Fingerprint sensing gun

Rohitkumar Mukeshbhai Mistri
rohitxedits@gmail.com
JSPM's Imperial College of Engineering and Research, Pune, Maharashtra

Kapil Virbhadra Mathpati
Kapilmathpati9180@gmail.com
JSPM's Imperial College of Engineering and Research, Pune, Maharashtra

ABSTRACT

In this modern age of science and technology, threat to our lives are exposed to lot of unplanned factors , one of them which could being shot by a gun, rather intentionally or not! Fingerprint sensing gun technology can prove to be a great savior for this crisis. It allows fast authentication of one's fingerprint to unlock the gun and use only when necessary. Unauthorized users cannot fire the weapon which itself gives an upper hand to the owner of the weapon. By the use of handful of electronic components, such a gun can be designed. It could prevent children from shooting a family member and untrained individuals.

Keywords—Gun, security, technology, life, threat, shootings, advancement, fingerprint, sensors, protection.

I. INTRODUCTION

In this 21st Century, advancement in technology has led to development in various fields of mankind. Its pros have set the level of achievements for references but the cons are proving threat to human life in some unimaginable way. The unplanned, unintentional shootings happened by children in India as well as in foreign countries was the ultimate reason that the had driven the need for design and development of such a gun.

A 17 year old college going student, a daughter of an army havildar allegedly committed suicide by shooting herself with her father's gun in the night. This incident took place in Baramati ,2017. According to records and reports, an eighteen year old boy brought a firearm to his school in Gurgaon putting 600 other school children in imminent danger. A recent Gulf News Report on India estimated the number of firearms in the hands of Indian Civilians to be a huge 40 million of which only 6.3 million being registered weapons.
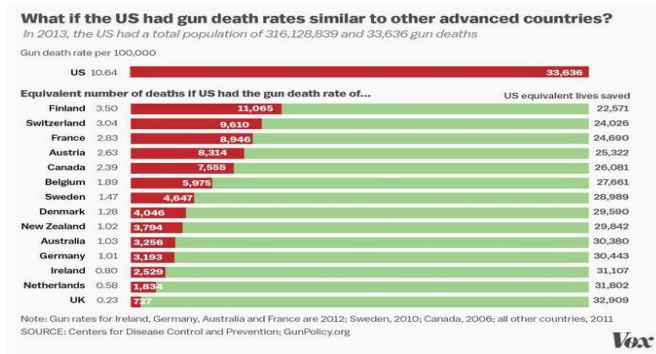
Children of age 0-14 in the US have far highers rates of unintentional fireweapon death rates than children in other developed countries. Approximately 3.3 million children live in their homes with guns loaded and unlocked. And about 70-80% children know the location of the guns in their houses. Just by pulling a small trigger, lives of thousands has been endangered, intentionally orr unintentionally and this has been going on for years and years. In the US, the GUN CONTROL ACT 1968 prohibits individuals under 18 years of age, convicted criminals, the mentally disabled, dishonorably discharged military personell and others from purchasing firearms.

In Canada, about 35 firearms per 100 residents have been noted. In 1989, a student armed with semiautomatic rifle killed fourteen students and injured more than a dozen others at a Montreal engineering school. Several high-profile mass shootings and a sustained rise in gun violence led to the development of such a firearm which could control these things at a much larger scale, at the same time being efficient and harmless as compared to the traditional existent one.

II. FINGERPRINT MECHANISM

The Grove - Capacitive Fingerprint Scanner / Sensor is based on the KCT203 Semiconductor fingerprint recognition module, including a high-performance MCU, a vertical RF push-type fingerprint sensor, and a touch sensing device. This module features many advantages such as small size, small fingerprint template, low power consumption, high reliability, fast fingerprint recognition, etc. The working of capacitive fingerprint sensor is different from ordinary fingerprint sensors as it uses completely different algorithm. Capacitive fingerprint scanners use arrays of tiny capacitor circuits to collect and record data rather than creating a traditional image of the fingerprint.


Arduino UNO R3 is connected to the laptop by the USB cable. The software is installed by doing all the required setups and installing specific libraries. Servo motor and fingerprint scanner code are fed to the system .Initially the weapon is locked. When the user places his finger on the fingerprint sensor, the fingerprint is authenticated by the system during which the sensor shows BLUE light. When the fingerprint does not match with the system, the sensor shows RED light As soon as the fingerprint image matches with the system, the weapon is UNLOCKED and the sensor shows GREEN light. The servo motor rotates 90° and the trigger is free to use. Again the same system can be used to lock the gun which blocks the trigger

