Inductive Short-Range Communication Channel

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Introduction

In this thesis, I research an alternative short-range wireless communication method that uses magnetic induction instead of conventional radio waves for transmission of data and create a prototype that uses magnetic induction for communication.

Objectives

The goals of the prototype were that it should work one way between a laptop and a smartphone and that the transmission should also be possible, when no other connectivity is available e.g. when the phone is in airplane mode, as this is one of the advantages of magnetic induction based connectivity.

Solution

The solution that I created consists of two parts: a website for sending data and a smartphone application for receiving data. I call the complete system MagSend.

On the sending side, by putting controlled stress on the processor of the laptop, an attempt can be made to manipulate the magnetic field that gets generated around the CPU. By manipulating the magnetic field in a controlled way, a payload signal can be encoded into the field.

On the receiving side, a smartphone is used to receive the signals from the magnetic field. By putting the smartphone on top of the sender, the magnetic field emitted by the CPU can be measured using a magnetometer in the phone. The received signal is then decoded and the contents of the payload can be displayed.
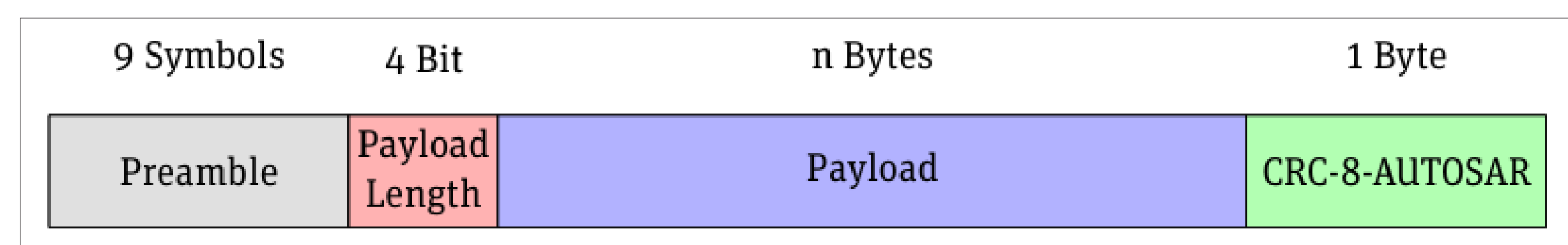

Figure 4: Structure of a MagSend packet including preamble
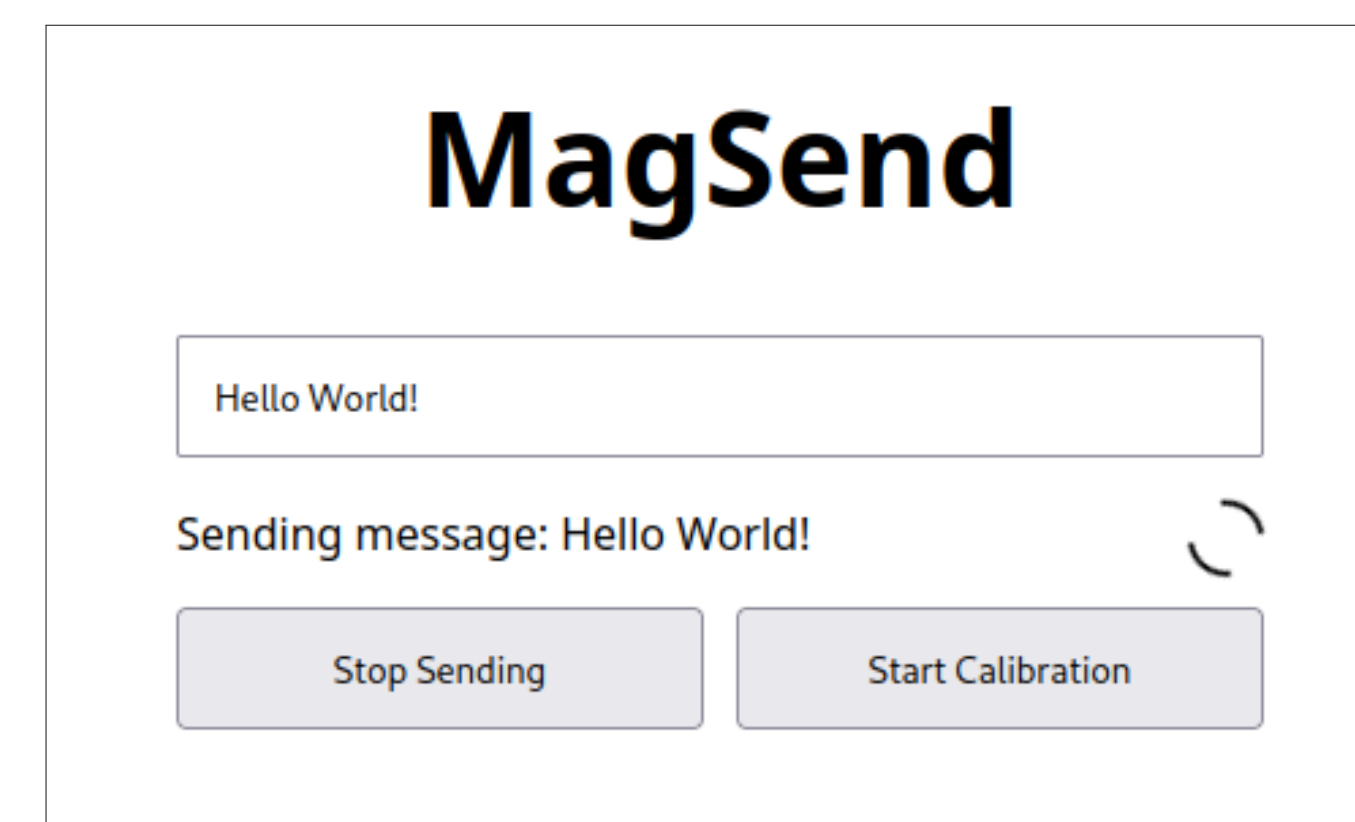

