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App Controlled Smart Locking System for Advanced Home Security

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Abstract :*Nowadays It Is Hard To Find Right Home Automated Security System In The Market As They Are Too Expensive And May Not Give Sufficient Coverage. In Our Proposed Work Along With Traditional Door Lock – Unlock System, We Have Developed An Exceptionally Improvised System By Which We Can Lock And Unlock Main Door Remotely Without Requirement Of Any Physical Effort Or Need Of A Key. When An Unknown Person Presses The Calling Bell, Immediately The Door Camera Capture His/Her Image And Send The Same To Owner Smart App Using Internet. Owner Can Lock Or Unlock The Door Remotely Through The Secure App Installed In His / Her Smart Phone. The App Has Additional Feature To Take Exterior Image / Video For Monitoring The Activity Going On Outside The Door. The System Has The Capability Of Sending The Notification If The Door - Lock Goes Offline. Our Proposed Internet Of Things Or Iot Based System Facilitate The User Hazard Free, Simple, Robust And Secure Solution For Home Security And Eradicate Manual Effort Towards Door Lock – Unlock Issues.*

Keywords *- Security, Calling Bell, Smart App, Door Locking System, Iot,Internet Of Things.*

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I. Introduction

Nowadays Every Family Is Divided Into Nuclear Families So For The Same House, Making Several Number Of Keys Is Very Common. Security Is The Major Issue Specially When All The Family Members Are Busy With The Outside World And The House Remains Barely Protected. Now Think About Some Daily Life Situation. Let's Say You Are Now Outside Your House, Off To A Market To Buy Something And You Get A Call From Your Best Friend And He Says, "Hey!! Where Are You? I'm Waiting For The Past 10 Minutes Outside Your Door After Pressing The Bell Several Times, Please Open The Door!!!" The Market Is 20 Minutes Far From Your Home. What Do You Do Now? Or Suppose, One Day You Are Out Of Station And Your House Is On Its Own And At That Time Someone Who Is Very Close To You Come From Very Far To Stay At Your House And He / She Has No Place To Live. In This Situation You Can't Do Anything Actually, Because You Have Not Given Your Keys To Anyone. And Your Friend Or Relative Has No Choice. Also When You Are Out For A Tour For No Matter How Many Number Of Days And Your House Is Empty So You Worry About Your House Instead And Waste Your Happy Moment.

With The Smart Lock Now, No Need To Worry About This Type Of Situation. So Your Locking System Will Help You To Open Your Door From Anywhere In The World With Your Permission As Well As You Can See What's Going On In Front Of Your Door Because You Can Get A Picture Of Front View Of Your House Via This Device With The Help Of Cameras Whenever You Are Outside. You Will Also Be Informed Who Is Pressing The Calling Bell And Who Is Spying On Your House. And The Most Interesting Thing Is That If Anyone Tries To Damage Your Main Door Then You And Your Nearest Police Station Will Be Informed With The Picture Of That Person And It Has Also A Fire Alert System And Fire Brigade Will Be Informed If It Finds That The Temperature Is Very High.

II. Related Works

According To Abdallah Kassem Et Al, In Large Apartment Complexes, Fraternities, Or Even For An Owner Having Many Keys For Each And Every Apartment, Car, Or Gate He Owns, Maintaining Entry To Authorized Personnel Only Is A Problem. Besides The Costs Involved In Fabrication, Duplication, And Distribution Of Keys, There Are Security Prob-Lems In Case Of Lost Keys. In This Paper An Innovative Lock System Prototype Using Today's Technologies Will Be Presented. In Their Proposed System, A Central Control Module Is Embedded In The Door Itself, This Is Required To Prevent Additional Complica-Tions And More Robust Mechanism For The Door As A Whole. Technically, This System Embeds Itself In The Local Area Network Of The House. This Adds Extra Security Layers And Prevents Access To The System Only Through The Network.

Furthermore, The Biggest Advantage Of The Proposed System Over Existing Ones Is That It Can Be Easily Installed With Minimal Requirement Of Infrastructures And Planning.[1]

In Another Paper, It Was Proposed A Smart Digital Door Lock System For Home Automa-Tion Equipment That Uses The Digital Information Such As A Secret Code, Semi-Conductors, Smart Card, And Finger Prints As The Method For Authentication Instead Of The Legacy Key System. In Our Proposed System, A Zigbee Module Is Embedded In Digital Door Lock And The Door Lock Acts As A Central Main Controller Of The Overall Home Automation System. Technically, Our Proposed System Is The Network Of Sensor Nodes And Actuators With Digital Door Lock As Base Station. A Door Lock System Pro-Posed Here Consists Of RFID Reader For User Authentication, Touch LCD, Motor Mod-Ule For Opening And Closing Of The Door, Sensor Modules For Detecting The Condition Inside The House, Communication Module, And Control Module For Controlling Other Modules. Sensor Nodes For Environment Sensing Are Deployed At Appropriate Places At Home. Status Of Individual Zigbee Module Can Be Monitored And Controlled By The Centralized Controller, Digital Door Lock.[2]

