

Video Coding

Seminar 1 SS 2021

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1. General Information

- Homework assignments every two weeks

a) Homework assignments:

- Solve with Python
- Can be done in groups of 5 people
- Show and explain your solution on seminars
 - You can show a homework **only** during the seminar
 - Submission via email is not possible

b) Each group member:

- should have working code (use of clouds)
- has to know the code

c) Everyone has to be able to answer theory questions

1. General Information

Homework assignments:

- Each seminar can be postponed **ONLY** for 2 weeks (if you can't submit seminar, you can submit it **ONLY** next time, not later)
- Do not use build-in functions (e.g. RGB → YCbCr conversion)
- Encoder and Decoder – separate python files
- Use functions in the code
- Main function has to be clearly understandable without redundant (often used in each homework) actions (like RGB → YCbCr conversion, DCT and iDCT)

1. General Information

Homework submission:

- 1) Run your code to show the results
- 2) Explain all the figures and videos
- 3) Show file sizes (if needed)
- 4) Answer questions regarding your code
- 5) Answer theory questions
- 6) Done, you can go home or wait for your next turn to submit one more HW
- 7) **Do not talk loud, respect your friends and colleges and let them submit their HWs in silence**
- 8) **If code is not working – try to figure out why (at home) and explain me**

1. General Information

- Quizzes every week

a) Quiz

- Test related to the latest content of the lecture
- Sign in at moodle2 (<https://moodle2.tu-ilmenau.de/>)
- Use your university login and password
- (Fakultät EI --> Institut für Medientechnik --> FG Angewandte Mediensysteme --> Video Coding)
- Pass the Quiz until the next lecture

1. General Information

- The homework points account for 30% of the final grade. The exam accounts for the other 70%.
- Gained points will only be added after passing the exam.
When a student fails the exam the points stay valid until the lecture is held again and there are new homework assignments (in the following summer semester).

2. Homework assignment

- Use the framework *videoencframework.py*
(from Python Examples folder for 2-nd Lecture)
- Capture an object with your webcam which contains fine patterns and movement
- Display video (RGB) using *cv2.imshow()* command (live video)
- Apply the **YCbCr** color transform (live video)
 - Use **matrix provided in lectures**
 - Make sure to enter colors in the right order

2. Homework assignment

- Display Y, Cr, Cb components **separately** (live video)
 - Use `cv2.imshow()` command
 - Don't forget normalization
- Write Y, Cb, Cr to the "`video_raw_data.txt`" file using the `pickle.dump()` or another function (3 seconds)
 - What is the size of .txt file?
- Convert Y, Cb, Cr to uint8 and int8 data type
 - What happened with the size of .txt file (**compare**)?

2. Homework assignment

- Now use *videodecframework.py*
(from Python Examples folder for 2-nd Lecture)
- Load your *"video_raw_data.txt"*
- Apply the inverse color transform (**Y,Cb,Cr** → **RGB**)
 - Use the matrix provided in the lecture
 - Display the resulting **RGB** output
- Implement **Encoder and Decoder** parts as **separate python files**

3. Installing Python (1/3)

- Linux (recommended and easier)
 - Python is already installed
 - Necessary packages
 - `sudo apt-get install python-numpy`
 - `sudo apt-get install python-scipy`
 - `sudo apt-get install python-matplotlib`
 - `sudo apt-get install python-opencv`

3. Installing Python (2/3)

- Windows
 - Install python (Python 3)
 - <https://www.python.org/downloads/windows/>
 - Necessary packages (use 32 bit versions)
 - <http://www.lfd.uci.edu/~gohlke/pythonlibs/>
 - numpy
 - scipy
 - matplotlib
 - opencv

3. Installing Python (3/3)

- Alternative solution for Windows
 - Install Python(x,y) (only Python2)
<https://python-xy.github.io/>

3. Installing OpenCV (1/2)

Download and install .Net Framework 3.5 (if not already there)

<http://www.microsoft.com/de-de/download/details.aspx?id=21>

- CV2 needs matplotlib and scipy.
- Install them (if not already there)

pip install numpy

pip install scipy

pip install matplotlib

3. Installing OpenCV (2/2)

Download *cv2.pyd* from Moodle or download the complete CV2 Package (very big)

- Copy *cv2.pyd* to
- **C:/Python27/lib/site-packages**
- Test:

```
import cv2  
print cv2.__version__
```