Voice Control

Introduction

eLearning

- Password: axela

- Announcements:
  - Link to the cloud with all documents
- FAQ:
  - Students ask students
  - Students ask Prof

Goals and motivation

- Python programming in chapter 1
- Audio analysis in chapter 2
- Classification in chapter 3 and
- Denoising in chapter 4

- Each chapter consists of a set of jupyter notebooks.
- Each jupyter notebook
  - explains a single topic
  - Gives you a programming exercise
  - Gives you a set of exam preparations

Requirements

- Hardware: Bring your own device – Notebook
- Work as a team – two or three students with at least one notebook
- Software:
  - Python, e.g. 3.11
  - Jupyter Notebooks
- Smartphone App: phyphox

Time Schedule

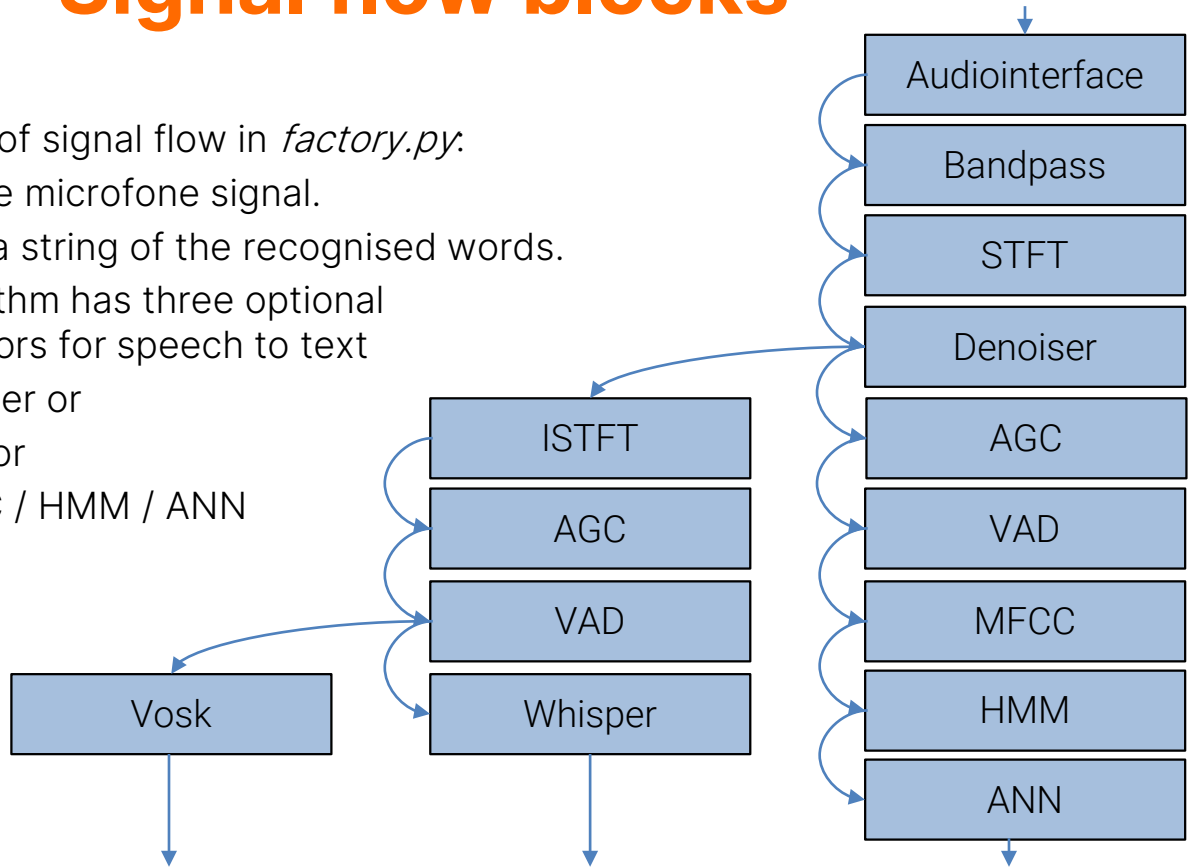
- 1 Session corresponds to 1,5 h.
- One semester corresponds to 30 sessions:
  - 2 Sessions: Python Introduction (no preparation necessary)
  - 2 Sessions: How to work with jupyter notebooks (installation of python, jupyter, ...)
  - 19 Sessions: 1 session per jupyter notebook
    - Before: read the jupyter notebook carefully and try the code.
    - During:
      - 30 minutes questions
      - 45 minutes program exercises
      - 15 minutes discussion of reference solution
    - After: try the exam preparation and compare it with the reference solution.
  - 7 Sessions: discussions of exam preparation

MOPS

- MOPS: Offline Python Speech-Recogniser
- Software is a chain of signal flow blocks:
  - Input signal x
  - Output signal y
  - (non-) linear behaviour defined by algorithms: $y = f(x)$

MOPS – Signal flow blocks

- Definition of signal flow in *factory.py*:
- Input is the microfone signal.
- Output is a string of the recognised words.
- The algorithm has three optional classificators for speech to text
  - Whisper or
  - Vosk or
  - MFCC / HMM / ANN

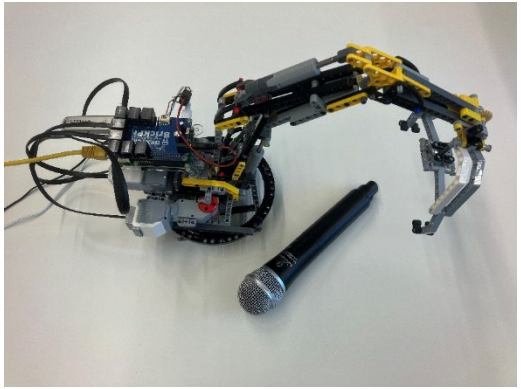


MOPS – Training of HMM / ANN

- Open python-script *Train.py.*
- Select keywords in the list VOCABULARY.
- Define the reaction of the system by connecting a detected word with a procedure, e.g.:

ResultController.TheResultController.AddCommand('links',
StateMachine.TheStateMachine.triggerMotorALeftTurn)

- Start the python-script *Train.py*.



MOPS – starting the software

- Open the shell and type: *python main.py* and the MOPS is running☺.

Thanks a lot for your attention...

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