

Modularization of Mobile Shopping Assistance Systems

Introduction

Shopping process

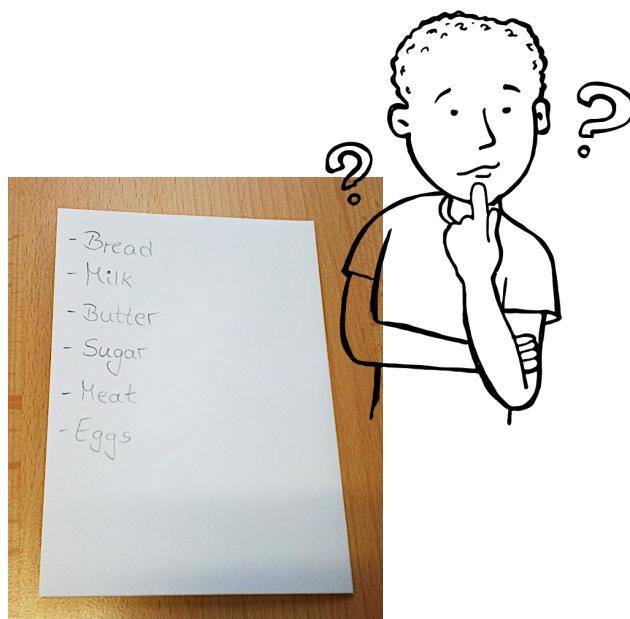
Introduction

Shopping process



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Shopping process



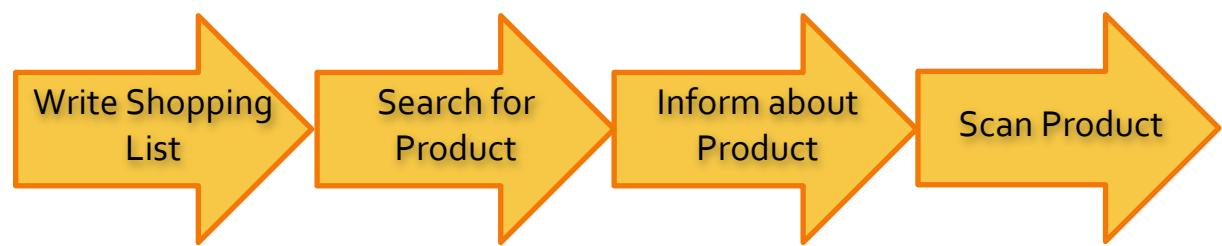
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Shopping process



