

# System for hand gestures recognition from the sign alphabet

Kosara Perchinkova

**In the frame of the Students' forum, 20 mn is given to junior participants for a talk on any health topic**

# Who am I?

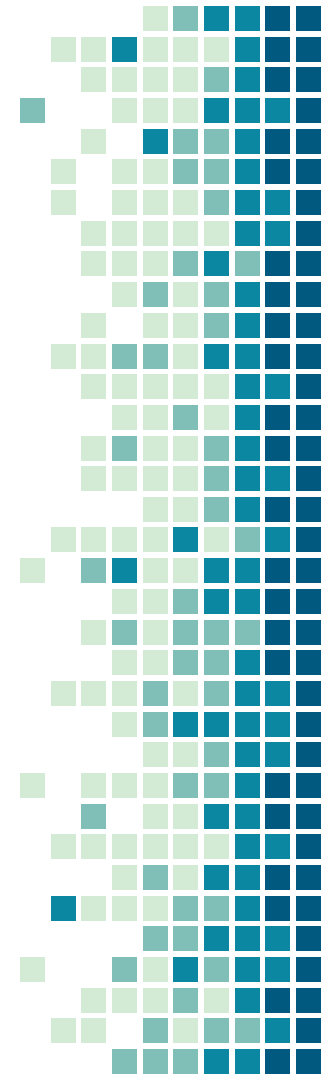
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SS. Cyril and Methodius – Skopje, Macedonia

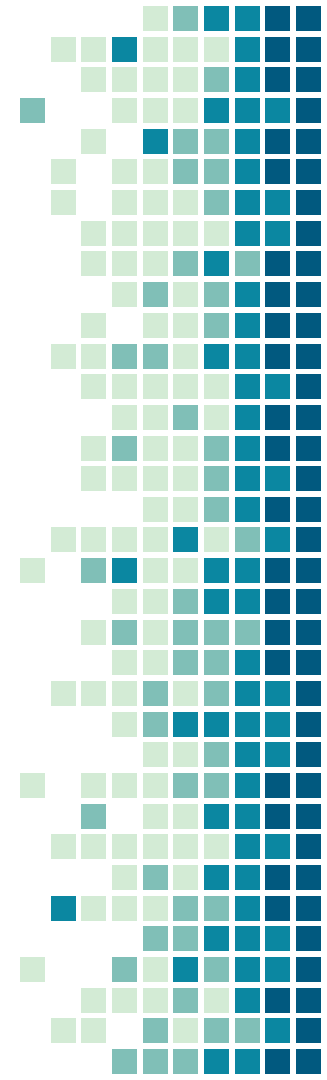
Module: Computer Technologies and Engineering

MSc Biomedical Engineering, Politecnico di Milano  
(starting from September)

Module: Information Bioengineering



- Idea
- Macedonian sign language and alphabet
- Goal
- System
- Results
- Future work



# Idea

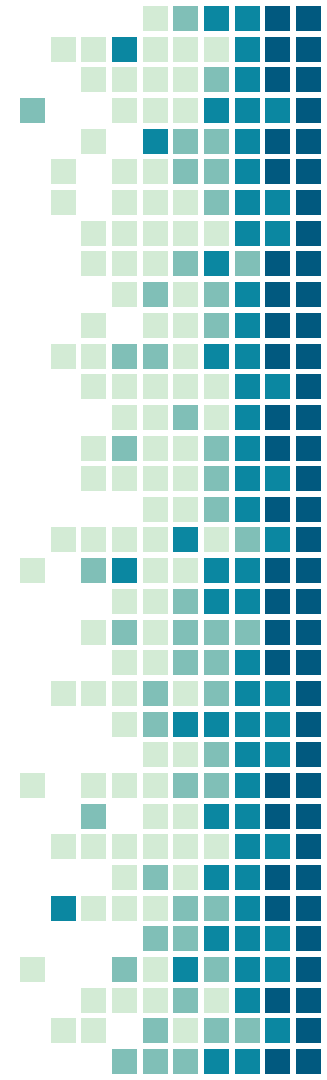
- Volunteering
- Research for implementation of machine learning
- Help in digitalization and interpretation of the Macedonian sign language
- Bring awareness and involve people