The Paper By Etzioni Et Al Asserts That The Value Of These Services Can Be Greatly Ex-Tended By Enabling Technology-Neutral Compositions Of These Home Services, And Furthermore That The Reliability Of Such Composite Services Will Be Of Paramount Im-Portance To Ensuring Widespread Deployment. Therefore Fault Management Capabili-Ties Must Accompany The Composition Capabilities In Order To Increase The Robustness And Reliability Of Such Services. This Paper Proposes A Web Services-Based Abstraction Layer For Home Area Network Service Composition And A Semantically Informed Fault Management System For Composed Services, Which Can Assist In Diagnosis And Correc-Tion Of Problems With Composite Services In Smart Homes Of The Future. Prototyping Work And Use Cases Are Also Described And Initial Metrics Are Presented That Investi-Gate The Overhead Of Introducing The Technology Neutral Abstraction Layer. [3]

In Suli Et Al's Paper It Describes A Comprehensive Program Of An Office Building Intel-Ligent Systems Fire Control Linkage System Subsystem Design, At The Same Time, It Describes The Following: The Idea Of The System Designing, The System Components, Selecting Equipment, The Linkage Of Alarming And Controlling Gas Extinguishing, And The Technical Features. [4] In A Bluetooth Based System By M Tanzil Et Al, The Design And Implementation Of A Low Cost But Yet Flexible And Secure Cell Phone Based Home Automation System. The Design Is Based On A Stand Alone Arduino BT Board And The Home Appliances Are Connected To The Input/ Output Ports Of This Board Via Relays. The Communication Between The Cell Phone And The Arduino BT Board Is Wireless. This System Is Designed To Be Low Cost And Scalable Allowing Variety Of Devices To Be Controlled With Minimum Changes To Its Core. Password Protection Is Being Used To Only Allow Authorised Users From Accessing The Appliances At Home. [5]

In A Paper By Ilkyu Ha, Their Proposed System Provides Strengthened Security Func-Tions That Can Transfer Recorded Images To A User's Mobile Device When An Invalid User Attempts An Illegal Operation; It Can Also Deliver Alarm Information To The Mobile Device When The Door Lock Is Physically Damaged. The Proposed System Enables A User To Check The Access Information And Remotely Operate The Door Lock To Enhance Convenience.[6]

According To Another Paper By Luo Et Al They Say How An Unlucky Event Is Often Caused By Human Negligence So They Have Developed A Multiagent Multisensor-Based Security System Or Intelligent Building. The System Can Be Widely Employed In Daily Life And Can Detect Dangerous Situations Using Sensors. The Structure Of The Security System Is Divided Into Four Parts, The Fire Detection/Diagnosis Agent, Intruder Detec-Tion/Diagnosis Agent, Environment Detection/Diagnosis Agent, And Power Detec-Tion/Diagnosis Agent. In This Paper, We Use An Adaptive Data Fusion Method In The Fire Detection/Diagnosis Agent And Use A Rule-Based Method In The Intruder Detec-Tion/Diagnosis Agent. We Use Statistical Signal Detection Theory In The Environment Detection/Diagnosis Agent, And Use A Fault Detection And Isolation Procedure (FDIP) In The Power Detection/Diagnosis Agent. The Security System Has A Four-Variety Detec-

Tion/Diagnosis Agent. Finally, They Implemented These Methods Using Computer Simu-Lation And Achieve Quite Satisfactory Results..[7]

Rosa Et Al In Their Research Have Tried To Produce Ways To Reduce Electricity Consump-Tion. They Have Stated Due To The High Variability Present In The Applications Workload Executed By These Devices, This Management Should Be Executed Dynamically. The Use Of Traditional Dynamic Voltage And Frequency Scaling (DVFS) Techniques Proved To Be Useful In Several Scenarios To Save Energy. Nonetheless, Due To Technology Scal-Ing That Limits The Voltage Variation And Slow Response Of The DVFS Schemes, The Use Of Such Technique May Become Inadequate. As Alternative, The Use Of Dynamic Fre-Quency Scaling (DFS) May Provide A Good Trade-Off Between Power Savings And Pow-Er Overhead. This Paper Proposes A Distributed DFS Scheme For Noc-Based Mpsocs. Both Noc And Pes Have An Individual Controlling Scheme. The DFS Scheme For Pes Takes Into Account Its Computation And Communication Load To Dynamically Change The Operating Frequency. In The Noc, The DFS Controller Uses Packet Information To Decide The Router Operating Frequency. Real And Synthetic Applications Were Used To Evaluate The Proposed Scheme. Results Show That The Number Of Executed Instruc-Tions Is Reduced Up To 41%, With An Execution Time Overhead Up To 18%. The Power Dissipation Is Reduced In Pes Up To 26% And In The Noc Up To 76%. [8]

III. Proposed Work

Working Principle

In This System Two Servers Is Being Used With Two Different Threads To Maintain The Traffic. So Main Server Is Running On Port 9000 And Backup Server Is Running On 9999 (Figure-1). Servers Are Also Connected To The Database Containing The Records Of Users And Devices.