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Shopping process



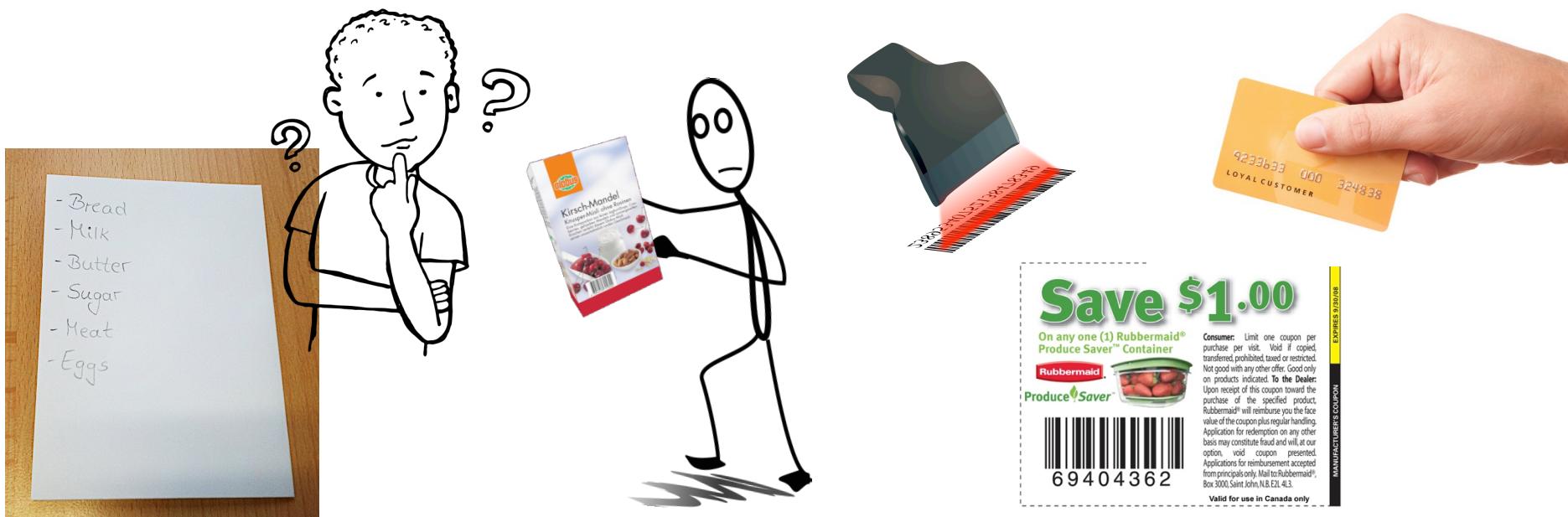
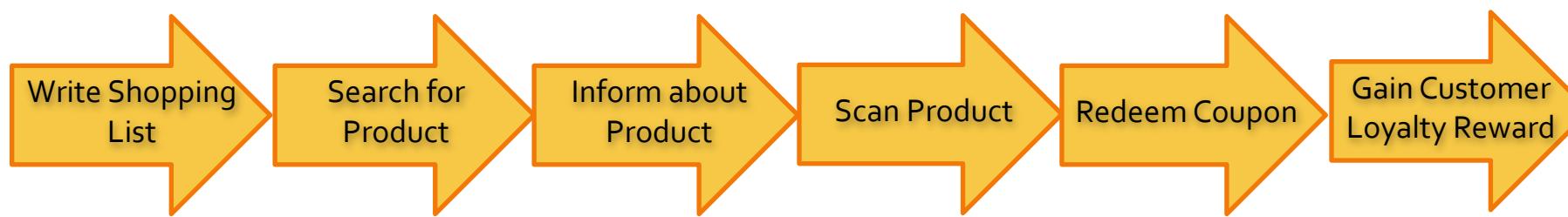
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Shopping process



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Shopping process



Introduction

Current approaches

- Self-Scanning
- Apps for mobile devices
 - Shopping list applications
 - Product information applications
 - Mobile Payment applications

Introduction

Current approaches

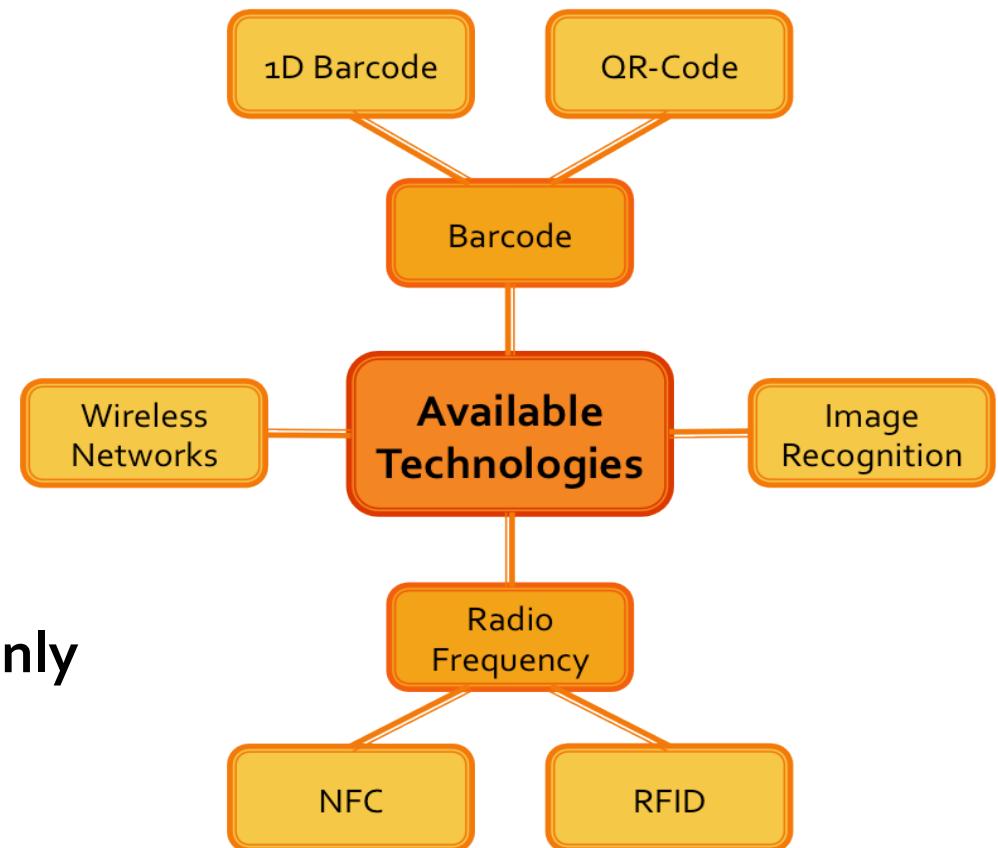
- Self-Scanning
 - Apps for mobile devices
 - Shopping list applications
 - Product information applications
 - Mobile Payment applications
- **Most of the current approaches are only stand-alone systems depending on only one technology**

