Hybrid lecture with blackboard use

If you want to work with the blackboard in the lecture hall, this is generally possible. The room microphone and other options can also be used. They are supplemented with a camera that you bring with you, which is connected to your own laptop and used as a screen share in Zoom & Co to show the blackboard. This allows two double boards (2x two board surfaces on top of each other) to be streamed in a legible manner. In large lecture halls (e.g. Benz and Daimler-HS), this corresponds to two-thirds of the total board area. The scenario can be used without additional staff.

Overview

Possible result

The setting can be used to work continuously on the blackboard. This means that it is possible to start the Zoom session with the camera once at the beginning of the lecture and then work exclusively on the whiteboard.
Up to four boards are visible. The image shows the section of the camera in Zoom. The content is easy to read in normal font size. If there is a lot of light coming in from the side via windows, a blind may need to be used to avoid reflections. With the proposed camera, the camera follows the teacher automatically or can be aligned manually. This behavior can be switched on and off using a hand gesture without using the computer, e.g. to change the orientation of the camera. It is also possible to switch back and forth between the displayed size and a double zoom using a gesture.
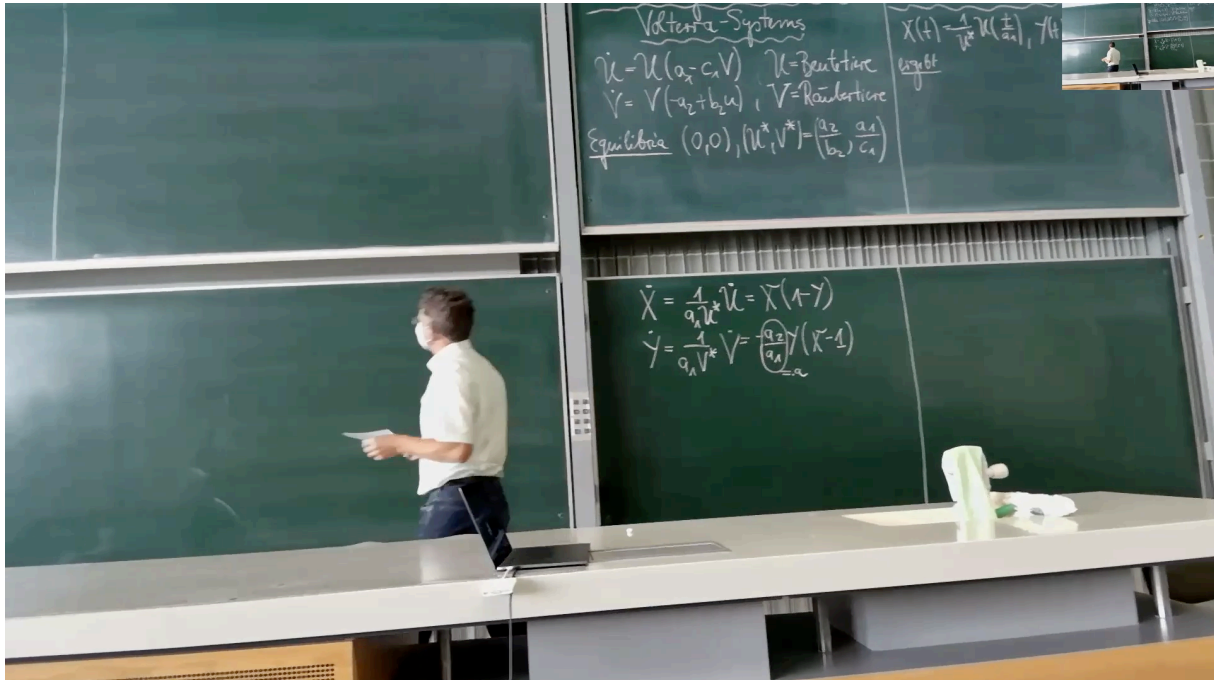
Necessary hardware

Already available **in the lecture hall** at KIT:
- Access to the lecture hall sound, microphone via USB connection, sound output via HDMI output of the laptop together with an optional projection
- Network access via Ethernet cable.

To be procured and brought by yourself
- 1x tripod, working height approx. 150 cm, approx. 50-100 €, e.g. https://www.rollei.de/collections/stative/products/stativ-c5i
- 1x Obsbot Tiny **webcam** approx. 220€, (alternatively other USB webcam without tracking function, preferably wide-angle)
- 1x **connection cable** 4-5m, approx. 20€: either connection cable, USB type C to USB type C, (USB 2.0 standard is sufficient) or with USB-A plug on one side
- Optional, depending on the lecture hall, extension cable USB-A socket to USB-A plug 5m to extend the USB connection in the lecture hall to the laptop for microphone use.
- **Laptop** with 2x USB-A connection (or via adapter), network connection (Ethernet RJ45), installed Zoom client and activated Zoom license. (In principle, the same procedure can be followed in MS teams).