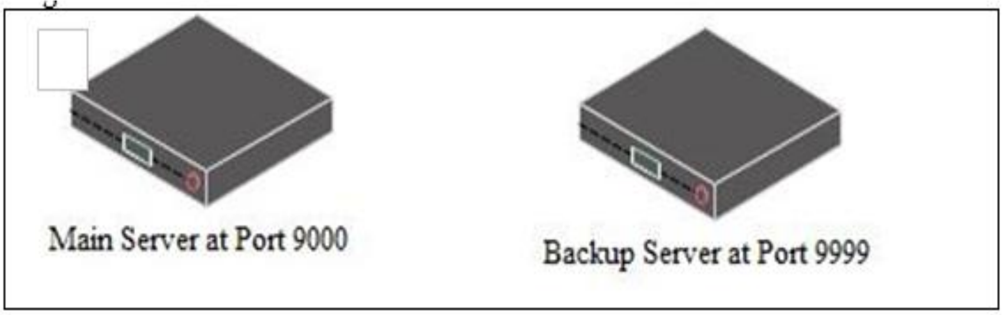


Figure 1 - Two Server Is Running In Different Port

Whenever A Lock Comes Online, First That Lock Connects To The Main Server And Sends Its User ID And MAC Address To The Server. Then Server Verifies The MAC Address And User ID From The Database. If The MAC Address Is Not Present In Database Then Connection Will Be Denied By The Main Server (Figure-2).

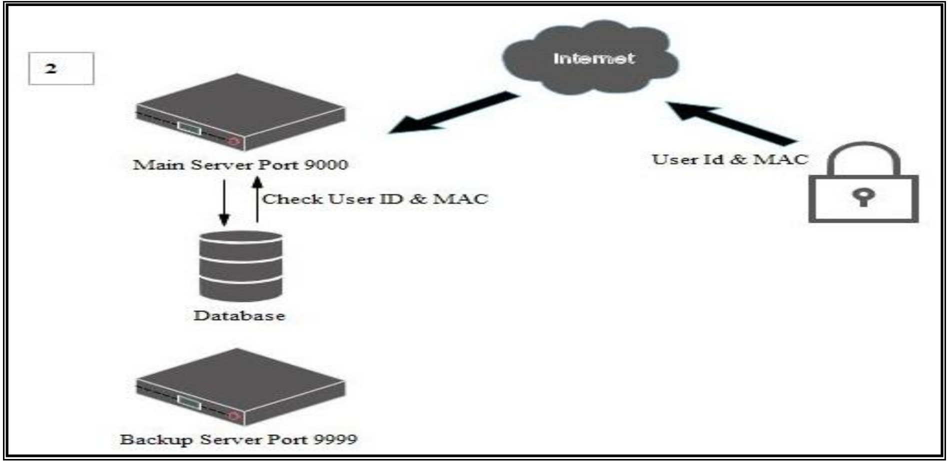
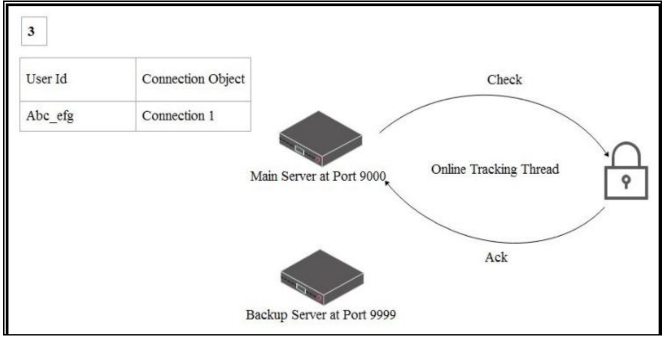


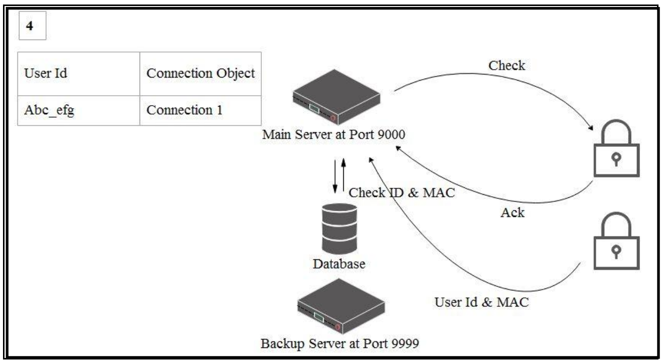
Figure 2 - First Lock Is Connecting To Main Server.

After Verification The Main Server Puts The Connection Object Inside A Dictionary (Which Contains Data As Name Value Pair) And Starts An Online Tracking Thread For That Server Which Sends A Check Message And Waits For Three Seconds For The Acknowledgment (Figure-3). If The Main Server Does Not Receive Any Acknowledgment Within Three Seconds Then Server Destroys The Connection Object Of That Lock And Sends An Email To Owner Of That Lock Device As We; As It Send A Push Notification To The Owner And Members Application.



User Id	Connection Object
Abc_efg	Connection 1

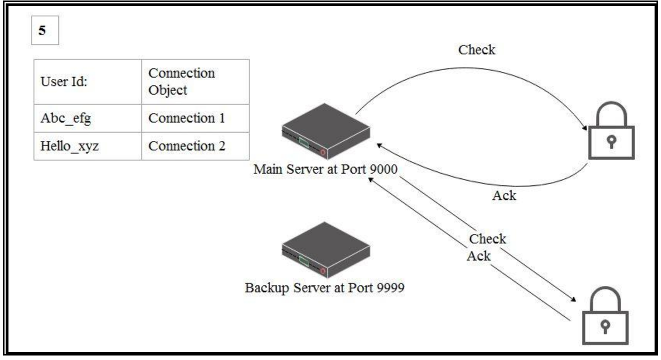
Figure 3 - Connection Is Established



User Id	Connection Object
Abc_efg	Connection 1

Figure 4 - Second Lock Is Connecting To Main Server.

