

# Canning of Statements in IOT Using Arduino Uno

Selviprithi Kodishwaran, Vijaya Krishnamoorthy, Vignesh Boopathy, Shanmuga Vishnu Sakthivel

**Abstract**— The security of the information is a tough task. But security challenges will be satisfied with Arduino IDE. These techniques are crucial one while addressing user authentication and information privacy. Therefore, once this sensitive information is moving from device to device over the Arduino network, then there's a necessity for coding of the information. Coding conjointly helps to safeguard information from intruders. The information will be simply encrypted with the assistance of cryptography, that is that the method of changing easy text into unintelligible text. The first objectives of the project are confidentiality, integrity, non-repudiation, and authentication. The Elliptic Galois Cryptography (EGC) protocol is introduced. In this protocol, a cryptography technique is used to encrypt confidential data that came from banking and military fields. The sensed data are given as input to the Arduino. Next, by using the Arduino coding the data is encrypted and then it will be decrypted itself by Arduino coding. And the final output is seen through mobile or computer

**Index Terms**— Changing easy text into unintelligible text; Confidentiality; Authentication

**Abbreviations:** EGS-Elliptic Galois Cryptography; GND-Ground; ACL-Asynchronous Connection-Less; LMP-The Link Management Protocol; AVRCP- A/V Remote Control Profile

## I. INTRODUCTION

The Arduino has several alternative microcontrollers and microcontroller platforms obtainable for physical computing. optical phenomenon Basic Stamp, Net media's BX-24, Phi gets, MIT's Handy board, and lots of others provide similar practicality. All those tools take the mussy details of microcontroller programming Associate in Nursing wrap it up in an easy-to-use package. Arduino conjointly simplifies the method of operating with microcontrollers, however it offers some advantage for academics, students, and interested amateurs over alternative systems. Arduino boards are comparatively cheap compared to alternative microcontroller platforms. the smallest amount dearly won version of the Arduino module may be assembled by hand, and even the pre-assembled Arduino modules price but \$50. The Arduino

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package (IDE) runs on Windows, Macintosh OSX, and Linux system} operating systems. Most microcontroller systems are restricted to Windows. The Arduino package (IDE) is easy-to-use for beginners, nevertheless versatile enough for advanced users to require advantage of also. For academics, it's handily supported the process programming atmosphere, thus students learning to program in this atmosphere are aware of however the Arduino IDE works. The Arduino package is printed as open supply tools, obtainable for extension by practiced programmers. The language may be dilated through C++ libraries, and folks needing to perceive the technical details will build the leap from Arduino to the AVR C programing language on that it's primarily based. The plans of the Arduino boards are printed underneath an original Commons license, thus practiced circuit designers will build their own version of the module, extending it and up it. Even comparatively inexperienced users will build the bread board version of the module to know however it works and economize.

## II. MATERIALS

### A. Hardware

- Arduino Board
- Bluetooth device
- Power supply

### B. Software

- Arduino IDE.

## III. EXISTING SYSTEM

Elliptic Galois Cryptography (EGC) protocol for defense against info infiltration throughout transmission over the IoT network. The IOT network transmit info through the planned protocol as a neighborhood of the controller. The formula among the controller encrypts the information exploitation the EGC protocol then they're encrypted. The EGC technique encrypts tip. The data was encrypted by exploitation Triple Des formula

## IV. PROPOSED METHOD

The project to the fashionable age was effectively substitutable with secret writing, the conversion of knowledge from a clear state to apparent nonsense. The mastermind of associate encrypted message shares the key writing technique alone with meant recipients to preclude access from adversaries. the key writing typically uses the names Alice ("A") for the sender, Bob ("B") for the meant recipient, and Eve ("eavesdropper") for the individual. Since the event of rotor cipher machines in warfare I and place on the arrival of computers in warfare II, the ways that within which throughout which accustomed do secret writing became numerous and complicated and its application numerous widespread. it's on paper realizable to interrupt such a system,

however it's not possible to undertake to thus by any known good suggests that. These schemes unit of live thus termed computationally secure; theoretical advances, e.g., algorithms, and quicker computing technology need these solutions to be typically tailored. There exist info on paper that they will preserve schemes that cannot be divided even with unlimited computing power—an example is that the one-time pad—but these schemes unit of live a great deal of sturdy to use in follow than the foremost effective on paper breakable however computationally secure mechanisms. So the encrypted info can receive toward Arduino to user kind owner with correct interference follow of Arduino programming.

