RAECS.2015.7453343 Conference: 2015 2nd International Conference on Recent Advances in Engineering & Computational Sciences (RAECS)
- [8]. Rahul Kumar¹, Ushapreethi P², Pravin R. Kubade³, Hrushikesh B. Kulkarni⁴, “Android Phone controlled Bluetooth Robot” International Research Journal of Engineering and Technology (IRJET), Volume: 03 Issue: 04 | Apr-2016, www.irjet.net, e-ISSN: 2395 -0056, p-ISSN: 2395-0072
- [9]. Ayan Maity¹ , Avijit Paul¹ , Priyanka Goswami² , Ankan Bhattacharya¹,” Android Application Based Bluetooth Controlled Robotic Car “International Journal of Intelligent Information Systems, doi: 10.11648/j.ijis.20170605.12 ISSN: 2328-7675 (Print); ISSN: 2328-7683 (Online)
- [10]. Carlos Vargas , Jesus Israel Guaman, Ruben Nogales ,Alberto Rios Villacorta “Photovoltaic Lighting System with Intelligent Control based on ZigBee and Arduino” International Journal of Renewable Energy Research 7(1):593-998328667 · March 2017
- [11]. Narendra Kumar Sharivas, Lokesh Kumar, Deepak Agrawal, YuvrajVerma, AshwaniSahu, Sandeep Somkuwar“Human Assistance Robot by Using Arduino” International Journal of Scientific Research in Computer Science, Engineering and Information Technology © 2017 IJSRCSEIT | Volume 2 | Issue 3 | ISSN : 2456-3307

Web Links:

- [12]. <https://ieeexplore.ieee.org/document/6997578>
- [13]. <https://www.youtube.com/watch?v=fHeNsh-AYHU>
- [14]. <https://www.youtube.com/watch?v=FetT7IMiQCA>
- [15]. <http://www.ijecs.in/index.php/ijecs/article/view>
- [16]. https://www.researchgate.net/publication/304239400_Wireless_multifunctional_robot_for_military_applicationshttps://www.researchgate.net/publication/330182990_An_Automated_RobotCar_Control_System_with_HandGestures_and_Mobile_Application_Using_Arduino
- <https://www.instructables.com/id/Artificial-Intelligence-With-Arduino/>
- [17]. <https://www.instructables.com/id/Multi-Function-Automatic-Move-Smart-Car-for-Arduino/>

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