All The Process Repeats Whenever A New Lock Device Becomes Online (Figure-4). Server Always Keeps The Dictionary Updated With The Lock Device Connection And Disconnection (Figure-5).



User Id:	Connection Object
Abc_efg	Connection 1
Hello_xyz	Connection 2

Figure 5 - Second Locks Connection Is Also Established.

Whenever Users Want To Lock And Unlock (Or Any Other Operation) The Door They Need To Click On That Button (The App Has Dedicated Button For Each Operation).

When User Touches Or Tap On The Button, The App Sends A JSON Object Containing Unique Android ID, Unique User ID, Email ID And Request Of That Operation To The Main Server. Now Main Server Checks The Unique Android ID From The Database. If That Is Not Valid The Server Simply Refuses The Request. If The Unique Android ID Is Valid One, Then Server Retrieves The Connection Object Using The

User ID From The Dictionary (Which Contain The Data As Name Value Pair) And Sends The Request And Email ID. Lock Device Performs The Operation When It Receives That Forwarded Request (Figure-6).

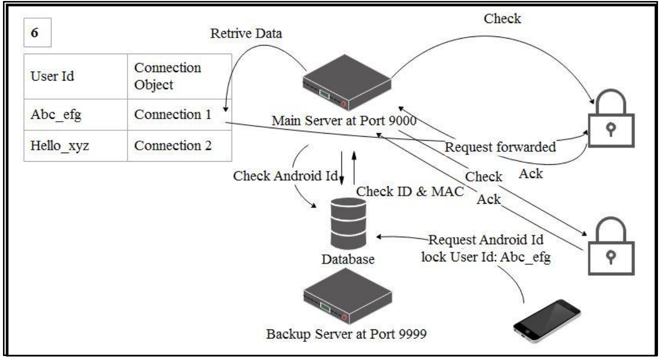


Figure 6 – One Phone Is Requesting For Service

Whenever The Request Is Related To The Image, After Taking Image, The Lock Saves The Image In Internal Storage And Then For Security It Connects To The Backup Server And Uploads That Image (Figure-7).

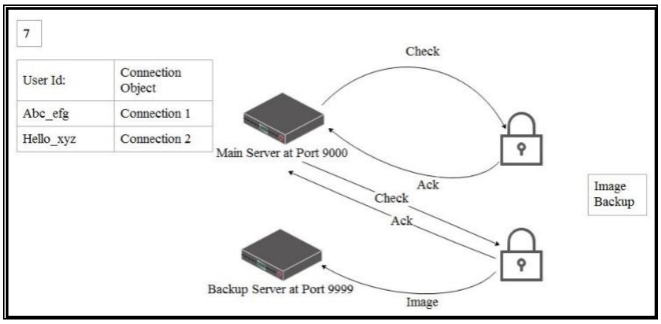


Figure 7 - The Lock Is Backing Up Taken Image.

If Someone Press The Doorbell Lock Take A Photo Of The Person Immediately And Upload It To The Main Backup Server And Server Send A Notification To The House Owner And Members.

IV. Algorithm

Server Algorithm

Lockdevice Class:

1) Initialize Function:
a) Take Connection Object Device IP, Username, MAC As Parameter.
b) Create A Object Of Database.
c) Update The Global Connection Dictionary By This Connection.
d) Update Online Device Table In Database.
e) Call Class Function Createdirectory.
f) Start A New Thread Of Class Function Onlinetrack And Pass Boolean True As Argument.
g) Send Push Notification To The Owner And Other Member.
2) Onlinetrack Function:
a) Take Loop Control As Parameter.
b) Create A JSON Object With ‘Message ’ Key.
c) If Loop Control Is True.
i. Send JSON Object To The Lock.
ii. Wait And Receive JSON Object As Reply From Lock Device.
iii. Decode JSON Object.
iv. If The Reply Is Not ‘Online’
1. Set Loop Control False.
v. If Any Exception Occurs
1. Set Loop Control False.

3) Createdirectory Function:
a) If ‘Serverbackup/Username’ Path Not Exist.
i. Create A Directory By Username.
4) Delete Function:
a) Delete The Device Name From Onlinedevice Table.
b) Call Send Email Function For Disconnect Alert.
c) Send Push Notification To The Owner And Other Members.
d) Remove The Connection Object From Global Connection Dictionary.

Backupserver Class:
1) Initialize Function:
a) Create A Object Of Database Class.
b) Create A Object Of Socket.
c) Call The Function Backupserverconnectionhandler.
2) Backupserverconnectionhandler Function:
a) If Backupservercontrol Is True.
i. Accept Connection.
ii. Start A New Thread For Backup Function And Send Connection As Argument.
3) Backup Function:
a) Receive The JSON Object From Client.
b) Decode JSON Object.
c) Open A File With File Name From JSON Object Inside Usersname Directory
i. Fetch File Content.
ii. If File Content Is Empty
1. Close File.
iii. Write The File.
d) Insert The Backup Details In To The Database.
e) If JSON Object ‘Email’ Key Is Yes.
i. Send Email To The Owner With The Image As Attachment.
f) If JSON Object Key ‘Bell’ Is Yes.
i. Send A Push Notification With The Image.
g) Otherwise.
i. Call Submitnotification Function From Database Object.