Introduction

Current approaches

- Self-Scanning
- Apps for mobile devices
 - Shopping list applications
 - Product information applications
 - Mobile Payment applications

→ **Most of the current approaches are only stand-alone systems depending on only one technology**



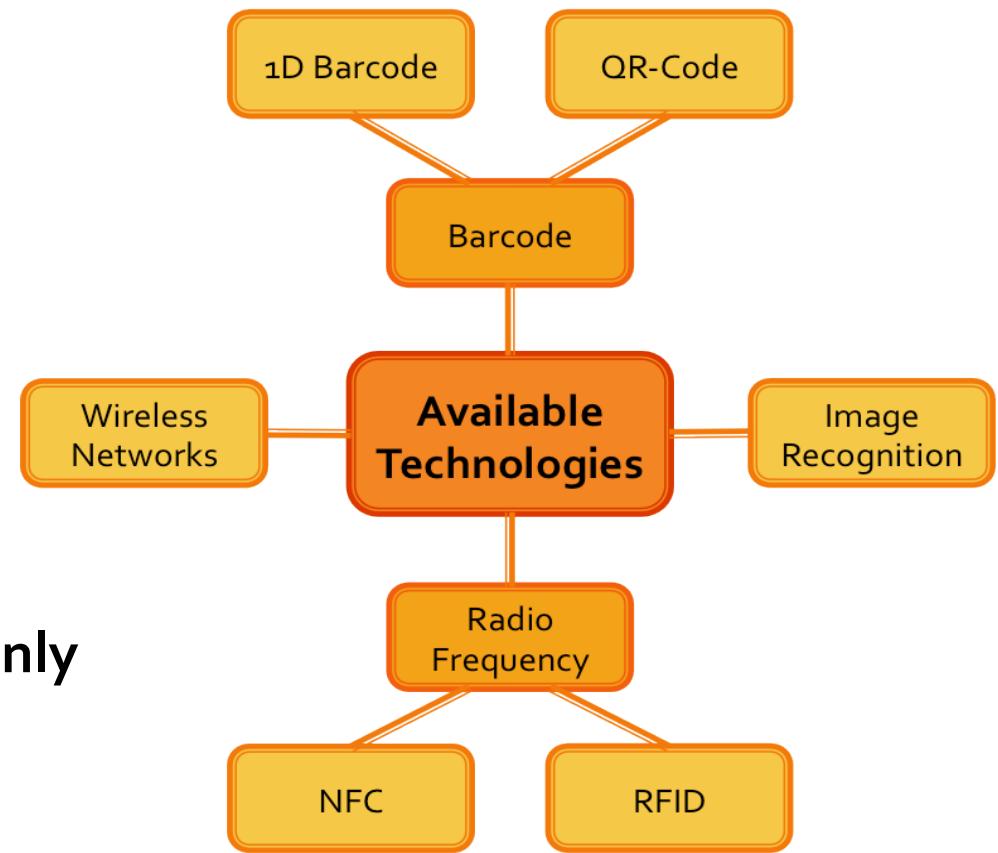
Introduction

Current approaches

- Self-Scanning
- Apps for mobile devices
 - Shopping list applications
 - Product information applications
 - Mobile Payment applications

