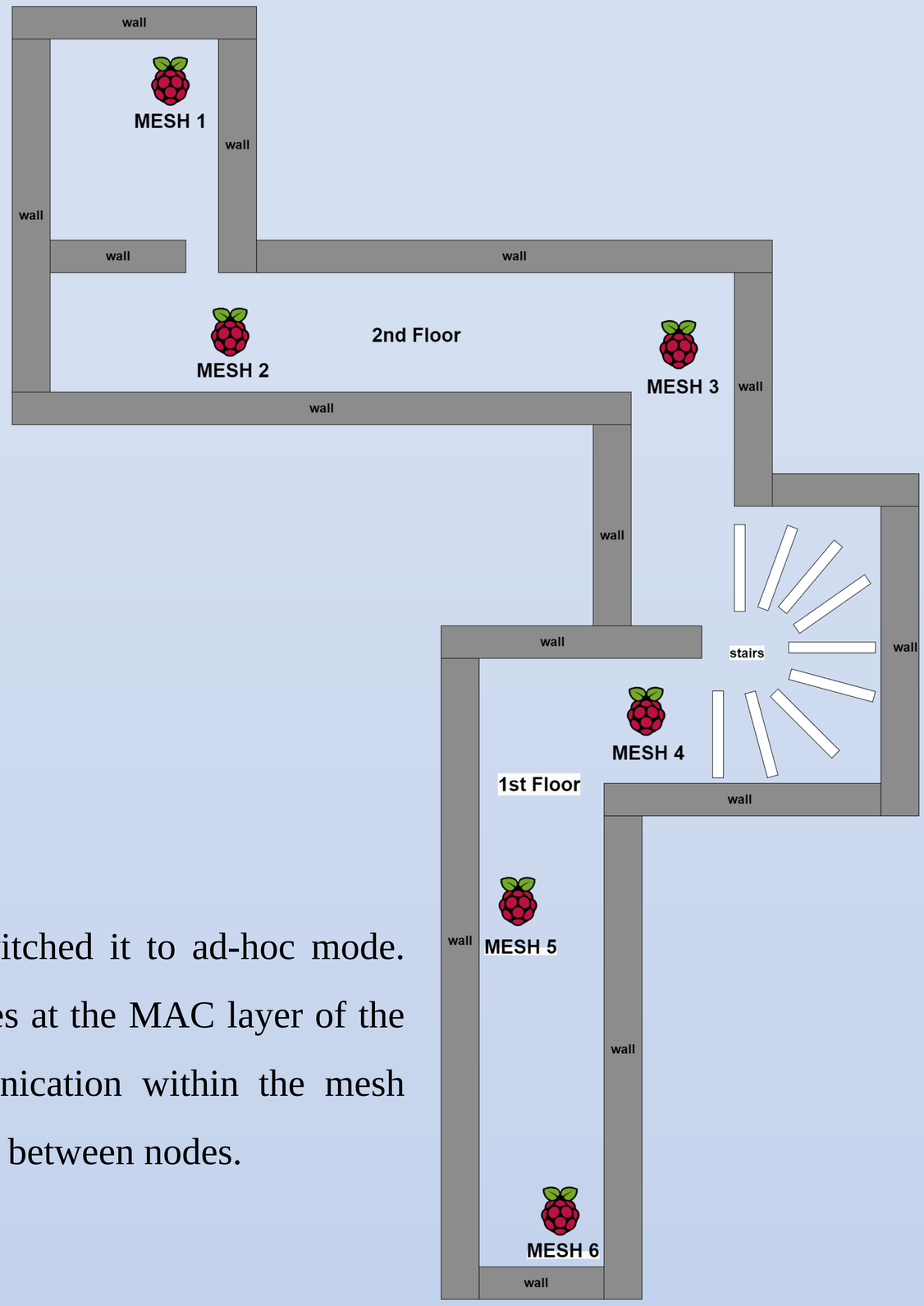
Mobile Mesh Wi-Fi Network

Alirıza Yatkın, Cevat Koyuncu, Nazlı Arıkan

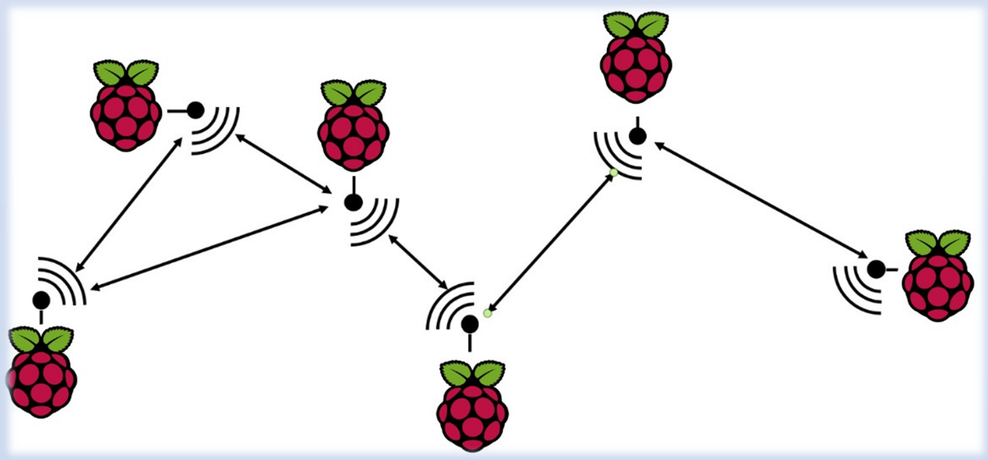
Supervisor : Prof. Dr. Cenk Toker
Electrical and Electronics Engineering, Hacettepe University

Introduction

A portable, long-range Wi-Fi network operating in the 2.4 GHz and 5 GHz radio bands. To achieve this, we use Raspberry Pi devices in a way that talks directly to each other without needing a central point.