Connectionhandler:
1) Receive JSON Object From From Client.
2) Decode That JSON Object Into Dictionary.
3) Create A Object Of Database Class.
4) If The Device Is Phone
a) If Android ID Is Registered As Owner Or Member.
i. If The Lock Is Online
1. Call Connctionforward Function In A New Thread And Pass Request, Email ID, Username, Connection Object As Argument.
ii. If The Lock Is Not Online.
1. Reply To The Client Ofline.
b) If Android ID Is Not Registered.
i. Reject The Request.
5) If The Device Is Lock Device.
a) If The MAC Of The Device Is Registered.
i. Create A New Object Of Lockdevice And Send Connection Object, IP Address, Username, MAC As Argument.
b) If The MAC Is Not Registered.
i. Reject The Request.

Main Function:
1) If ‘Serverbackup’ Directory Not Exist.

```
    a)  Create A Directory ‘Serverbackup’
2)  Declare The Global Connection Dictionary.
3)  Start Backup Server In New Thread.
4)  Start Main Server.
5)  Start Infinite Loop
    a)  If Keyboard Interrupt
        i.   Stop Main Server.
        ii.  Stop Backup Server.
        iii. Call Delete All Online Device From Database Object.
    b)  Accept Request.
Start Conncetionhandler Function In A New Thread And Pass Address And Connection Object As Argument.
```

V. Device Algorithm

***Main**:*

```
1)  Create A JSON Object With String ‘Devicetype’, Username, MAC Address.
2)  Connect To The Main Server.
3)  Send The JSON Object.
4)  Start The Calling Bell Function In A New Thread.
5)  Start A Infinite Loop.
    a)  If Any Keyboard Exception.
        i.  Stop The Calling Bell Thread.
        ii. Close The Connection To Server.
    b)  Receive The Request From Main Server.
    c)  If The Request Is Online Check.
        i.  Send Reply To The Server ‘Online’.
    d)  If The Request Is ‘Lock’.
        i.  Lock The Door.
    e)  If The Request Is ‘Unlock’.
        i.  Unlock The Door.
    f)  If The Request Is ‘Takeimage’.
        i.  Call Takeimage Function Is A New Thread And Pass Requested Email ID And Boolean Type False As Argument.
    g)  If The Request Is ‘Email’.
        i.  Call Takeimage Is A New Thread And Pass Requested Email ID And Boolean Type True As Argument.
```

Callingbell

```
1)  If Lockactivator Is True
    a)  Wait For Button Press.
    b)  If Pressed.
        i.   Capture Image.
        ii.  Call Sendimage Function And Send Bell=True As Argument.
        iii. Go To Step (A).
```

Takeimage

```
1)  Take Email ID And Email As Parameter.
2)  Capture A Image.
3)  If Email Is True.
    a)  Call Sendimage Function And Send Email ID And Email As Argument.
4)  If Email Is Not True.
    a)  Call Sendimage Function And Send Email ID As Argument.
```

Sendimage

```
1)  Take Email ID, Email, Bell As Parameter.
2)  Retrieve The File Name.
3)  Create A JSON Object Containing File Name, Username, Email ID.
```

```
4)	Connect To The Backup Server.
5)	Send The JSON Object.
6)	Open The File.
7)	Read The File And Send To The Backup Sever.
8)	Close The Connection.
```

VI. Phone Application Algorithm

***Main Activity*:**

```
1)	Create A Request JSON Object.
2)	If Lock Button Taped.
    a)	Add Device Type Phone In In Request JSON Object.
    b)	Add Username In Request JSON Object.
    c)	Add Android ID In JSON Object.
    d)	Add Email ID In Request JSON Object.
    e)	Add Request ‘LOCK’ In Request JSON Object.
    f)	Convert JSON Object To String.
    g)	Start A New Thread Of Send Class And Pass Request JSON String.
3)	If The Unlock Button Tapped.
    a)	Add Device Type Phone In In Request JSON Object.
    b)	Add Username In Request JSON Object.
    c)	Add Android ID In JSON Object.
    d)	Add Email ID In Request JSON Object.
    e)	Add Request ‘UNLOCK’ In Request JSON Object.
    f)	Ask User To Confirm.
    g)	If User Tap In Yes.
        i.	Convert JSON Object To String.
        ii.	Start A New Thread Of Send Class And Pass Request JSON String.
4)	If Take Image Button Is Tapped.
    a)	Add Device Type Phone In In Request JSON Object.
    b)	Add Username In Request JSON Object.
    c)	Add Android ID In JSON Object.
    d)	Add Email ID In Request JSON Object.
    e)	Add Request ‘Takeimage’ In Request JSON Object.
    f)	Start A New Thread Of Send Class And Pass Request JSON String.
5)	If Email Image Button Is Tapped.
    a)	Add Device Type Phone In In Request JSON Object.
    b)	Add Username In Request JSON Object.
    c)	Add Android ID In JSON Object.
    d)	Add Email ID In Request JSON Object.
    e)	Add Request ‘Email’ In Request JSON Object.
    f)	Start A New Thread Of Send Class And Pass Request JSON String.
```

Send Class

```
1)	Take Request JSON String As Parameter.
2)	Connect To The Main Server.
3)	Send The JSON String.
4)	Get The Response.
5)	Update The Status Display By Response.
```

