

**Course Code: ETISR102**

**Course Title: Independent Study and Research II**

# Application of AdHoc Network in Homes

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Formatting Guidelines to Students

Font Face: Times New Roman, Font Size: 12, Alignment: Justify, Line Gap: 1.15, Font Color: Black, Diagram: Must have number e.g. **Fig. 1. Description of the Figure**, Table: Must Have Table Number e.g. **Table 1. Description of the Table**

## Section One: Synopsis

### 1.1. Print out of View Synopsis from AMIZONE Profile

The screenshot displays the AMIZONE web application interface. The header features the AMIZONE logo and the text "AMITY INTRANET ZONE". On the right, there are links for "Help" and "Change Password", and a user profile section for "Mr Malayani Senapati" with the date and time "Sunday, April 15, 2018 7:29:41 PM".

The left sidebar contains a navigation menu with the following items: Home, My Academic Planning Worksheet, My Calendar, Time Table, My Courses, My Faculty, NTCC, Digital Library, Registration, Downloads, Examination, Fee Bills & Receipts, Suggestion Box, My Profile, Student Achievements, Videos, Hostel, Research Notice, Register for Wifi, and Withdrawal.

The main content area is titled "Synopsis" and contains a "Print Preview" button. The synopsis is organized into sections:

- I) Project Duration : (59 Days)**
  - a. Date of Summer Internship commencement (12/02/2018)
  - b. Date of Summer Internship completion (12/04/2018)
- II) Topic**

Introduction and Application of AdHoc network systems
- III) Project Objective**

To define, explain and simulate a virtual AdHoc network example in a network simulation software.
- IV) Methodology to be adopted**

AdHoc networking method specifies no central controlling device and has a mobile and dynamic topology.
- V) Brief Summary of the project**

AdHoc networking used in Home's network system to make it smart and also relate to IoT. Hence smart Homes. It's a portrayal of futuristic homes.

### 1.2. Certificate from External/Industry/Trailing Institute/Organization, if any

## **Section Two: Weekly Progress Activities**

### **Activities**

<b>Week One</b>	<b><u>Discussion and selection of topic related to Networking.</u></b>
<b>Week Two</b>	<b><u>Basic learning and research on AdHoc Networks.</u></b>
<b>Week Three</b>	<b><u>Designing a Home AdHoc.</u></b>
<b>Week Four</b>	<b><u>Implement the design in a 3D Software.</u></b>
<b>Week Five</b>	<b><u>Code a Java Program to show a simple Door Opening Detection.</u></b>
<b>Week Six</b>	<b><u>Drafting and Final improvements on the report.</u></b>
<b>Week Seven</b>	<b><u>Drafting and completing the Presentation.</u></b>
<b>Week Eight</b>	<b><u>-</u></b>

## **Section Two: Weekly Progress Activities**

### **Week One**

#### **Discussion and selection of topic related to Networking.**

The first week went by searching for innovative and new topics related to Networking. A lot of topics like Ad-Hoc Networking, Internet of Things etc. popped up.

Selection of an innovative and new topic was necessary to make a unique project which would stand out from the others. So I decided to choose Ad-Hoc Networking application and asked for help from the mentor.

## **Section Two: Weekly Progress Activities**

### **Week Two**

#### **Basic learning and research on AdHoc Networks.**

Learning before implementation of a project always helps a lot. I started looking up Ad-Hoc network from various websites and books. The most preferred books and websites are mentioned in the reference materials section.

Looking up journals and conference papers would have been helpful but I decided to not look into any because Home Automation is very much redundant in accordance to journals and hence may become a plagiarised project. Hence I didn't consult any conference paper or journals.

## **Section Two: Weekly Progress Activities**

### **Week Three**

#### **Designing a Home AdHoc.**

I drafted a rough design of a home Ad-Hoc network and started improvising on it. The designing phase wasn't time taking but placing the devices in different parts of the home and keeping in mind the distance from each other took quite a while to finish.



## **Section Two: Weekly Progress Activities**

### **Week Four**

#### **Implement the design in a 3D Software.**

I chose “Sweet Home 3D” in Ubuntu Mate OS to implement the design of the home AdHoc network. The software didn’t have complete packages of every device, hence the representing devices were different and were named according to the device it had to portray.

