Karlsruhe Institute of Technology

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# C.S.I. Pollen(yzer)

## AUTOMATIC DETERMINATION OF POLLEN COLOR DIVERSITY ON MOBILE PHONE IMAGES OF POLLEN TRAPS

Parzival Borlinghaus

### Background

Pollen is known to be the only source of proteins and fats for honey bees and is therefore an important part of the honey bees' nutrition [1]. Pollen are essential for brood care and good indicators for the quality of a foraging site. It is also known that a diverse diet makes colonies more robust, including in terms of winter losses [1].

### C.S.I. Pollen

The spatial and temporal pollen (color) diversity has already been extensively assessed [2]. With the help of 750 beekeepers, almost 18,000 pollen samples were collected and undergone chromatic assessment in 2014 and 2015 for the "CSI Pollen" study [3]. The involvement of citizen scientists served to improve the scalability of the study - further automation is the logical continuation of this proven idea.

### Pollenyzer

We present an app that allows to quantify corbicular pollen loads from pollen traps and to determine its color diversity in an objective and automatic way. Since color diversity is closely related to the actual plant diversity [3], this relation allows conclusions to be drawn on the quality of a site and on biodiversity in general. In this way the app provides beekeepers with important information about the well-being of their colonies, while scientists benefit from aggregated information about local biodiversity. The web app is freely available on all devices.

POLLENYZER

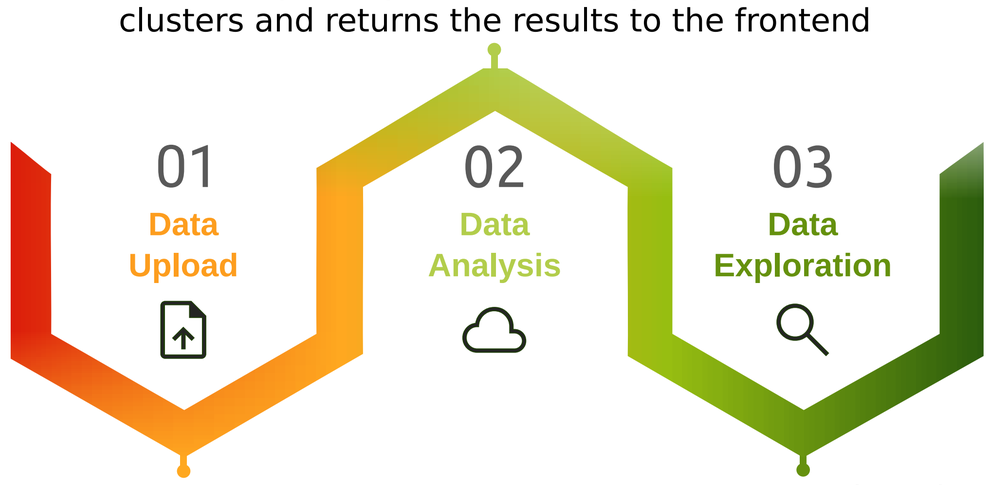
#### Current Features

- Count pollen
- Extract colors
- Cluster colors
- Visualization
- Gathering of scientific meta data

#### Outlook

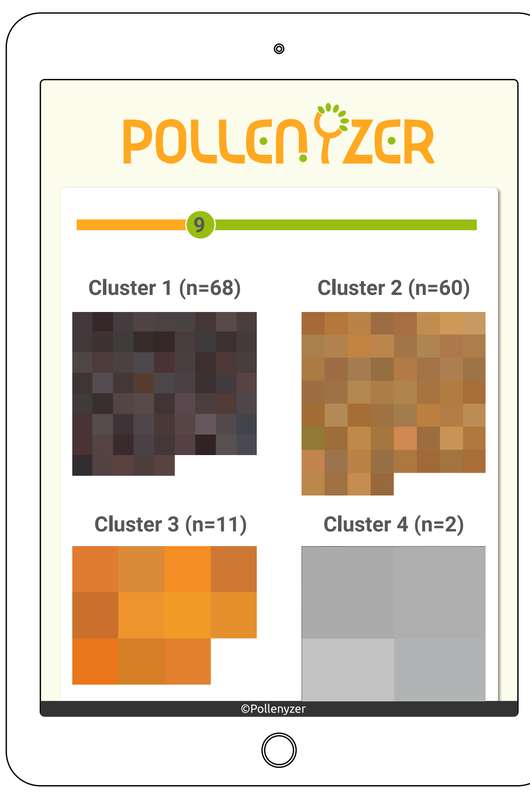
- Color calibration across images and devices
- User accounts and data export
- Suggestion of pollen candidates
- Open for suggestions

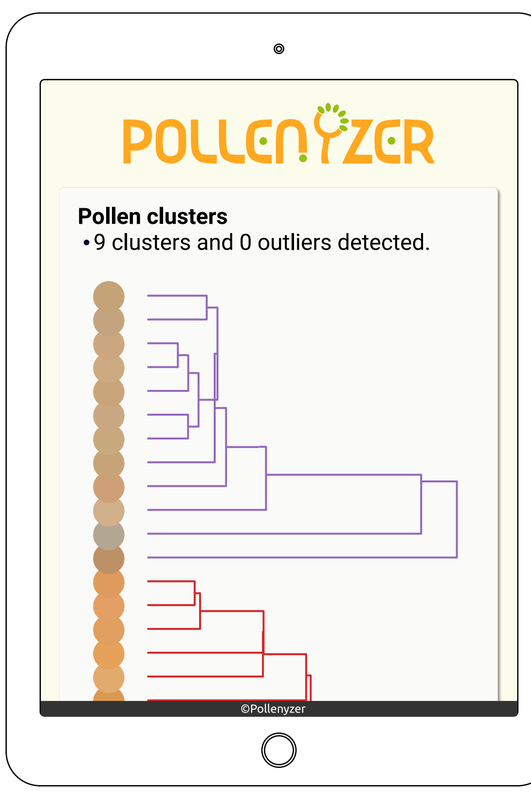
A cloud service detects the pollen loads, extracts primary and secondary colors, finds clusters and returns the results to the frontend

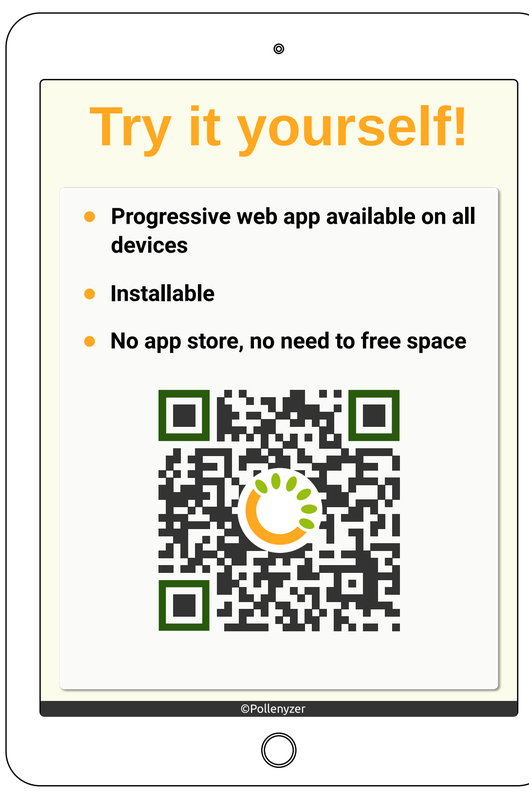



Users provide data either by upload or by allowing access to the device's camera

Users can explore the color diversity and reassess the clustering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DBU Deutsche Bundesstiftung Umwelt

**References**

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