VII. Result Analysis

Tool Used For Experiment Setup

This Can Be Implemented Using Following Materials-

1. Laptop, 2. Raspberry Pi 3 Model B, 3. Stepper Motor, 4. PI Camera, 5.Power Bank6. Android Smart Phone

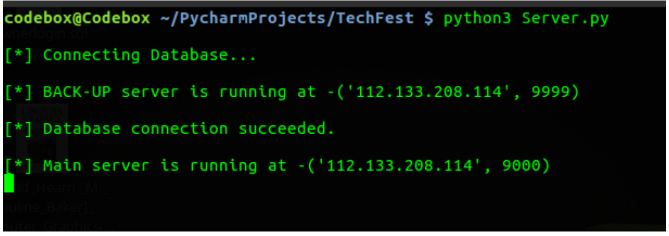
Here We Used One Laptop Running On Linux Mint 18.1 As A Server Machine Which Was Connected With A Public IP Address And Also Running The Server Program. One Android Smart Phone Power By Android 7.1.2 Nougat Used As Lock Device Controller. And One Raspberry Pi 3 Model B Is Used As A Lock Device The

Raspberry Pi 3 Was Connected With Pi Camera And One Stepper Motor Was Also Connected With The GPIO Pins And This Stepper Motor Was Attached To A Metal Bar Via A Gear. One Power Bank Was Used As A Power Supply Of That Device. The Raspberry Pi 3 Was Connected With The Wi-Fi Router.

In Raspberry Pi The Pi Camera Was Working As Main Door Camera And The Locking Function Was Programmed In Such A Way That Whenever It Receives LOCK String It Rotate The Stepper Motor Clockwise And When It Receives UNLOCK String It Rotates The Stepper Motor Anticlockwise.

Server Starting

Main Server And Backup Server Is Started And They Are Running On Different Port And Thread. Connection With Database Is Also Established (Figure 8).

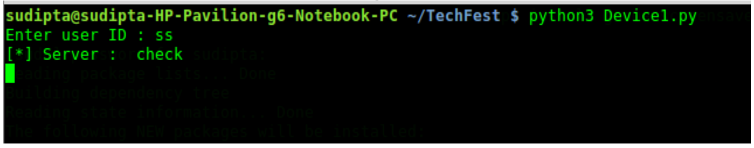


```
codebox@Codebox ~/PycharmProjects/TechFest $ python3 Server.py

[*] Connecting Database...

[*] BACK-UP server is running at -('112.133.208.114', 9999)

[*] Database connection succeeded.

[*] Main server is running at -('112.133.208.114', 9000)
```

Figure 8 - Starting Server.

Lock Device Starting

One Lock Device Is Connected To The Main Server (Figure 8).

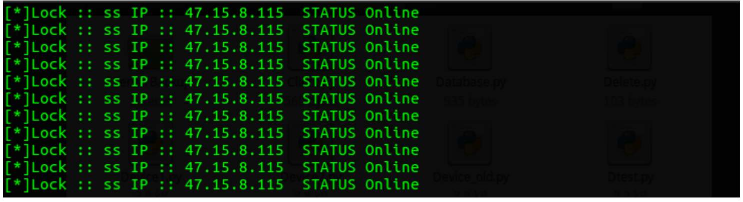


```
sudipta@sudipta-HP-Pavilion-g6-Notebook-PC ~/TechFest $ python3 Device1.py
Enter user ID : ss
[*] Server :  check
```

Figure 9 - Starting Lock Device.

Online Tracking Of All Device

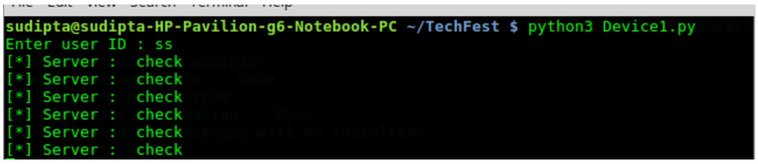
Main Server Send A Check Message To The Clients (Lock Devices) And Waits For Three Seconds For The Acknowledgement (Figure 10).



```
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
```

Figure 10 - Online Tracking Server Side.

Client (Lock Device) Receives The Check Message And Sends An Acknowledgment For Each Check Messages (Figure 11).



```
sudipta@sudipta-HP-Pavilion-g6-Notebook-PC ~/TechFest $ python3 Device1.py
Enter user ID : ss
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
```

Figure 11 - Online Tracking Client Side**.**

Android Application

This Is The Graphical User Interface Of Android Application. Each Button Is Dedicated For Each Operation To That Specific Device Which Is Registered With This Android Device (Figure 12).

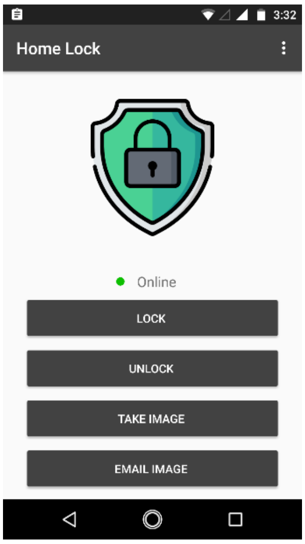
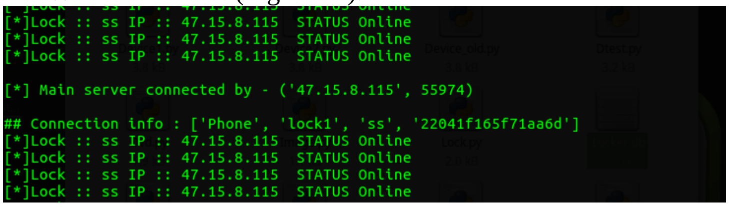


Figure 12 - User Interface Of The Android App.