The software rendered in a 3D format and the design was exported in SVG and PNG format which are used in the Output Section.

## **Section Two: Weekly Progress Activities**

### **Week Five**

#### **Code a Java Program to show a simple Door Opening Detection.**

Java applet was used in implementation of the Door Open-Close System with an integrated Fingerprint Scanning system. If the door is opened, a timer of one minute goes off; within that time if the user successfully enters a registered fingerprint then the timer is stopped else the alarm sounds. The alarm can be stopped by entering a registered fingerprint or through the smart phone of the user.

The Java code is mentioned in the Code section of this report.

## **Section Two: Weekly Progress Activities**

### **Week Six**

#### **Drafting and Final improvements on the report.**

The report was drafted in a format which was provided by Amity University and several changes were made according to the project and as asked by the guide in charge.

## **Section Two: Weekly Progress Activities**

### **Week Seven**

#### **Drafting and completing the Presentation.**

The PowerPoint presentation was made over the template provided by Amity University including the details of the project in a visually improved manner.

## **Section Two: Weekly Progress Activities**

### **Week Eight**

#### **Conclusion.**

The work was completed before proceeding into the last week.

### Section Three: Deliverables or/and Output

3.1.

Output / Deliverables are distributable	Yes	✓	No	
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**Note:** If yes, attach a DVD containing your deliverables, and Software (Free) below the cover page of the report.

### 3.2. Description of Deliverables/Output:

There are two types of Deliverables and Outputs in this section of the report. Figures A and B depict the design of the Home's AdHoc Network in a PNG Format drafted in a 3D software. Figures C, D and E are the outputs of the Door Detection System.

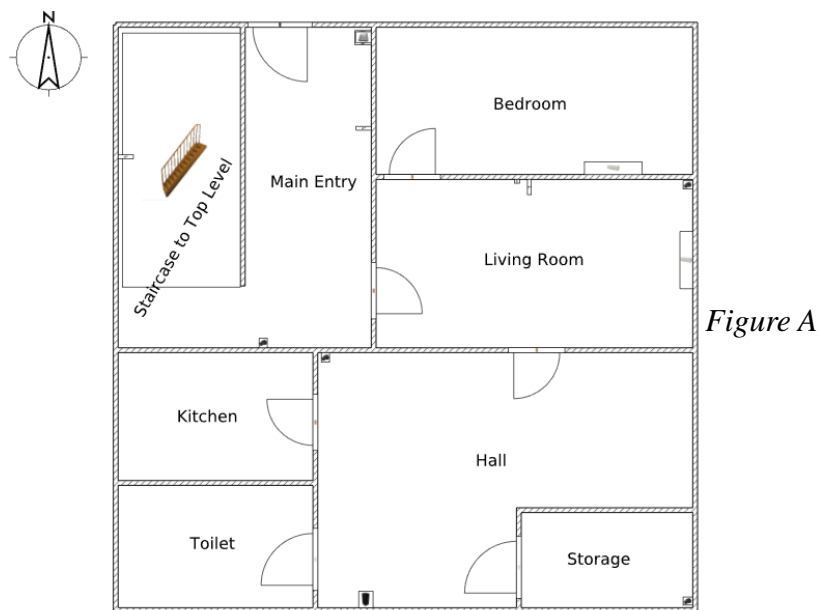


Figure A shows the Level Zero of the Home where the AdHoc Network is configured. The devices used are :- a) 4 CCTV Cameras (Wi-Fi and IP Enabled)