### A. Schematic and Reference Style

EAGLE FILES: arduino-uno-Rev3-reference-design.zip  
(NOTE: works with Eagle six.0 and newer)

**NOTE:** The Arduino reference style will use associate degree Atmega8, 168, or 328, Current models use associate degree ATmega328, however associate degree Atmega8 is shown within the schematic for reference. The pin configuration is identical on all 3 processors.

### B. Power

The Arduino Uno is powered via the USB association or with associate degree external power offer. the facility supply is chosen mechanically. External (non-USB) power will come back either from associate degree AC-to-DC adapter (wall-wart) or battery. The adapter is connected by plugging a two.1mm center-positive plug into the board's power jack. Leads from battery is inserted within the Gnd and Vin pin headers of the facility connection. The board will treat associate degree external offer of six to twenty volts. If provided with but 7V, however, the 5V pin may provide but 5 volts and therefore the board could also be unstable. If exploitation quite 12V, the transformer might overheat and harm the board. The suggested vary is seven to twelve volts.

### The power pins square measure as follows:

- **VIN.** The input voltage to the Arduino board once it's exploitation associate degree external power supply (as critical five volts from the USB association or different regulated power source). you'll be able to offer voltage through this pin, or, if provision voltage via the facility jack, access it through this pin. The board is provided with power either from the DC power jack (7 - 12V), the USB connection (5V), or the VIN pin of the board (7-12V). provision voltage via the 5V or three.3V pins bypasses the regulator, and may harm your board. we do not advise it.

- **3V3.** A 3.3 potential unit offer generated by the on-board regulator. most current draw is fifty mA.

- **GND.** Ground pins.

A properly designed defend will browse the IOREF pin voltage and choose the suitable power supply or modify voltage translators on the outputs for operating with the 5V or three.3V.

### C. Memory

The ATmega328 has 32 KB (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

### D. Input and Output

Each of the 14 digital pins on the Uno can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

- **Serial: 0 (RX) and 1 (TX).** Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- **External Interrupts: 2 and 3.** These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. See the `attachInterrupt()` function for details.
- **PWM: 3, 5, 6, 9, 10, and 11.** Provide 8-bit PWM output with the `analogWrite()` function.
- **SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK).** These pins support SPI communication using the SPI library.
- **LED: 13.** There is a built-in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though is it possible to change the upper end of their range using the AREF pin and the `analogReference()` function. Additionally, some pins have specialized functionality:

- **TWI: A4 or SDA pin and A5 or SCL pin.** Support TWI communication using the Wire library.

There are a couple of other pins on the board:

- **AREF.** Reference voltage for the analog inputs. Used with `analogReference()`.
- **Reset.** Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

See also the mapping between Arduino pins and ATmega328 ports. The mapping for the Atmega8, 168, and 328 is identical.

### E. Physical Characteristics

The maximum length and width of the Uno PCB are 2.7 and 2.1 inches respectively, with the USB connector and power jack extending beyond the former dimension. Four screw holes allow the board to be attached to a surface or case. Note that the distance between digital pins 7 and 8 is 160 mil (0.16"), not an even multiple of the 100-mil spacing of the other pins.

### F. Implementation

Throughout the pairing methodology, there will be a combine of devices, they're troublesome to ascertain a relationship to bring into existence a shared secret spoken as a link key. If a link secret is hold on by every device, they are same to be paired or secure. A tool that needs to speak alone with a secure device can cryptographically certify the identity of the alternative device, then confirm that its constant device is paired with. Once a link key has been generated, associate documented Asynchronous Connection-Less (ACL) link between the devices could even be encrypted therefore as that the data that they exchange over the airwaves is protected against eavesdropping. Link keys could even be deleted at any time by either device. If done by either device this may implicitly exclude the bonding between the devices; thus it's potential for one in every of the devices to possess a link key hold on but not bear in mind that it's not secure to the device associated with the given link key. Some services just about rather like the problem Push Profile, elect to not expressly want authentication or cryptography therefore as that pairing does not interfere with the user experience associated with the service use-cases.

**Restricted input devices:** The apparent example of this class of device is to boot a Bluetooth Hands-free receiver, that generally have few inputs. These devices usually have a bunch PIN, as associate example "0000" or "1234", that area unit hard coded into the device.

**Numeric input devices:** Mobile phones unit of live classic samples of those devices. they permit a user to enter a numeric worth up to sixteen digits long.

**Alpha-numeric input devices:** PCs and sensible phones unit of live samples of those devices.

### G. Specifications and Features

The Bluetooth specification was developed as a cable replacement in 1994 by Jaap Haartsen and Sven Mattisson, who were working for Ericsson in Lund, Sweden. The specification is based on frequency-hopping spread spectrum technology. The specifications were formalized by the Bluetooth interest group cluster (SIG). The SIG was formally proclaimed on twenty could 1998. nowadays it's a membership of over nineteen,000 corporations worldwide. it had been established by Ericsson, IBM, Intel, Toshiba and Nokia, and later joined by several different corporations.