→ **Most of the current approaches are only stand-alone systems depending on only one technology**

→ **Every retail environment has its own individual structure**



Introduction

Aim

Overview of all possible mobile solutions that simplify the customer's shopping process based on current and upcoming technologies

- Mapping shopping tasks to modules including possible technologies & use cases
- **Analysis of the benefits and drawbacks of technologies and services**
- **Individual linkage of modules and technologies/use cases allows easy integration of several modules in a retailer's infrastructure**

Shopping Module Overview

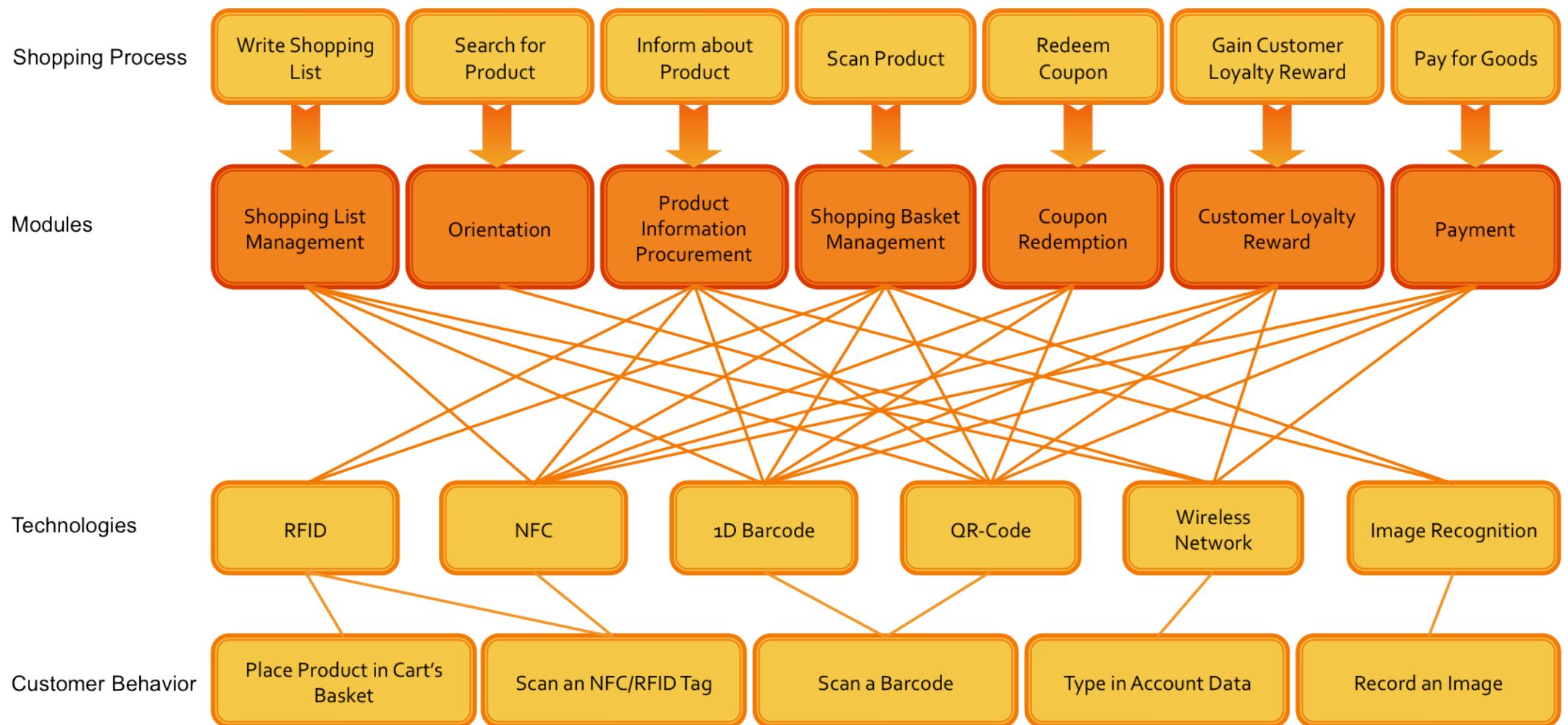
Shopping Process



Shopping Module Overview



Shopping Module Overview



Shopping Modules

Shopping List Management

NFC

1D Barcode

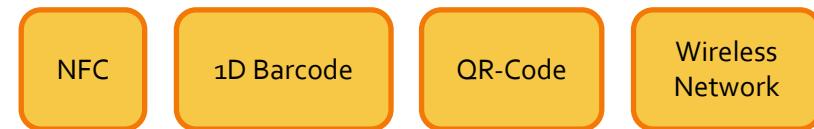
QR-Code

Wireless Network

Shopping Modules