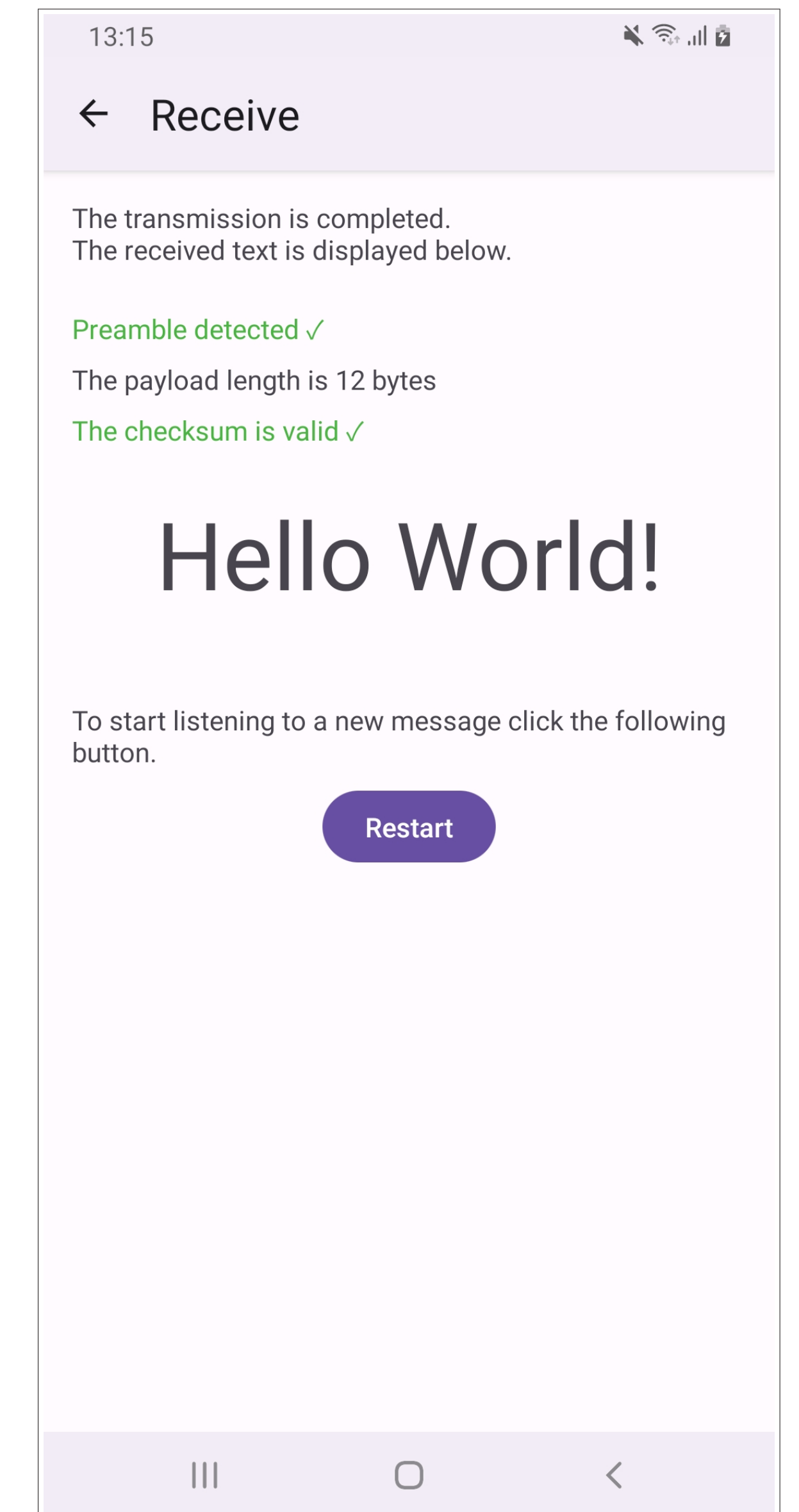**Figure 1:** Devices during transfer

Figure 3: Website during sending

Figure 2: App screen after receiving a message

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