# Sign language

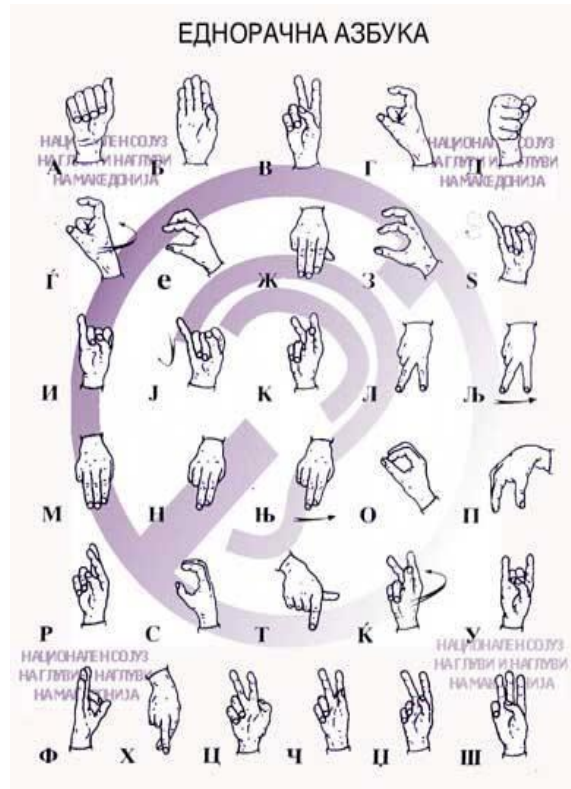
\*Gestuno

- Composition:
  - Fingers
  - Hands
  - Arms
  - Facial expressions
- Macedonian language: NOT standardized



