A MIDDLEWARE FRAMEWORK FOR INFRASTRUCTURE-LESS COMMUNICATION ON SMART DEVICES

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DECLARATION

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Name of the supervisor: Dr. Kutila Gunasekara

Signature of the supervisor: Date: 29th July 2024

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ABSTRACT

Smartphones play a pivotal role in daily life, prompting researchers to increasingly emphasize peer-to-peer networks for connecting multiple mobile devices. This focus arises from scenarios where cellular coverage is unavailable, such as during disasters or conflicts when cellular tower communications are compromised. Researchers are currently exploring methods for individuals to connect with nearby users to establish social connections in such challenging circumstances.

This research presents the implementation of a middleware framework for infrastructure-less communication, comprising the Meshify API and the Meshify Core. The Meshify API provides interfaces for integrating the framework into applications, offering methods for device connectivity. The Meshify Core implements the necessary logic to manage the framework's functionality through the Meshify API. The middleware implementation is versatile and can be applied to various use cases involving wireless communication. Its layered architecture and modular design enable developers to extend their capabilities with minimal effort, ensuring adaptability to evolving wireless standards and protocols.

As part of this research, a Bluetooth multi-chat Android application was developed as a prototype to evaluate how the middleware facilitates communication over wireless networks.

Keywords **-** *Flooding, piconet, scatternet Bluetooth Classic, Wireless Technologies*

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LIST OF ABBREVIATIONS

AP	Access Point
API	Application Programming Interface
BLE	Bluetooth Low Energy
GO	Group Owner
IoT	Internet of Things
IMANETs	Internet-based Mobile Ad-Hoc Networks
LAN	Local Area Network
L2CAP	Logical Link Control and Adaptation Protocol
MAC	Media Access Control
MANETs	Mobile Ad-Hoc Networks
NFC	Near Field Communication
PIN	Personal Identification Number
P2P	Peer-to-Peer
RF	Radio Frequency
RFCOM	Radio Frequency Communication
SDK	Software Development Kit
SDP	Service Discovery Protocol
SPANs	Smartphone Ad-Hoc Networks
SSID	Service Set Identifier
TARP	Tiny Ad-hoc Routing Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
WPA2	Wi-Fi Protected Access 2
WPS	Wi-Fi Protocol Setup