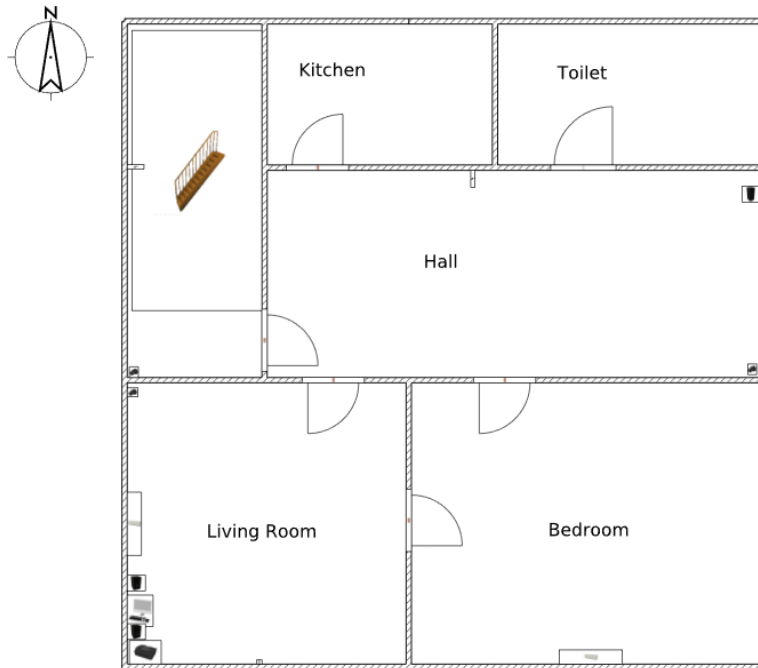
b) 2 Alarm Speakers

c) 3 Hue Lights (Wi-Fi Enabled)

d) 1 Repeater (can control every device in the network via Router in Level 1)

e) 1 Fingerprint Scanner collaborated with a Door Opener Detection System (Wi-Fi enabled) for the main entrance into the house.

f) 2 Air Conditioners (Wi-Fi enabled and Split Model)



*Figure B*

Figure B shows the Level One of the Home where the AdHoc Network is configured. The devices used are: - a) 3 CCTV Cameras (Wi-Fi and IP Enabled)

b) 1 Alarm Speaker and a 2.1 Home Theatre (Wi-Fi Enabled)

c) 2 Hue Lights (Wi-Fi Enabled)

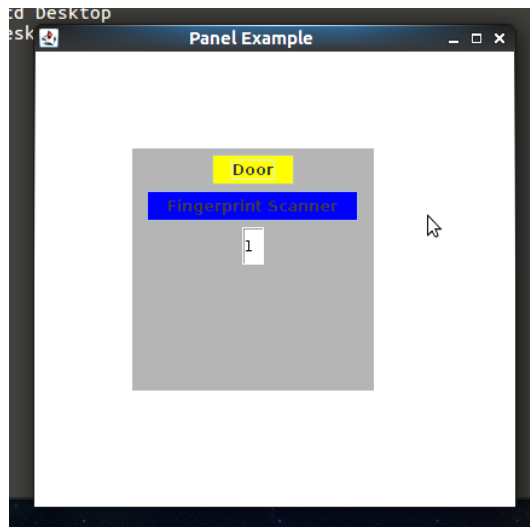
d) 1 Router (can control every device in the network)

e) PC (can control every device in the network)

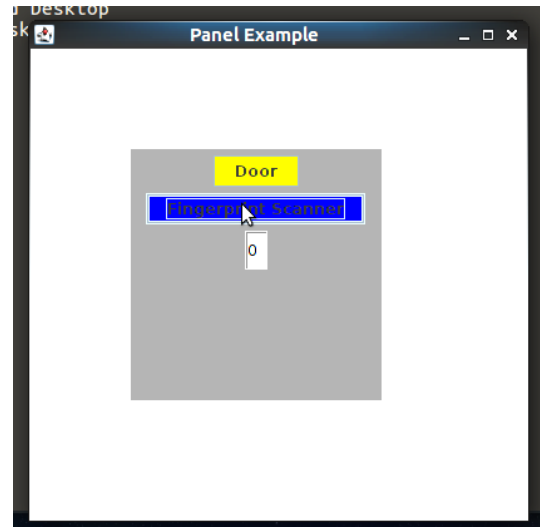
f) 2 Air Conditioners (Wi-Fi enabled and Split Model)

g) Printer (Wi-Fi enabled and shared among devices)

Figures C, D and E are the outputs for the Door Open-Close Detection System. When the Door button is pressed, the timer goes off. If the Fingerprint Scanner button is pressed then the timer is put off. But if the Fingerprint is not recognized or the timer runs out of time, a new Alarm Panel is called depicting the state of Alarm.

