GoNature
Final presentation

Augmented nature project - ACP2

Environmental awareness

What does it mean and why example species identification is important and is taught in schools?

> More caring about nature around.

> More caring about surroundings.

Contents

1. Core idea
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Core Idea

This project is to develop an **online gamified platform** to encourage and help students going into the wilderness for collecting and identifying different varieties of plant types as a school assignment.

It helps them explore the local nature leveraging tools like image recognition and crowdsourcing.

Teachers would benefit the most (not checking Every students work by hand)
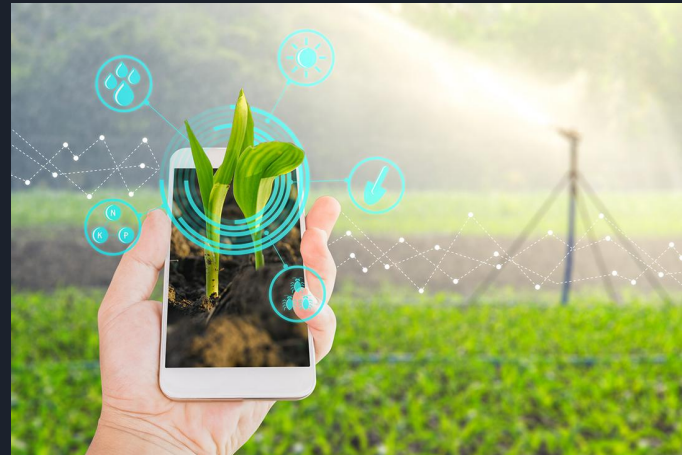
System flow chart of the app
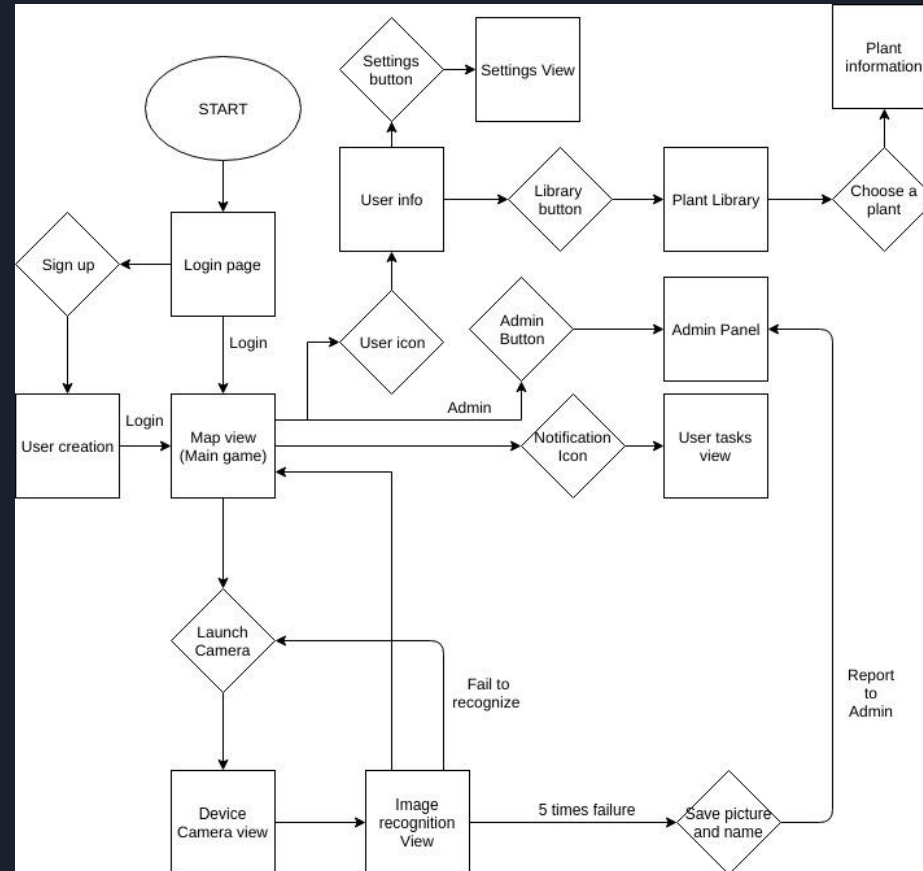
Our messy back-end

Plant identification machine learning solution

Plant identification via Plant.id API, a machine learning solution integrated into our application

With saving plants in database, we can make good use of the dataset to be used for training a machine learning model that can be implemented later for independent plant detection

Plant identification machine learning solution

Good results during evaluation, but not without obstacles:

- Botanical Gardens, not that great for testing
- More pictures = more accurate identification

Plant identification machine learning solution

How does it work?

1. Sends plant photo(s) for identification /identify-plant, returns id
2. Check identification and get name of the plant and other info /check-identifications
3. Client can confirm suggestion, give feedback / crowdsourcing /confirm-suggestion

Project Structure and packages

- The project structure has been to 3 main folders.
    1. In the amplify folder we have the backend functions which is generated by amplify.
    2. Build folder which is used for publishing the application to server.
    3. Src folder which contains all the components and style files.

- For storing the pictures we used AWS S3 and for storing users data we used dynamoDB.
- For the login information we used Amazon authentication.
- For the map we used React-Leaflet, which has many map themes. In our case we choose animated version.
- For the styling we chose bootstrap and also used excited components from the devextreme-react.

