

Fast Broadcast implementation on Android devices

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Abstract—Fast Broadcast [1] is a Vehicle-to-Vehicle Multi-Hop Broadcast algorithm used to estimate car's transmission range and to propagate messages through vehicles reducing traversed hops. The aim of our work was implementing that algorithm on Android devices using Wi-fi Direct™ APIs for devices connection.

Index Terms—Veicular Nets, Fast Broadcast, Wi-fi Direct™, Android.

I. INTRODUCTION

FAST broadcast algorithm provides an easy-to-implement method to estimate vehicles wireless range and to send vehicle-to-vehicle covering large sistance, without any pre-existent network infrastructure. The algorithm is essentially divided in two phases:

- *Estimation phase*: In this phase time is divided into turns and at each turn T a car (one car per turn) sends an *Hello message* containing information about his estimated wireless range and his position. This message is heard by all cars in his actual range, and used by them to update their range estimation.
- *Broadcast phase*: When an *Alert message* is sent by a car, this must be forwarded by one of the cars hearing it. Any Preceding car receiving the message, has information about the distance from the source (which included position in the message) and use this to compute a contention window: it waits a random time choosen in that window, and then forwards back the message. If someone else already forwarded the message, the waiting car aborts the forwarding operation.

This brief description describes roughly the algorithm idea. We will focus on our implementation in the next sections.

II. TECHNOLOGIES

Our project uses Android devices instead of vehicles, using their Wi-fi connectivity to communicate each other, especially adopting Wi-fi Direct™ standard. Android SDK's APIs from 14 enables the use of these technology to create small wireless devices networks, where one of the devices is used as an *Access Point*. Wi-fi Direct™ specification is available only for purchase from Wi-fi Alliance™ website [2]. Basically a network created with Android Wi-fi Direct™ APIs is called *group*. A *group* has an owner (the access point), and one or more other devices. In the network the only available IP address is group owner's. Using Wi-fi Direct™ on Android devices is not possible to connect devices without user's permission.

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III. IMPLEMENTATION

Due to Wi-fi Direct™ features, the developed application performs two subsequest operations:

A. Devices connection

Devices connection setup consists in the following operations:

- One of the devices ask other devices for connection
- When a device accepts, it starts a DHCP negotiation with the connection starter. If no Wi-fi Direct™ group exists, a group is created and the starter device becomes the group owner; if requesting device is already an owner of a pre-existing group, the device is added to this group. At the end of this phase, each device has an IP address. Only group owner's IP is available via APIs.
- Each device opens a TCP Server Socket on port 8888, listening for incoming connections.
- When a device connects to a group, it connects via Socket to the group owner sending a *Ping message*. This message is used by the group owner to collect devices MAC/IP addresses: The first is included into the *Ping message* by each device, the second indeed is obtained by the owner from the incoming Socket information (using Java APIs).
- After collecting all the couples

<MAC address, IP address>

from all the clients on a map, it sends it back to all the devices, to let them communicate directly.

When all of this operations are done, all the devices are connected and can communicate each other directly via TCP Sockets.

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B. Subsection Heading Here

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IV. CONCLUSION

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APPENDIX A

PROOF OF THE FIRST ZONKLAR EQUATION

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APPENDIX B

Appendix two text goes here.

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The authors would like to thank...

REFERENCES

- [1] H. Kopka and P. W. Daly, *A Guide to L^AT_EX*, 3rd ed. Harlow, England: Addison-Wesley, 1999.
- [2] <https://www.wi-fi.org/knowledge-center/published-specifications>



Michael Shell Biography text here.

John Doe Biography text here.

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