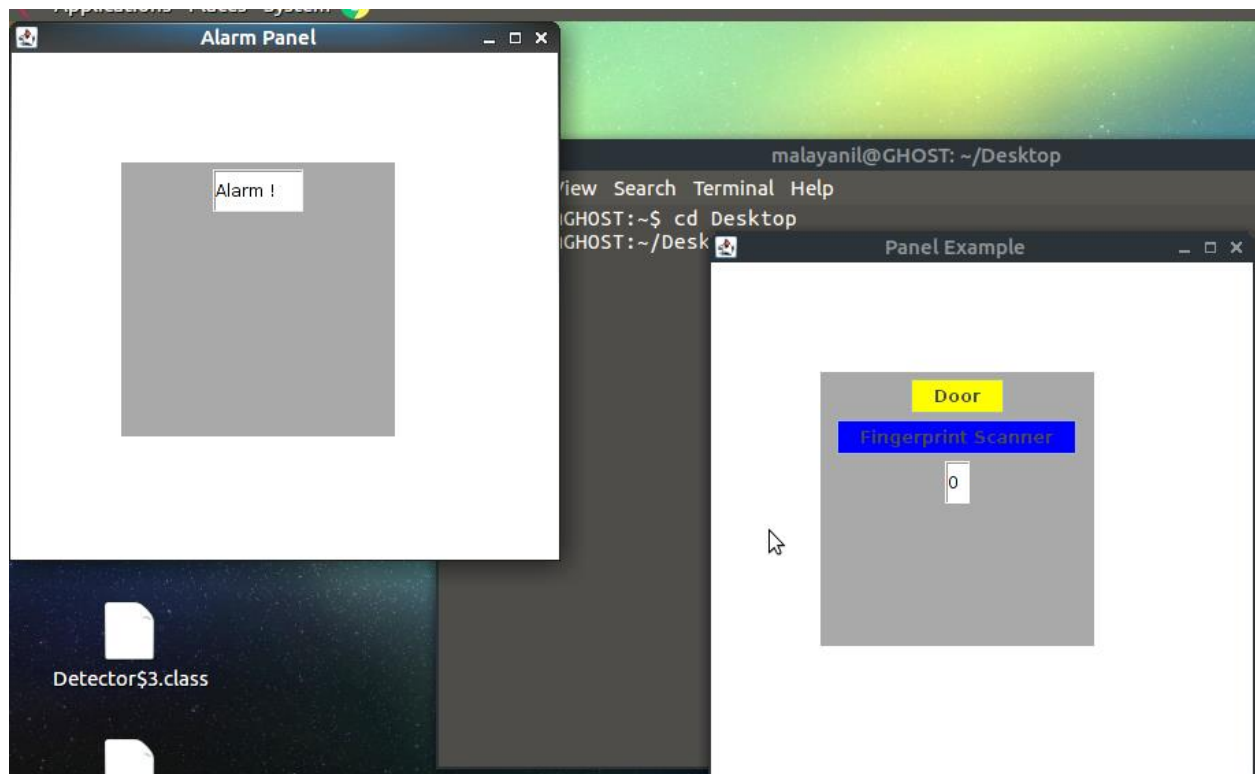


*Figure C*



*Figure D*

*Figure E*





Implementing this small program into our AdHoc network is simple. If the Fingerprint of the user is recognized then no alarm will be sounded. But if the timer runs out or fingerprint is not recognized then the alarm will be sounded through the Alarm Speakers present in both the levels of the Home.

The user can prevent any exceptional cases for the Door sensing system by arranging for various methods of fingerprint input and various input types (index, middle, thumb fingers). Also there can be a process through the Smart Phone of the user to put off the alarm, in case the fingerprint scanner is misbehaving.

## **Section Four : Literature Survey or Related Works**

### **4.1. Reference**

- 1. Journal: Title of the paper, Authors Name, Publisher, Vol. Number, Issue No., Page Number, Year**

No journals were went through during this project.

