Save the vineyard! Hackathon

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Save Tokaj!

Motivation:

- automated detection of vineyard infected by Esca disease by using Machine Learning algorithms
- propose an end-to-end solution from detection to real action

Method:

- Machine learning:
    - Neural networks, Transfer learning, Keras, Tensorflow, Data augmentation
    - Detection of Esca from images

- iOS app:
    - Core ML, AR kit, Firebase
    - Real-time Esca detection
    - get position of Esca vineyard

- web app:
    - Python (Flask + Folium library)
    - display positions of infected vineyard
    - observe Eska evolution in time
    - possible correlation with different parameters

Results:

- we reached precision 80% in Esca detection by VGG 19 model (CNN)

- position of detected Esca vineyard tree is automatically send from iOS device to web server

- Esca positions are displayed in augmented reality and on [web map](web map)
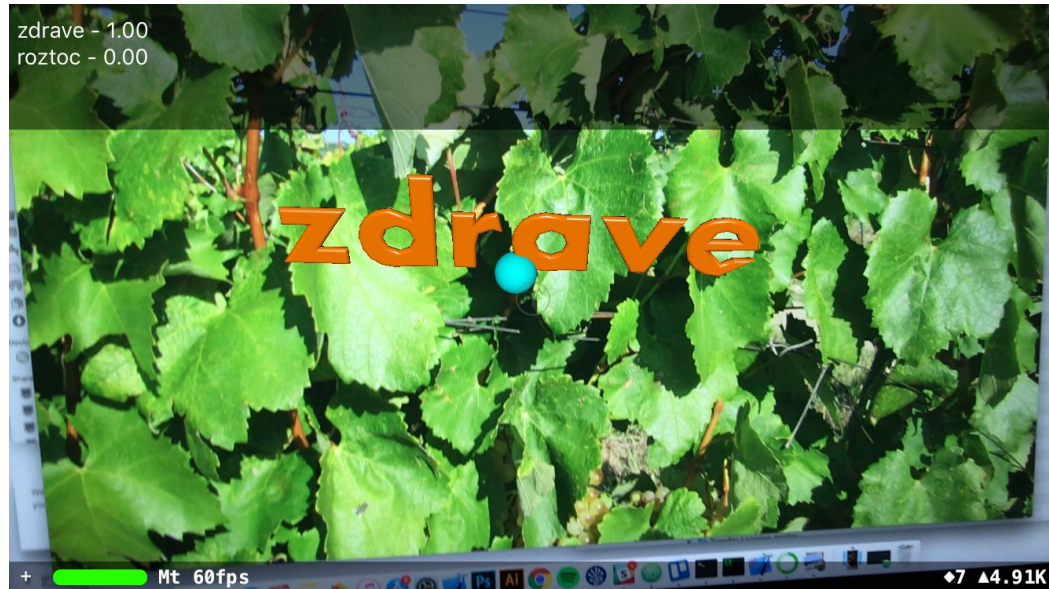
Esca spread/ population in time from GPS data (web app)
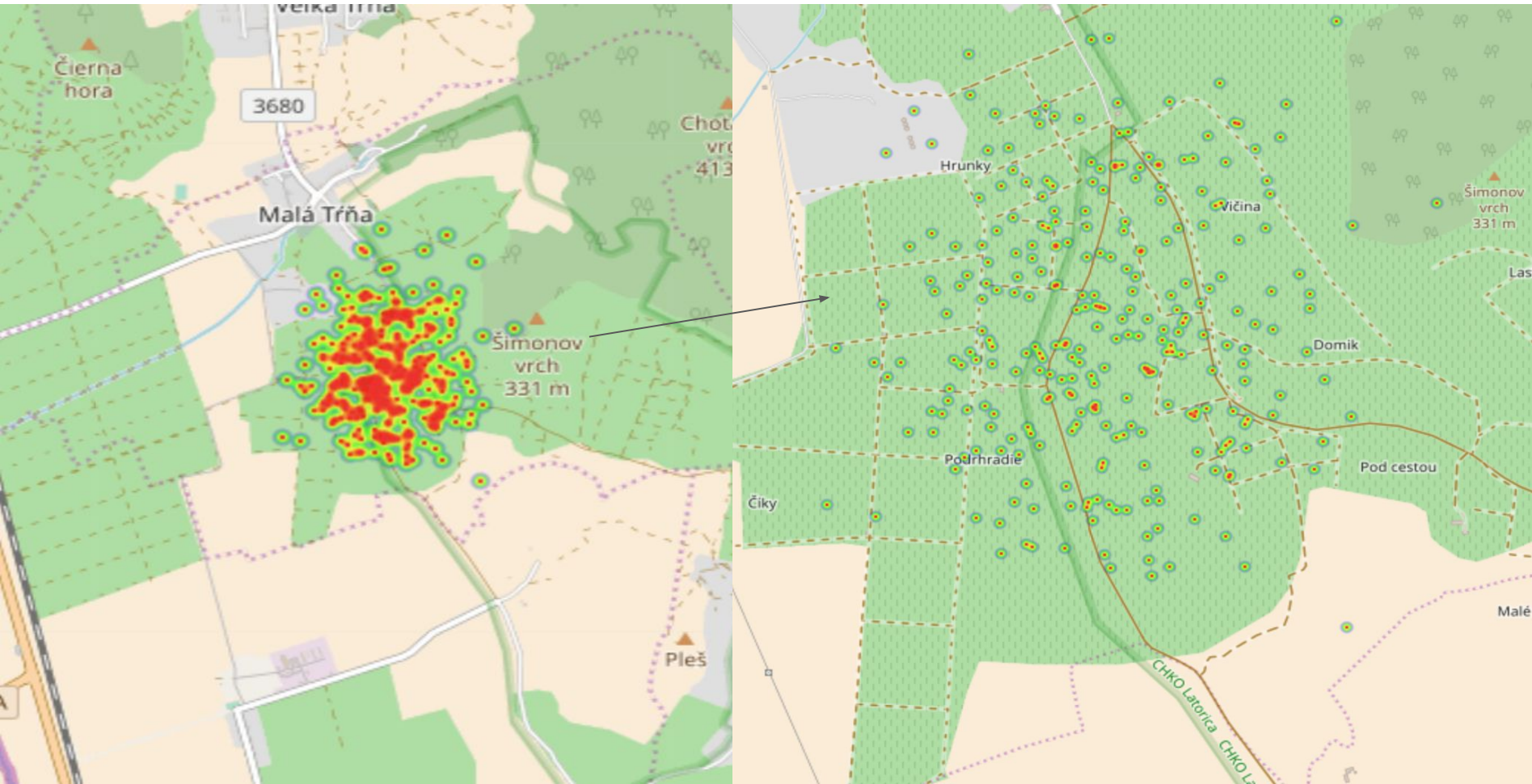
Next steps:

- take pictures in specific area of vineyards in Tokaj
- analyse the long term gathered data in database for disease spread prediction
- show pictures of endangered trees instead of tags
- use UAV for automated control of infected vineyard (using GPS coordinates on map)
- using of Galileo + GPS system: precision in 10 cm
    - e.g. by using Broadcom BCM47755 chip, Xiaomi Mi 8
- stop the Esca