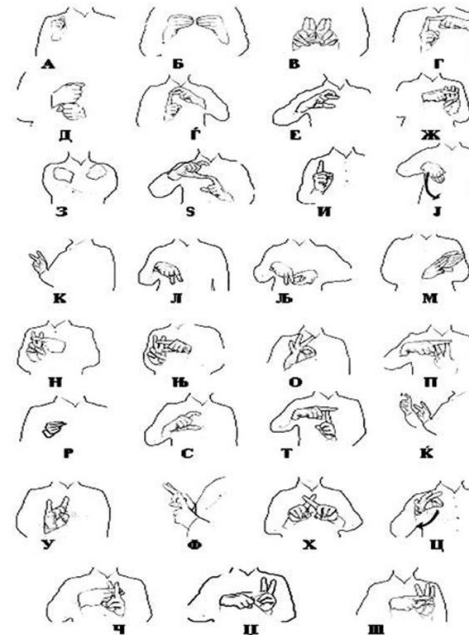
# Alphabet

## One hand



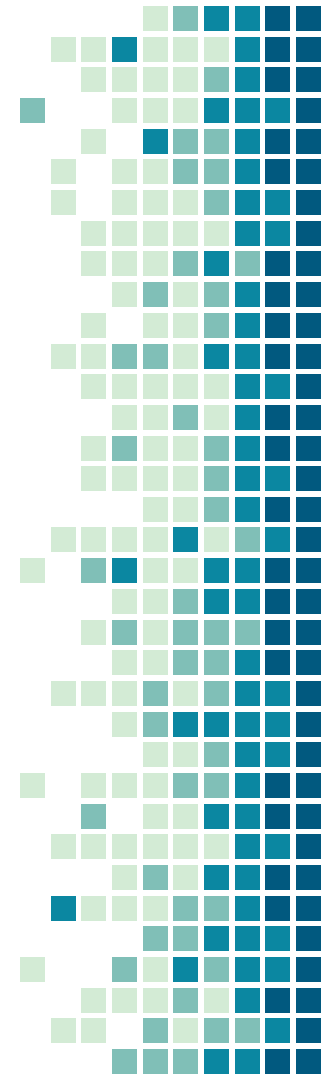
## Two hands

### ДВОРАЧНА АЗБУКА



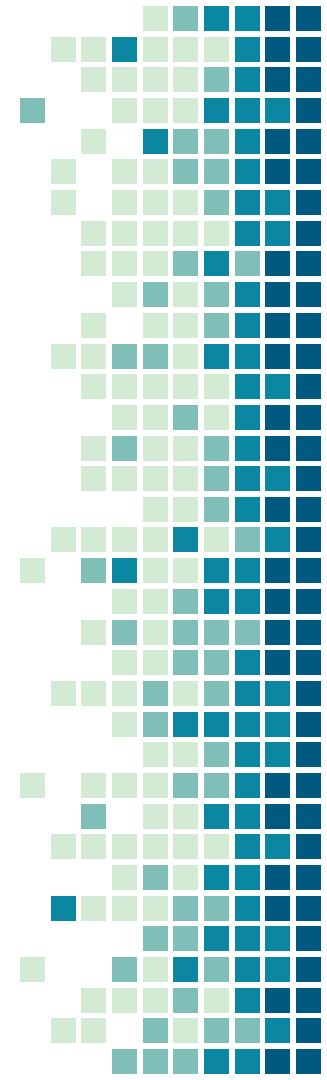
# Goal

- Predict the gestures of ONLY one hand
- WITHOUT using sensors and gloves for detection of hands
- Use images from camera from laptops



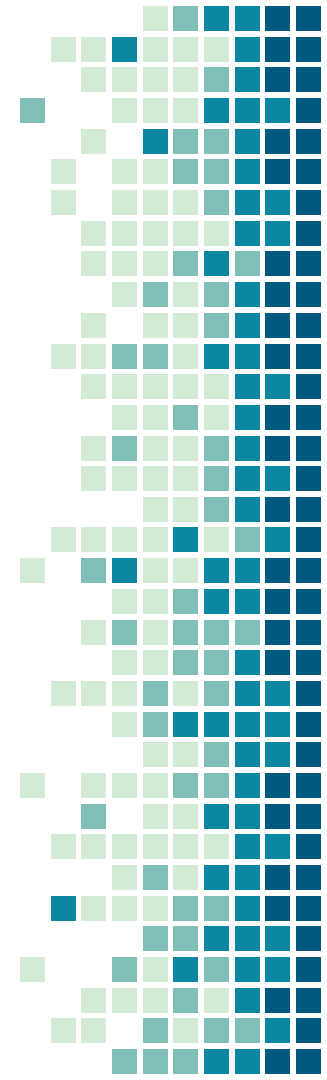
# System – Creating the dataset

- Videos:
  - approx. 10 seconds for each letter
  - 20 frames from each video
  - 31 letters
  - 15 testers, 13 used
  - Total 8060 images