Shopping List Management

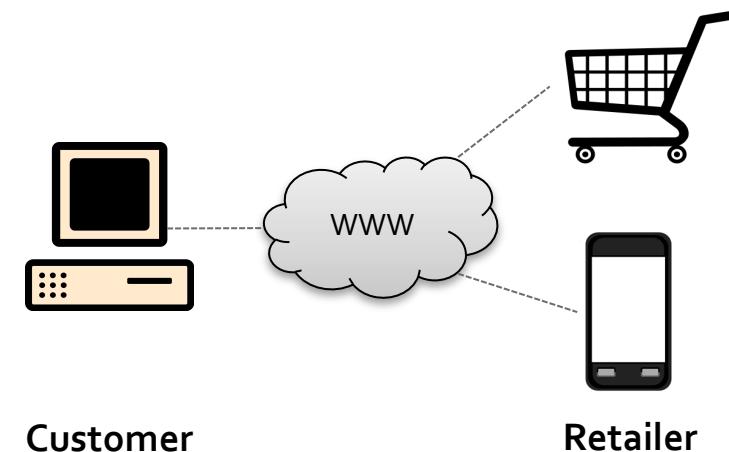
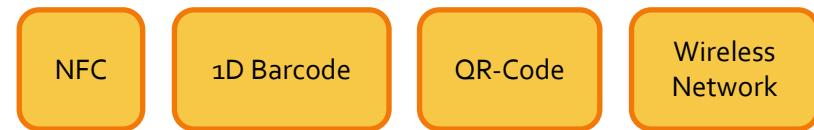
- Shopping list creation using an own mobile device
 - Inside the market e.g. transmission of data to retailer's device



Shopping Modules

Shopping List Management

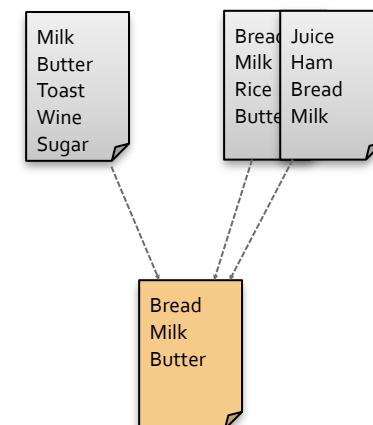
- Shopping list creation using an own mobile device
 - Inside the market e.g. transmission of data to retailer's device
- Shopping list creation using a desktop computer
 - Requires internet connection & user profile



Shopping Modules

Shopping List Management

- Shopping list creation using an own mobile device
 - Inside the market e.g. transmission of data to retailer's device
- Shopping list creation using a desktop computer
 - Requires internet connection & user profile
- Shopping list suggestions based on previously purchased products
 - Requires user profile