Request Forwarding From Server

After Getting Request From The Phone, Server First Verifies The Device And Then Sends The Request To The Lock Which Is Registered With This Phone (Figure 13).

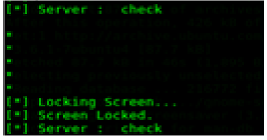


```
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online

[*] Main server connected by - ('47.15.8.115', 55974)

## Connection info : ['Phone', 'lock1', 'ss', '22041f165f71aa6d']
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
```

Figure 13 - Request Forwarding By Server For Locking.

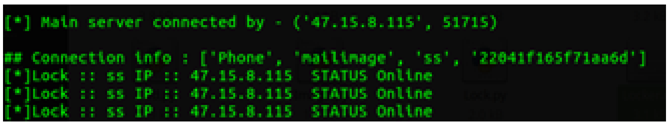
Lock Device Receiving The Forwarded Request

The Lock Device Works On The Request Which Is Forwarded By The Server (Figure 14, Figure 16). This Is The Lock Request Which Is Forwarded By Server (Figure 14).The Server Received A Mail Image And It Is Forwarded (Figure 15).



```
[*] Server :  check
-
-
-
-
-
[*] Locking Screen...
[*] Screen Locked.
[*] Server :  check
```

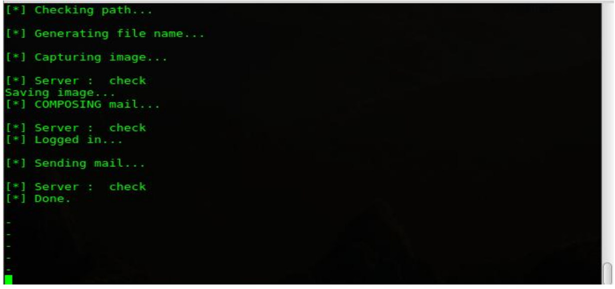
Figure 14 - Locking



```
[*] Main server connected by - ('47.15.8.115', 51715)

## Connection info : ['Phone', 'mailImage', 'ss', '22041f165f71aa6d']
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
```

Figure 15 - Request Forwarding By Server For Email The Image.

After Receiving The Lock Device Is Working On The Mail Image Request (Figure 16).

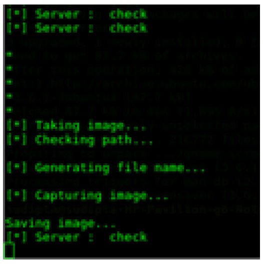


```
[*] Checking path...

[*] Generating file name...

[*] Capturing image...

[*] Server :  check
Saving image...
[*] COMPOSING mail...

[*] Server :  check
[*] Logged in...

[*] Sending mail...

[*] Server :  check
[*] Done.

-
-
-
-
-
```

Figure 16 - Device Is Sending The Image**.**

Backup

The Lock Device Receives A Request To Take Image (Figure 17, Figure 18) And The Lock Captured The Image By The Door Camera (Figure 18).



```
[*] Server :  check
[*] Server :  check

-
-
-
-
-
[*] Taking image...
[*] Checking path...

[*] Generating file name...

[*] Capturing image...

Saving image...
[*] Server :  check
```

Figure 17 - Lock Device Is Taking The Image.

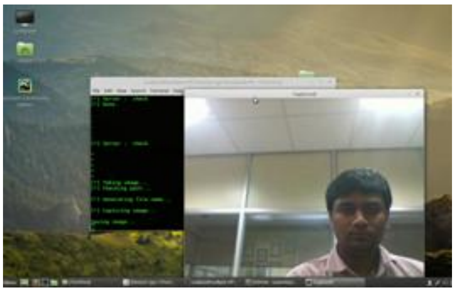
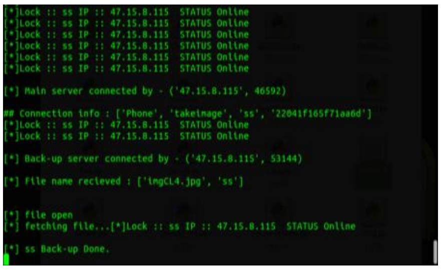
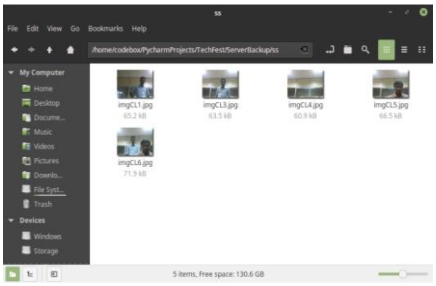


Figure 18 - The Image Of The Person Is Taken By The Lock.



```
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online

[*] Main server connected by - ('47.15.8.115', 46592)

## Connection info : ['Phone', 'takeImage', 'ss', '22041f165f71aa6d']
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online

[*] Back-up server connected by - ('47.15.8.115', 53144)

[*] File name recieved : ['imgCL4.jpg', 'ss']


[*] file open
[*] fetching file...[*]Lock :: ss IP :: 47.15.8.115  STATUS Online

[*] ss Back-up Done.
```