Lookup table to translate Finnish plants

One challenge from the API usage that it used scientific names, so we had to use a lookup table to translate these names to be used by Finnish 8 graders.

```
export const NameTranslations = {
Pinophyta : 'Havupuu',
'Acer platanoides' : 'Vaahtera',
'Alnus incana' : 'harmaaleppä',
'Betula nana' : 'vaivaiskoivu',
'Betula pendula' : 'rauduskoivu',
'Geranium sylvaticum' : 'metsäkurjenpolvi',
'Picea abies' : 'kuusi',
'Vaccinium myrtillus' : 'mustikka',
'Vaccinium oxycoccos' : 'karpalo',
'Asparagus densiflorus' : 'Asparagusdensiflorus',
'Zantedeschia aethiopica' : 'Zantedeschiaaethiopica',
'Hedera helix' : 'Hederahelix',
'Strelitzia parvifolia' : 'Strelitziaparvifolia',
'Ficus carica' : 'Ficuscarica',
'Cotinus coggygria' : 'Cotinuscoggygria'
};
```

Our super cool front-end

Sign in to your account

Username *

Enter your username

Password *

Enter your password

Forget your password? Reset password

SIGN IN

No account? Create account

Create a new account

Username *

Username

Password *

Password

Email *

Email
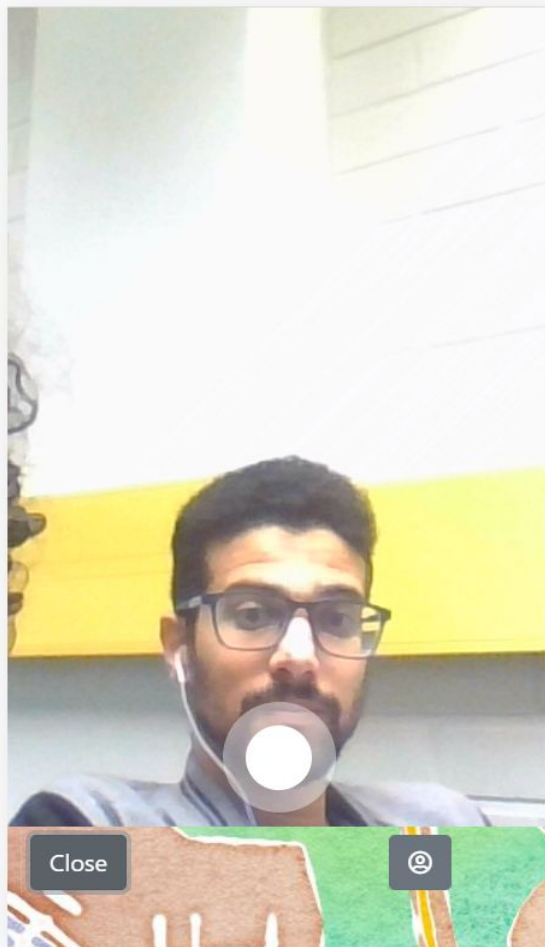
Phone Number *

+1 ▼   Phone Number

CREATE ACCOUNT

Have an account? Sign in

Kasvi Kirjasto

Cotinuscoggygria
common

Ficuscarica
common

Hederahelix
common

Library
AdminPanel
Scores

Close

Admin

Tehtävän anto   Opiskelijat

Select... ▾

Cancel

Admin

Tehtävän anto   Opiskelijat

Tehtävän nimi:

Löydettävä kasvi:

valitse kasvi ▾

Valitse opiskelija ryhmä:

valitse ryhmä ▾

Aika raja:

‹   JANUARY 2019   ›

SUN	MON	TUE	WED	THU	FRI	SAT
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

Luo

Cancel

Tilastot

Kerättyjen kasvien määrä

Nimi	↓	Määrä
Username123		4
nechir123		3
manish		1
eetu		1
nacha123		1
moamenibrahim		0
ubitester1		0
Mo		0

Sulje

Evaluation

Setup:

1. Checked the API first with best working plants in **Botanical gardens.**
2. Adding plants to database with coordinates.
3. Prepare tasks and contact peoples :)

Users tasks:

1. Create a user
2. Use the image recognition functionality to take a picture of a plant
3. Try to find a collectable plant
4. Complete a task
5. Browse your plant library to see your plants

How to evaluate then?

After finishing the tasks, users will have to fill an evaluation survey including:

- Some basic background information from users: previous experience with any AR apps, personal information about sex, age and others.
- System usability scale (SUS).
- Evaluation questions about the app.
- Tell users about the gamified application approach with more explanation and what they think about it in a free discussion.

Map of plants used in evaluation

Some reflections and results

8 participants

The participants were 75% male, 25% female gender. As for age, 50% were 23-26 years old, 37.5% 18-22 years old, and 12.5% 27-30 years old.

50% responded that they would like to use it frequently. 62.5% found it unnecessarily complex, while the rest found it somewhat complex.

66.7% of participants considered that the application would be very useful for them for identifying different plants. 50% responded that the application is fun and playful and looks attractive, with minimalistic functionality and a clean user interface.

Future work

- **Functionalities:**
    - **Crowdsourcing the plants**
    - **Report for missing plants**
    - **Admin rights for giving task to students**
    - **Student's task progress**
    - **Grading system with time**

- **Gamify the application (visualization).**

- **The machine learning approach for plant identification (instead of the API).**

- **Testing plants with actual 8 grade students in Oulu.**

Thanks for listening :)

Link to project (Github):
https://github.com/manishmaharjan/augmentednature

Link to website (production):
https://acp2.tk

Link to evaluation forum (Google):
https://forms.gle/tBJ1CEH5L8rXTRQa7