Shopping Modules

Orientation

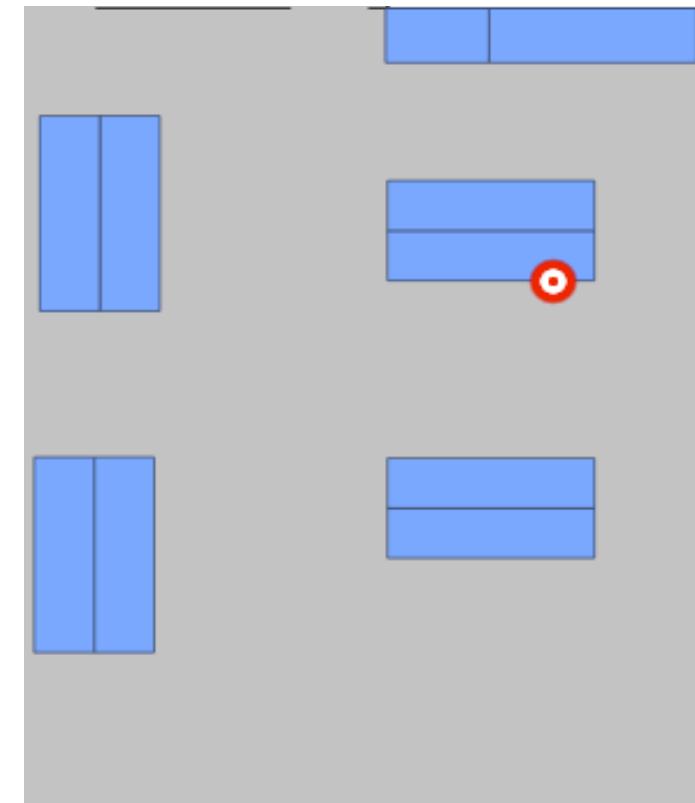
Wireless
Network

- Help customers to orientate themselves using a map of the market displaying...

Shopping Modules

Orientation

- Help customers to orientate themselves using a map of the market displaying...
... the location of the searched product



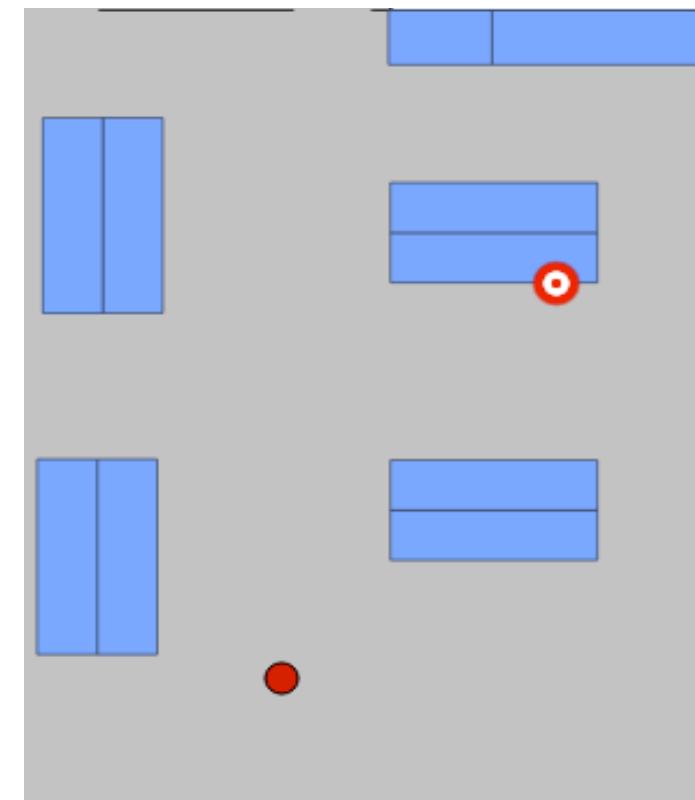
Shopping Modules

Orientation

- Help customers to orientate themselves using a map of the market displaying...

- ... the location of the searched product

- ... the customer's position



Wireless Network

Shopping Modules

Orientation

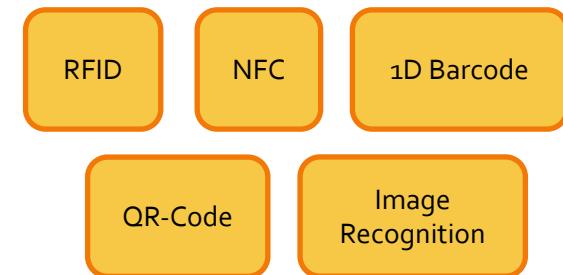
- Help customers to orientate themselves using a map of the market displaying...
 - ... the location of the searched product
 - ... the customer's position
 - ... the path between current location and searched product