Figure 19 - Image Backing Up To The Server.



ss

/home/codebox/PycharmProjects/TechFest/ServerBackup/ss

imgCL1.jpg 65.2 kB
imgCL3.jpg 63.5 kB
imgCL4.jpg 60.9 kB
imgCL5.jpg 66.5 kB
imgCL6.jpg 71.9 kB

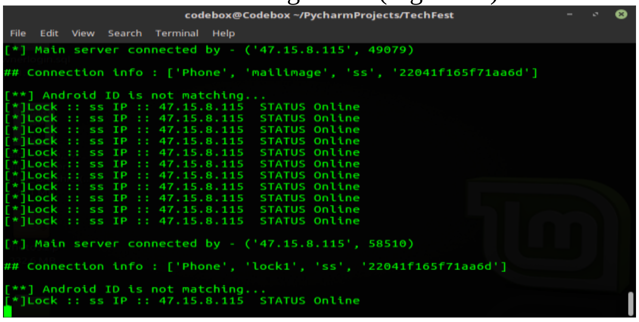
5 items, Free space: 130.6 GB

Figure 20 - After Backup Inside Server

After Taking The Image The Lock Device Is Sending The Image To Backup Server (Figure 19).After Uploading, The Image Is Now Available Inside The Serverbackup/Ss Directory (Figure 20).

Request From Unknown Devices

The Request Is Rejected When The Device Is Not Registered (Figure 21).



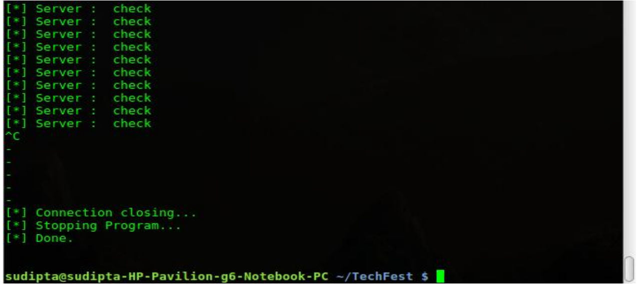
codebox@Codebox ~/PycharmProjects/TechFest

```
[*] Main server connected by - ('47.15.8.115', 49079)

## Connection info : ['Phone', 'mailImage', 'ss', '22041f165f71aa6d']

[**] Android ID is not matching...
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online

[*] Main server connected by - ('47.15.8.115', 58510)

## Connection info : ['Phone', 'lock1', 'ss', '22041f165f71aa6d']

[**] Android ID is not matching...
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
```

Figure 21 - Request From Unregistered Phone.

Lock Devices Stopped

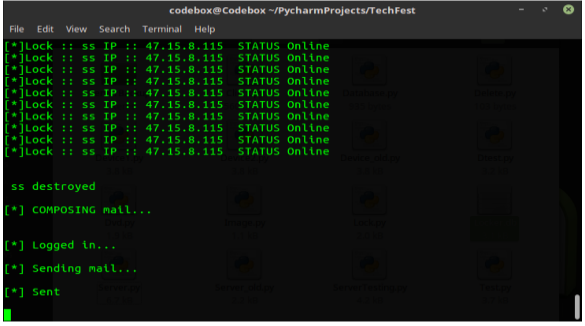
The Lock Device Is Stopped (Figure 22).



```
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
[*] Server :  check
^C
-
-
-
-
-
[*] Connection closing...
[*] Stopping Program...
[*] Done.

sudipta@sudipta-HP-Pavilion-g6-Notebook-PC ~/TechFest $
```

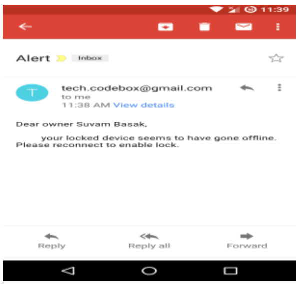
Figure 22 - Lock Device Is Shutting Down.

After It Is Seen That Acknowledgement Is Missing Server Destroys The Connection Object And Sends An Email To The Owner Of That Lock (Figure 23 Figure 24).



```
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online
[*]Lock :: ss IP :: 47.15.8.115  STATUS Online

 ss destroyed

[*] COMPOSING mail...

[*] Logged in...

[*] Sending mail...

[*] Sent
```

Figure 23 - When Lock Device Get Disconnected.



tech.codebox@gmail.com
to me
11:38 AM View details

Dear owner Suvam Basak,

your locked device seems to have gone offline. Please reconnect to enable lock.

Figure 24 - Owner Received A Mail When His/Her Device Goes Off Line

VIII. Conclusion

This System Of Advanced Door Lock Security Is The Current State Of Research In The Problem Of The World. Different Devices Using For Home Security, Our Goal Is To Use Only Device That Is Mobile Which Covers All The Functionality And Capability. Integra-Tion Of Different Parts And Their Solution Can Be Developed With Current Devices And Applications. Different Applications Have Been Developed In This Field Via Computer With PORT. Used Computer And Develop Inbuilt Application And Computer Is Taking Care Of It.

Using Mobile Device, A Complete Individual System Which Has All The Features Combined Like Audio , Video With Communication Devices With Wi-Fi And Bluetooth. Devel-Op All Applications For Mobile Which Works On Mobile Server For The Users. Amongst These, This Will Be A Remarkable And Useful Innovation To Mankind.

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