HAUTE ÉCOLE
D'INGÉNIERIE ET DE GESTION
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Département : Technologies de l'information et de la communication
Filière : Informatique et systèmes de communication
Orientation : Informatique logicielle

# Bachelor Thesis

## RF fingerprinting on NFC devices

**Not confidential**

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# 1 Specification

# Table of contents

## 2 Summary

This Dirac, 1981 is a good dirac. Einstein, 1905 too.

# 3 Introduction

## 3.1 Description

RF fingerprinting is a technique that allows the identification of radio transmitters by extracting small imperfections in their spectrum. These imperfections are caused by tiny manufacturing differences in the devices' analog components. Using Software-Defined Radio (SDR) equipment, we can analyse this spectrum in order to extract the aforementioned differences and identify a device.

Such technique can be used on any type of radio transmission: Bluetooth, BLE, WiFi, LTE, etc. This project aims to use RF fingerprinting on NFC devices. Indeed, NFC is often used in access control and payment applications but many implementations are vulnerable to relay attacks. Spoofing the imperfections in an emitter's radio spectrum is close to impossible at the present time, since it is essentially a hardware signature. This is why a technique like the one described here would be a valuable additional security layer.

The goal of this project is to determine if RF fingerprinting of NFC devices could be used as an authentication technique, in order to prevent relay attacks.

## 3.2 Context

This project is conducted in the context of my bachelor thesis at HEIG-VD.

- Department: Information and communication technologies
- Faculty: Information technology and communication systems
- Orientation: Software engineering

## 4 State of the art

## 5 Conclusion

## Bibliography

DIRAC, Paul Adrien Maurice, 1981. *The Principles of Quantum Mechanics*. Clarendon Press. International series of monographs on physics. ISBN 9780198520115.

EINSTEIN, Albert, 1905. Zur Elektrodynamik bewegter Körper. (German) [On the electrodynamics of moving bodies]. *Annalen der Physik*. Vol. 322, no. 10, pp. 891–921. Available from DOI: `http://dx.doi.org/10.1002/andp.19053221004`.

## List of Figures

## List of Tables