Features & Specifications:
- CPU: GD32
- Fingerprint template storage: Max. 100
- Connector: Grove UART
- Sensor resolution: 508 DPI
- Sensor pixel: 160*160
- False Rejection Rate: <1%
- False Acceptance Rate: <0.005%
- Match Response Time(1:N Mode): <350 ms
- Match Response Time(1:1 Mode): <7 ms
- LED Colour: RGB
- Sensor size: Ø 14.9 mm
- Frame size: Ø 19 mm
- Power consumption: Full speed:<40 mA , Sleep:<12 uA
- Operating voltage: 3.3V/5V
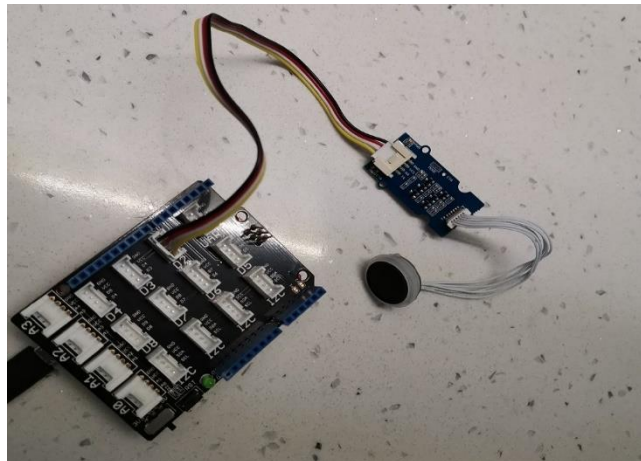- Operating temperature: 20-70°C

Grove Capacitive Fingerprint Sensor Pinout
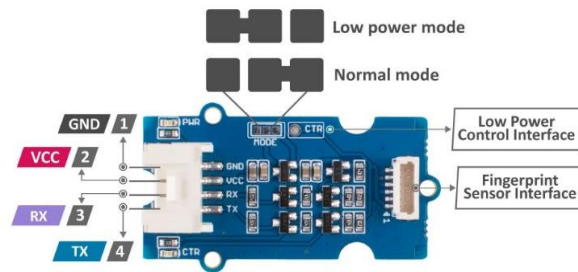
- Connect Grove - Capacitive Fingerprint Scanner/Sensor to port D2 of Grove-Base Shield.
- Plug Grove - Base Shield into Seeeduino.
- Connect Seeeduino to PC via a USB cable

Seeeduino	Grove Cable	Grove - Capacitive Fingerprint Scanner/Sensor
GND	Black	GND
5V or 3.3V	Red	VCC
D3	White	RX
D2	Yellow	TX

III. SOURCE CODE

```
#include "ATSerial.h"
#include "Protocol.h"
#include "KCT202.h"
#include <Servo.h>

#if defined(ARDUINO_ARCH_AVR)
#define debug  Serial
SoftwareSerial uart(2, 3);
FingerPrint_KCT202<SoftwareSerial, HardwareSerial> kct202;

#elif defined(ARDUINO_ARCH_SAM)
#define debug  SerialUSB
#define uart Serial
FingerPrint_KCT202<Uart, Serial_> kct202;
#elif defined(ARDUINO_ARCH_SAMD)
#define debug  SerialUSB
#define uart Serial
FingerPrint_KCT202<Uart, Serial_> kct202;

#else
#define debug  Serial
SoftwareSerial uart(2, 3);
FingerPrint_KCT202<SoftwareSerial, HardwareSerial> kct202;
#endif

Servo servoMotor;
Protocol_oprt oprt;
uint8_t err_code = 0;
uint8_t param[10];
uint32_t param_len;
bool servoActivated = false;
```

IV. LOCK MECHANISM

The main challenge for construction of such a gun is the locking mechanism. It needs a solid framework such that as soon as the user of the gun uses the weapon, it then becomes necessary to again lock it.

Locking of the gun post use is the most important part of this weapon as it will ensure that no one uses it again or it does not fall into wrong hands which is not at all the sole purpose of this project. For the required necessity, a servo motor mechanism would work just perfectly. Due to the controlled motion of the servo motor, the blockage near the trigger could be made. 90° rotation of the servo motor can be ensured by interfacing it with Arduino and providing suitable code for the same.
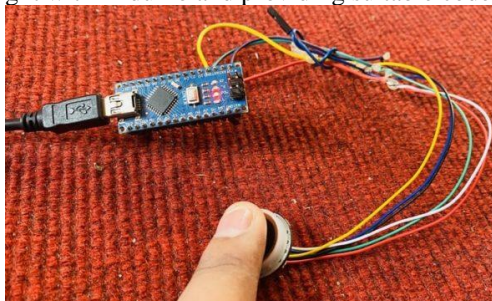
V. CONCLUSION

In conclusion, fingerprint sensing guns provide a range of blessings and challenges within the realm of firearm safety and protection. Those firearms employ biometric era to ensure that handiest legal individuals can function the weapon. By using incorporating fingerprint reputation, clever weapons enhance personal protection, prevent unauthorized access, and reduce the danger of accidental misuse or firearm-related incidents.

The brilliant capabilities contribute to a safer and more responsible method to firearm utilization and human protection.

In the long run, fingerprint sensing guns constitute a ability solution for boosting firearm safety and lowering unauthorized get admission to.

It can show to be a brilliant solution to these days's cutting-edge world regarding big quantity of human lack of confidence and danger to human lives in every thing. This kind of gun with excessive level recognition ought to foster better security views and result in be a technological epitome.

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