IOHIVE: Interactive Journal for Beekeepers to Support Apiary Inspections

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Why non-traditional interfaces?

- Create a natural link with the users` working environment
- Promote user performance in multitasking contexts
- Focus on the relation of the user and the technology

Objectives of the project
Design design and development of technological infrastructures and services for:

- Remote hive monitoring of beekeeping data
- Supporting beekeeping practices and management techniques
- Supporting the utilization of all beekeeping products

Beekeeping

- A labor-intensive practice
- Field Visit: Hive inspection
- Record observations
- Understanding the state of the hive
- Understanding the effectiveness of actions

Journaling

- Empirical methods
- Notes based on signs, symbols, and numbers
- During or after the process of the inspection
- Difficult to track the plurality and complexity of data

Our contribution

Install digital sensors on a beehive to assist in collecting data that can be later used to study the health and behavior + provide a journaling assisting device

Logging and Journaling Apiculture Practices

❖ There are certain lists and categories of information that one might look for in an inspection

❖ The amount of data produced in only one inspection can be overwhelming

❖ Beekeepers started journaling those inspections = keep notes

Appearing problems:

1
Time-consuming

2
Not conducive environment

3
the quality and quantity of the information differ

Relatable Systems and Software
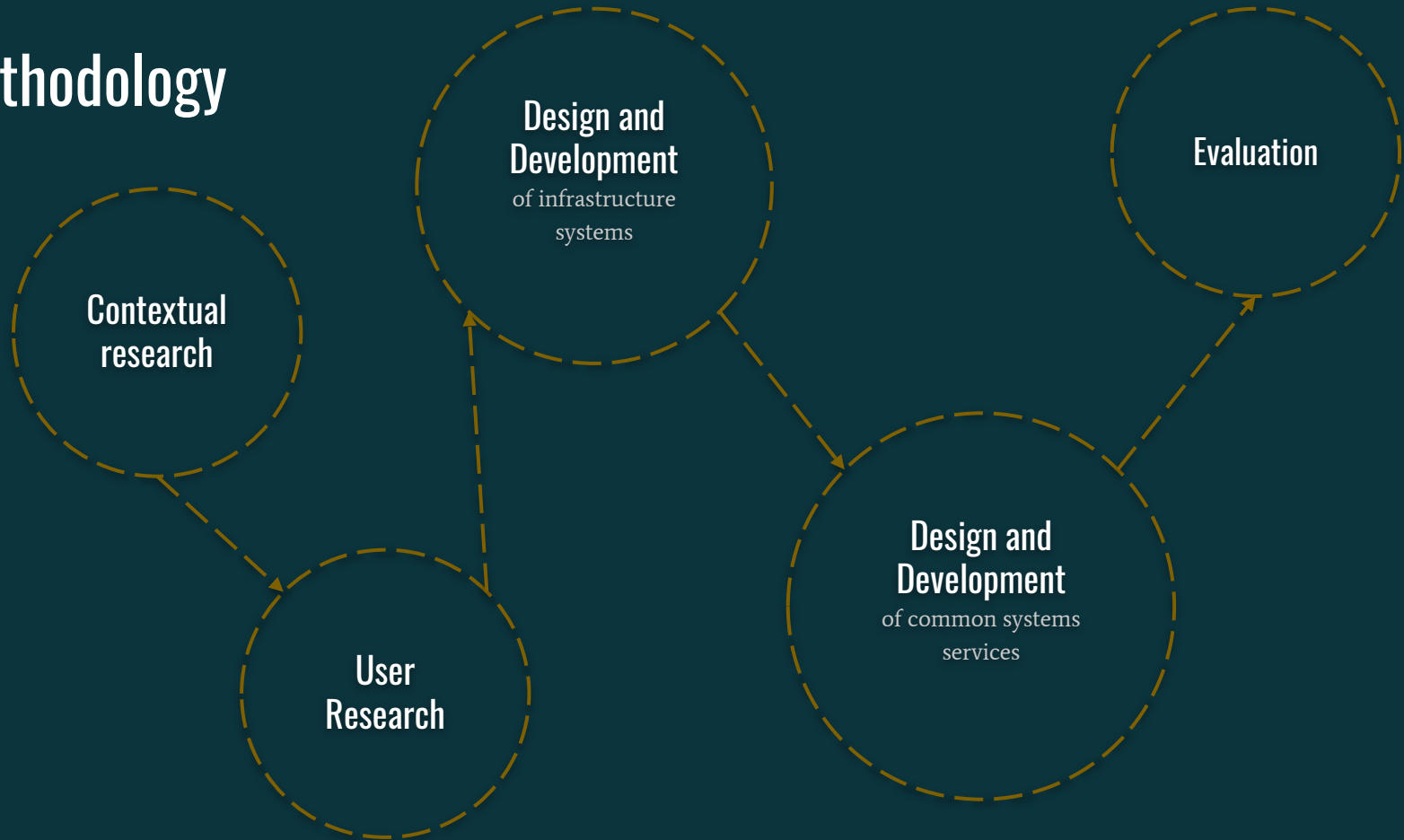
Beehive Journaling

Services and Applications:

1. Beep App and Beep Scale
2. OSBeehives and BuzzBox

Beehive Monitoring

Data related to:

➔ Temperature
➔ Humidity
➔ Weight
➔ Audio
➔ Video
➔ Vibrations

Methodology

Contextual research

Design and Development
of infrastructure systems

Evaluation

User Research

Design and Development
of common systems services

User research

Record beekeeping practices, the work environment, the challenges beekeepers face and the tools they use

What we learned:

1. Beekeepers only record a general review of their observations
2. Problematic situations are preferred to be solved on the spot
3. Time management and action plan before the next inspection

What other Researchers say:

- Not a user-friendly digital tool available
- Available systems do not cover their needs
- Some parameters stay neglected

User research

Record beekeeping practices, the work environment, the challenges beekeepers face and the tools they use

Journaling during Inspection

Marks on field

Symbols on the frames

User research

Record beekeeping practices, the work environment, the challenges beekeepers face and the tools they use

Hive tool always on hand

Everything placed at a close range

Interaction Requirements

- ❏ Hands-free interactive tools
- ❏ Avoid barehand interactions
- ❏ Use smart emerging technologies
- ❏ Portability
- ❏ Small and Lightweight assistive technology
- ❏ Utilization of tangible, speech recognition and/or gesture-based interactions

Wearables

small electronic gadgets with wireless communication capability, which are usually worn on the human body, or easily integrated into accessories and clothing

- ❖ Abundance and variety of interactions
- ❖ Immediate access to charts of live data
- ❖ Available technologies for manual data input

- ❖ Creation of a digitized version of Journaling
- ❖ Formation of a new user experience in beekeeping inspection
- ❖ Functions that meet the needs of beekeepers

IOHIVE Platform

- Accessible through wearable/tangible device & web application
- Integration of different end devices in order to monitor beehives
- Devices operated over the LoRa low-power wide-area network modulation technique

Future work of IOHIVE

- Design the physical product, the electronics, and the interaction techniques
- Develop the web interfaces, the user roles, and the visualization mechanisms

Currently working on...

Conceptual Designs

Prototypes

Evaluation Protocols

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