Shopping Modules

Product Information Procurement

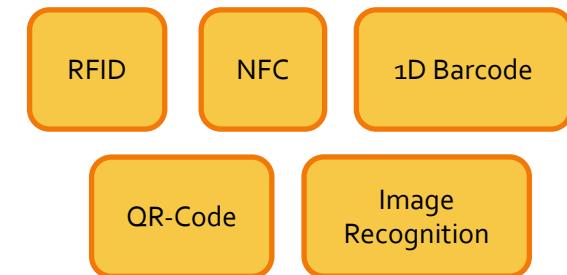
- Using mobile phone for product recognition
 - Scanning barcode or RFID/NFC tag
 - Image recognition



Shopping Modules

Product Information Procurement

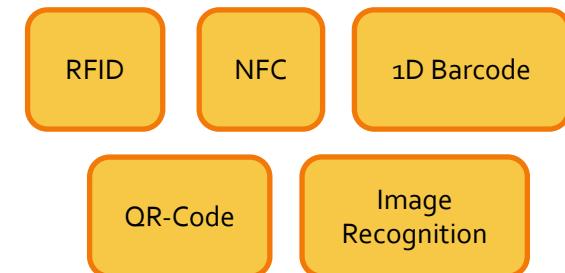
- Using mobile phone for product recognition
 - Scanning barcode or RFID/NFC tag
 - Image recognition
- Using smart shopping cart
 - Recognizing RFID tagged products put into the cart



Shopping Modules

Shopping Basket Management

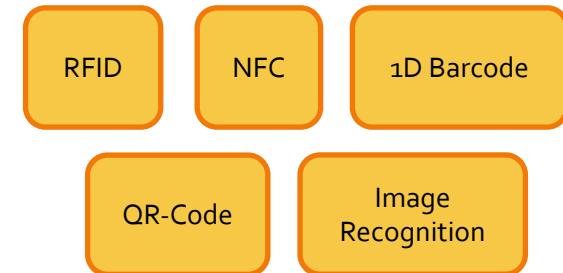
- Using mobile phone
 - Scanning barcode or RFID/NFC tag
 - Image recognition
- Using smart shopping cart
 - Scanning products via RFID when put into the cart



Shopping Modules

Shopping Basket Management

- Using mobile phone
 - Scanning barcode or RFID/NFC tag
 - Image recognition
- Using smart shopping cart
 - Scanning products via RFID when put into the cart
- By taking tagged products out of the shelf



Shopping Modules

Coupon Redemption

- Digital coupons stored on the own smartphone
 - Barcode/ NFC



Shopping Modules

Customer Loyalty Reward

- Authentication by...

- ... logging in

- ... a personalized code

- NFC / barcode

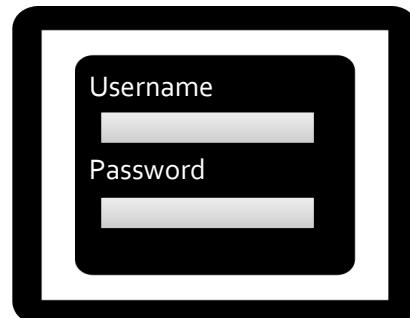
→ Requires user profile

Wireless
Network

NFC

1D Barcode

QR-Code



Shopping Modules

Payment

- Authentication by...

- ... logging in

- ... a personalized code

- NFC / barcode

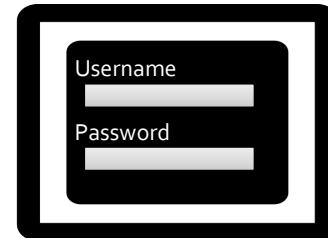
→ Requires user profile with stored bank account data

Wireless
Network

NFC

1D Barcode

QR-Code



Shopping Modules

Payment

- Authentication by...