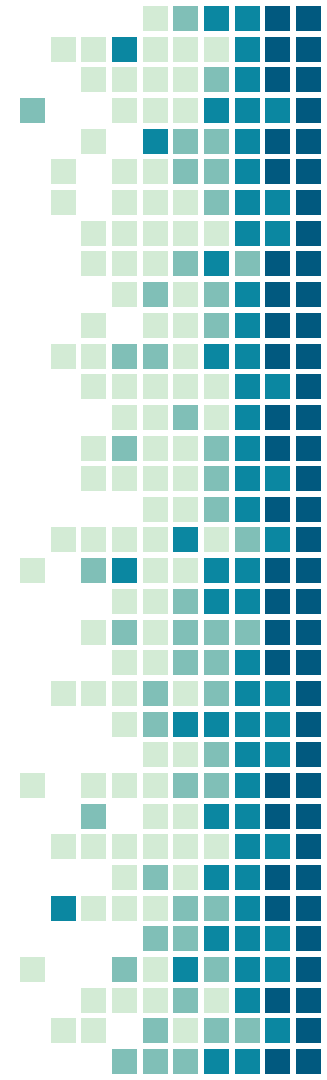


# Examples



# System – Machine learning

- Division of dataset: 80% train, 20% test
- Training and testing the model:
  - SVM ( Support Vector Machine)
    - Linear SVC (Support Vector Classification)  
– one-vs-rest scheme
    - Results: ~97%
  - CNN (Convolutional Neural Network)
    - Library Keras
    - Results: 96.52%



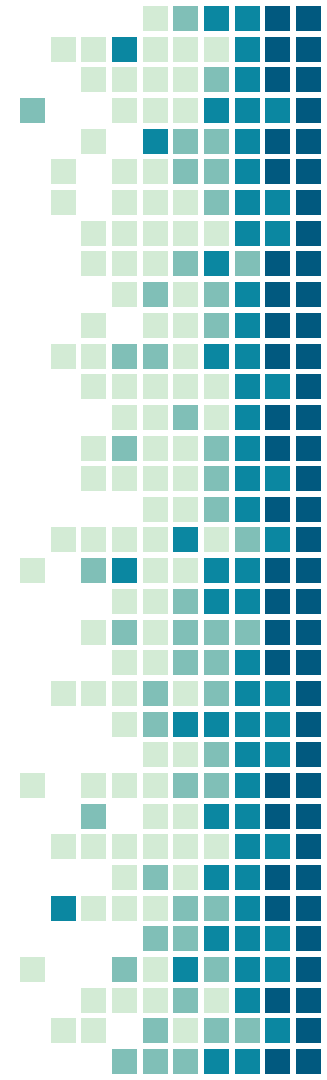


Capture gesture!



Activate Windows  
Go to Settings to activate Windows.

- Real life testing
- Simple user interface



# SVM-Linear SVC

74 Hand Gesture Recognition System



Capture gesture!

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Activate Windows  
Go to Settings to activate Windows.

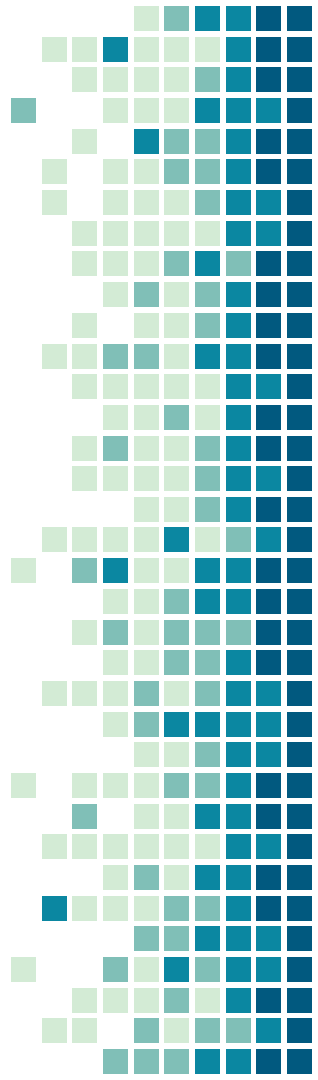




Capture gesture!

.....

Activate Windows  
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# Future work

- Help in standardization
- Increase the dataset
  - Different backgrounds with various light conditions
- Improving the system
  - Different approach for detecting the hand

Project is ON HOLD



The project was made as bachelor thesis at the Faculty of Electrical Engineering and Information Technologies, university of "SS. Cyril and Methodius" in Skopje, Macedonia.

Mentor: Goran Stojanovski

Original title: Проектирање и имплементација на систем за препознавање на знаци од македонскиот знаковен јазик.  
Десктоп апликација

# THANKS!

Any questions?

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