- 2. Conference Paper: Title of the Paper, Authors name, Conference Name, Publisher, Page Number, Year**

No conference papers were discussed or suggested during this project.

- 3. Book:**

Title of the Book: Networking The Complete Reference

Authors Name: Bobbi Sandberg

Publisher: McGraw Hill

Edition: Third

Year: March 2<sup>nd</sup> 2015

- 4. Web Site:**

Topic Name: AdHoc

Website URL: [https://en.wikipedia.org/wiki/Ad\\_hoc](https://en.wikipedia.org/wiki/Ad_hoc)

Date of Visit: First Week.

Topic Name: AdHoc Networking

Website URL: <https://searchmobilecomputing.techtarget.com/definition/ad-hoc-network>

Date of Visit: First Week

#### **4.2. Summary of the Independent Study & Research**

This project focuses upon the application of AdHoc networks for Home Automation, hence an implementation of Smart Homes for the future. As the definition of AdHoc Network, this network too is decentralized.

This network consists of a Router, a Repeater, a PC and a Smart phone which would act as the instruction passing devices. And the receiver devices consist of Alarm speakers, a Printer, a set of IP Cameras, a Door Open-Close Detection system, a fingerprint scanner, a set of Hue Lights and a set of Air Conditioners.

All of these are interconnected and can be accessible via any instructor device either from inside or outside the home. The lights, cctv(s), AC(s) etc can be controlled by the mobile as per the requirement of the user.

A repeater is put in the level one of the home to properly distribute the wireless signals in that level and connect wired devices as needed which ensures least amount of packet loss and failure of signal transmissions. The IP cameras store the data directly to the PC hard drive if the PC is online else it stores in itself and updates accordingly. The AC can be switched on and off via the instructor devices but the detailed functions can only be done by their given remotes.

The design of the Home levels have been provided above and has been done using a 3D renderer.

## Section Five: Experiments

### 5.1. Experimental Setup

The full experimental setup consists of the virtual Home Design and a program which implements the Door Open-Close system.

### 5.2. Algorithm or Code

```
import java.awt.*;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

import java.time.Duration;

import javax.swing.*;

import javax.swing.Timer;


public class Detector

{

    long lastTickTime, comp=1, millis;

    Timer timer;

    Duration duration;


    Detector()

    {

        JFrame f= new JFrame("Panel Example");

        JPanel panel=new JPanel();

        JFrame ftwo= new JFrame("Alarm Panel");

        JPanel paneltwo=new JPanel();
```

```
panel.setBounds(80,80,200,200);  
panel.setBackground(Color.gray);
```

```
JButton b1=new JButton("Door");  
b1.setBounds(50,100,80,30);  
b1.setBackground(Color.yellow);
```

```
TextField t1=new TextField("5");  
t1.setBounds(50,100, 200,30);  
t1.setEditable(false);
```

```
JButton b2=new JButton("Fingerprint Scanner");  
b2.setBounds(400,400,10,10);  
b2.setBackground(Color.blue);
```

```
timer = new Timer(100, new ActionListener()  
{  
    @Override  
    public void actionPerformed(ActionEvent e)  
    { if(millis>=0)  
        {  
            long runningTime = System.currentTimeMillis() - lastTickTime;  
            duration = Duration.ofMillis(5000 - runningTime);  
            millis = duration.toMillis();
```

```

        t1.setText(Long.toString(millis/1000));
        comp=millis;

    }

    while(comp<0)
    {

        paneltwo.setBounds(80,80,200,200);
        paneltwo.setBackground(Color.gray);

        ftwo.add(paneltwo);
        ftwo.setSize(200,200);
        ftwo.setLayout(null);
        ftwo.setVisible(true);
        comp=999;

        TextField t1=new TextField("Alarm !");
        t1.setBounds(50,100, 10,10);
        t1.setEditable(false);
        paneltwo.add(t1);
    }
}

});