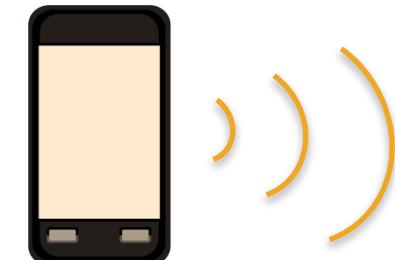
- ... logging in

- ... a personalized code

- NFC / barcode

→ Requires user profile with stored bank account data

- Transmission of bank account data via NFC



Prototypical Implementation

Prototypes:

- Phone Payment at a Smart Shopping Cart
- Self-Scanning and Phone2Phone Payment

Prototypical Implementation

Phone Payment at a Smart Shopping Cart

Modules

- Shopping List Management
- Shopping Basket Management
- Payment

RFID

NFC

1D Barcode

QR-Code

Wireless Network

Prototypical Implementation

Phone Payment at a Smart Shopping Cart

Modules

- Shopping List Management
 - Generate shopping list using mobile phone
 - Transmission of shopping list to the retailer's smart shopping cart via NFC
- Shopping Basket Management
- Payment

RFID

NFC

1D Barcode

QR-Code

Wireless Network



Prototypical Implementation

Phone Payment at a Smart Shopping Cart

Modules

- Shopping List Management
- Shopping Basket Management
 - Shopping cart recognizes products
- Payment

RFID

NFC

1D Barcode

QR-Code

Wireless Network

Prototypical Implementation

Phone Payment at a Smart Shopping Cart

Modules

- Shopping List Management
- Shopping Basket Management
- Payment
 - Shopping cart generates QR code including product information and purchase price
 - Customer scans QR code and transfers the specified amount to the retailer
 - Customer sends a confirmation via NFC to the shopping cart
 - Security protection of the sold products is removed

RFID

NFC

1D Barcode

QR-Code

Wireless Network

Prototypical Implementation

Self-Scanning and Phone2Phone Payment

Modules

- Product Information Procurement
- Shopping Basket Management
- Payment



Prototypical Implementation

Self-Scanning and Phone2Phone Payment

Modules

- Product Information Procurement
 - Scanning products with NFC-equipped smartphone and display product information
- Shopping Basket Management
- Payment



Prototypical Implementation

Self-Scanning and Phone2Phone Payment

Modules

- Product Information Procurement
- Shopping Basket Management
 - Purchase decision by adding the product to the basket of goods
- Payment



Prototypical Implementation

Self-Scanning and Phone2Phone Payment

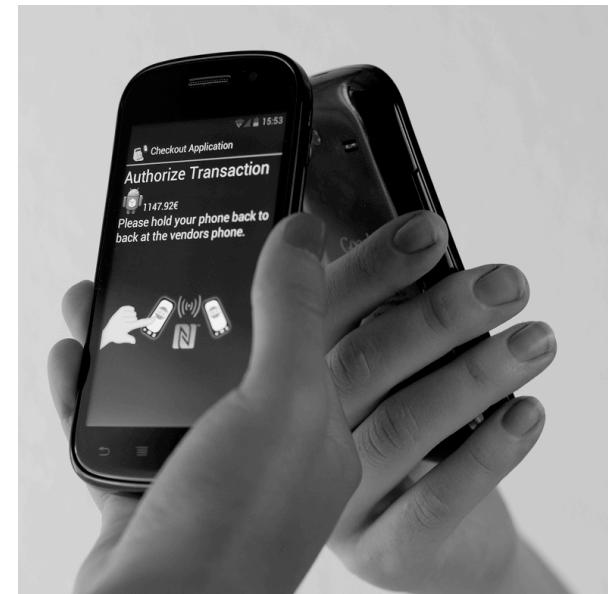
Modules

- Product Information Procurement
- Shopping Basket Management
- Payment
 - Transmit basket of goods to retailer's smartphone
 - Confirm payment by tying in PIN code
 - Send bank account information via NFC

RFID

NFC

Wireless Network



Conclusion

- Customer shopping tasks were mapped to modules
- Each module can be implemented using a set of different technologies and requires certain customer behavior
- Module overview helps retailers to identify possible benefits or drawbacks
- Modules are independent from each other
 - ➔ Allows composition of modules (technologies and use cases) that fits to the market's needs
- Easy exchange of modules and technologies and easy integration of new upcoming technologies/ use cases

Thank you
for your attention!