Mesh Network Topology



Solution Methodology

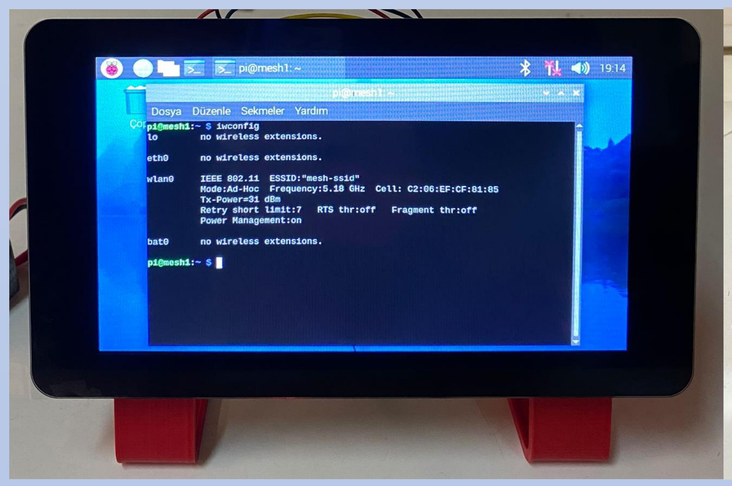
We configured the Wi-Fi settings of our Raspberry Pi and switched it to ad-hoc mode. Next, we installed the BATMAN-adv routing protocol, which operates at the MAC layer of the Data Link Layer, to manage network traffic. We enabled communication within the mesh network by using Python and socket programming to allow messaging between nodes.

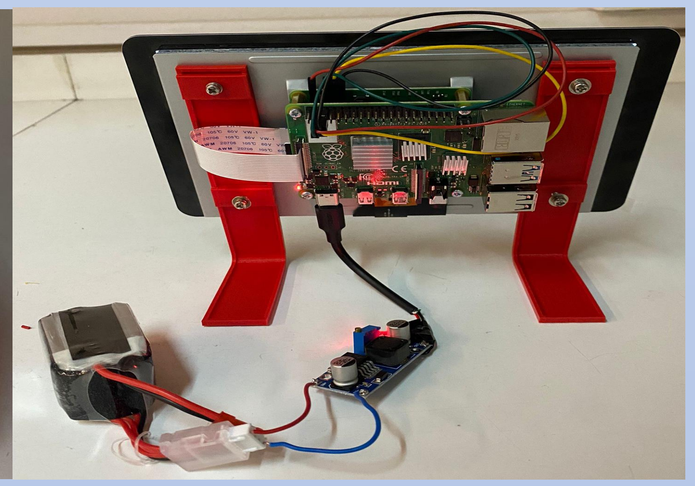
Application Areas

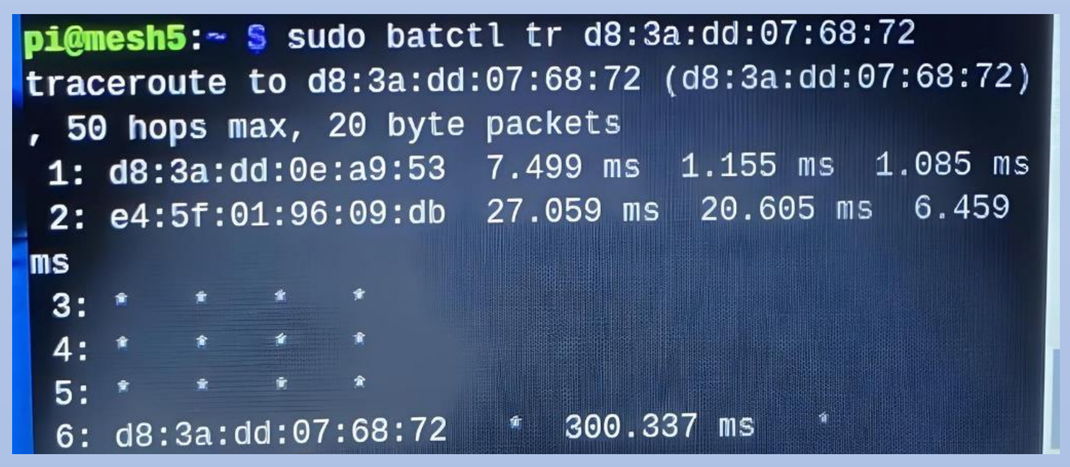
Our project can serve as a basic prototype that assists emergency teams in communicating with each other and with people in need during disasters such as earthquakes, particularly when base stations are damaged.

Hardware Prototype

- Raspberry Pi 4B
- Raspberry Pi Screen
- 11.1V Li-PO Battery
- Buck Converter







Results and Conclusion

We have successfully established a robust network with a high coverage that can be easily moved around and used in different places.

- This project was completed within the context of ELE401-402 Graduation Project courses in Hacettepe University, Faculty of Engineering, Department of Electrical and Electronics Engineering.
- We thank to our supervisor Prof. Dr. Cenk Toker for his invaluable contributions to our project.