```

```
b1.addActionListener(new ActionListener()
{

    public void actionPerformed(ActionEvent e)
    {
        lastTickTime = System.currentTimeMillis();
        timer.start();
    }

});
```

```
b2.addActionListener(new ActionListener()
{

    @Override
    public void actionPerformed(ActionEvent e)
    {
        timer.stop();
        ftwo.setVisible(false);
    }

});
```

```
panel.add(b1);
panel.add(b2);
panel.add(t1);
f.add(panel);
f.setSize(400,400);
```

```

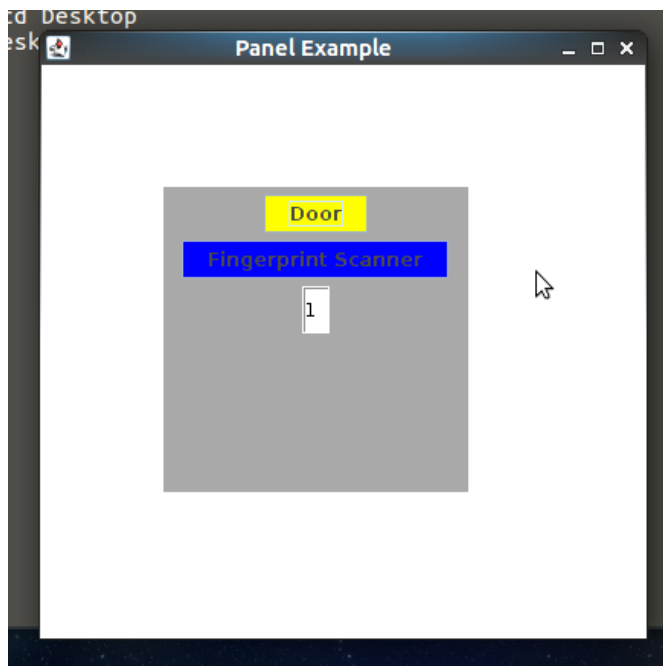
        f.setLayout(null);

        f.setVisible(true);
    }

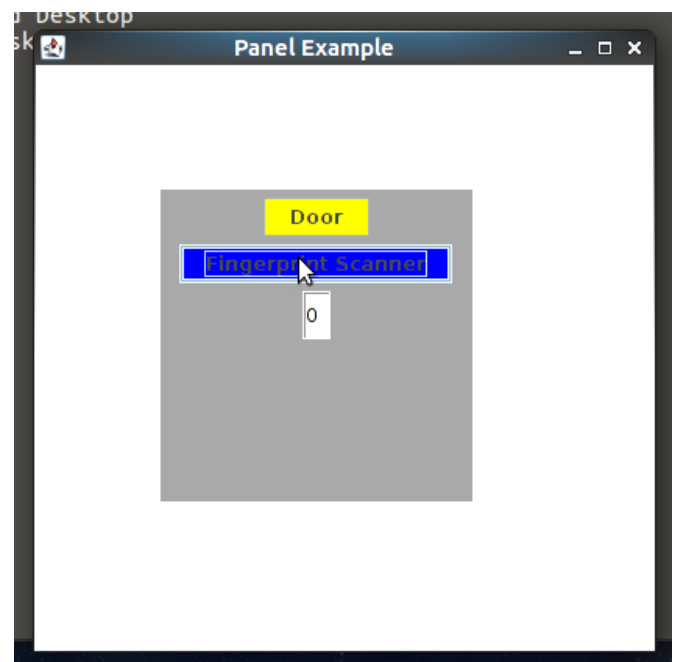
    public static void main(String args[])
    {
        new Detector();
    }
}

```

### 5.3. Few Screenshots of Output



*Figure One*



*Figure Two*



## **Section Six: Financial Statement if any**

### **6.1 Expenditure**

There has been no expenditure during the process of this project work.

### **6.2. Estimation of the Income in 5-years Plan if deployable in the Market**

If this project is deployed in the market at a reasonable and moderate price. It can be quite a success. It is the age of technology, and using fingerprint as a biometric lock is pretty much acceptable by the society. Deployment in homes via local electronic shops along with compatible home appliances would vary the cost from Rs. 25,000 to a maximum price (which depends on the latest technologies and devices the customer chooses).

## Section Seven: Plagiarism

### 7.1 URL/Software of Plagiarism site

<https://www.plagscan.com/plagiarism-check/>

### 7.2. Plagiarism Report