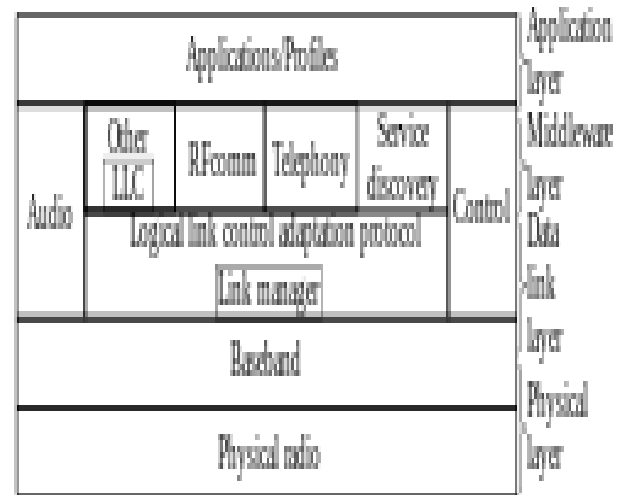
### H. USB Overcurrent Protection

The Arduino Uno has a resettable polyfused that protects your computer's USB ports from shorts and overcurrent. Although most computers provide their own internal protection, the fuse provides an extra layer of protection. If more than 500 mA is applied to the USB port, the fuse will automatically break the connection until the short or overload is removed.

### I. Technical Information

#### BLUETOOTH PROTOCOL STACK

Main articles: Bluetooth stack and Bluetooth protocols



Bluetooth is outlined as a layer protocol design consisting of core protocols, cable replacement protocols, telecom management protocols, and adopted protocols.[58] necessary protocols for all Bluetooth stacks are: LMP, L2CAP and SDP. additionally, devices that communicate with Bluetooth nearly universally will use these protocols: HCI and RFCOMM.

#### LMP

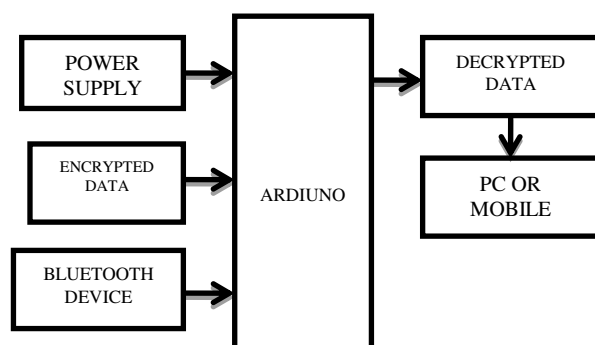
The Link Management Protocol (LMP) is employed for set-up and management of the link between 2 devices. enforced on the controller.

#### AVRCP

A/V Remote Control Profile. unremarkably employed in automobile navigation systems to manage streaming Bluetooth audio. Adopted versions one.0, 1.3, 1.4 & 1.5

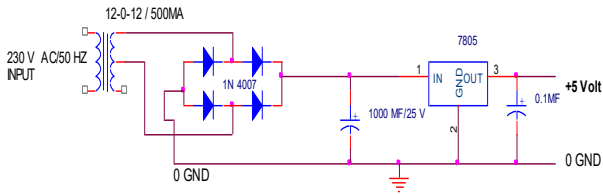
### V. FIGURES

#### BLOCK DIAGRAM



|                             |                                    |
|-----------------------------|------------------------------------|
| Microcontroller             | :ATmega328                         |
| Operating Voltage           | :5V                                |
| Input Voltage (recommended) | :7-12V                             |
| Input Voltage (limits)      | :6-20V                             |
| Digital I/O Pins            | 14 (of which 6 provide PWM output) |

## BLOCK DIAGRAM



## CONCLUSION

Thus, the highly encrypted data is sent from the Arduino. The encryption and decryption are performed by Arduino IDE coding. And the final output is seen through the mobile or pc. In the paper, we proposed a semantic-aware multi keyword ranked search scheme by adopting the Doc2Vec model. Doc2Vec model extracts the features from the document set and can implement semantic search by the features. Traditional schemes ignore the semantic information by adopting the bag-of-words model and cannot fully meet the user's search intention. Also, the dimension of features is much smaller than the scale of the dictionary, which improves the efficiency of our scheme. The real-world experiment shows that our model is superior in search efficiency and accuracy to the TF-IDF based model and the Word2Vec model

## FUTUREWORK

In future, instead of using Arduino board we can use any advanced board. And, we can check the decrypted data in smart watches.

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