Setting up the camera

The camera is positioned on the tripod in the center of the board surface to be used. Two boards next to each other can be used in this way. A third board next to it is no longer suitable from the viewing angle and is not used (see picture series).

2
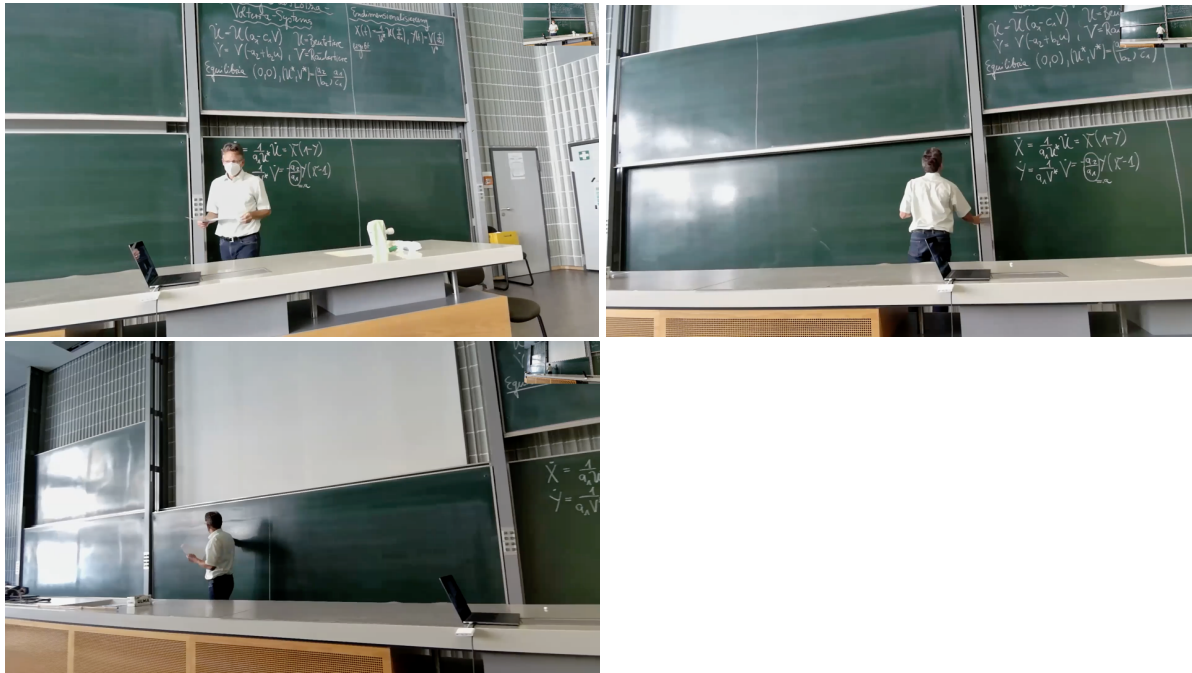
The camera should be as low as possible so that as much of the upper board as possible is still visible above the teacher's head during automatic tracking. Here, the camera has been positioned so that it looks straight over the lecture hall desk.

In terms of distance, the blackboard is positioned between the lecture hall desk and the first row of seats. Please ensure that there are no tripping hazards and that escape routes remain clear.
It is recommended that you set up the laptop so that you can check the orientation of the camera yourself via your own screen.

Starting the zoom session

1. First connect your own laptop to the lecture hall technology via USB. (see also instructions "Using Zoom for hybrid scenarios with the media technology in the lecture hall" on https://www.zml.kit.edu/downloads/Merkblatt_HybrideSzenarienHoersaal.pdf). This makes it possible to access the lecture hall microphone in Zoom.
2. The laptop is also connected to the lecture hall projection via HDMI for the sound output.
3. Connect the USB camera you brought with you using a USB cable.
4. Connect the existing Ethernet cable for network access. After plugging in the cable, the connection must be activated. To do this, open your browser, go to http://captive-portal.scc.kit.edu/ and activate it with KIT Login (ab1234). [Alternatively, a VPN connection to the KIT can also be established and used without activating the LTA connection.]
5. Starting the Zoom client and Zoom session.
6. Under Camera, select the OBSbot Tiny USB camera in the zoom toolbar.

7. Select "USBDigital Audio" as the microphone in the toolbar. For the loudspeaker, select the HDMI device that corresponds to the projector in the lecture hall. So that external participants can be heard in the lecture hall if necessary. The exact names may vary depending on the lecture hall, but are similar. You can find out which input is the microphone in use by unmuting and tapping the microphone lightly. You should be able to see the tapping as a level with a green tint in the Microphone icon on the Zoom toolbar. For sound output, you can run the "Test Speakers & Microphone" function in the Zoom toolbar near the microphone icon to check whether the audio is output via the speakers in the lecture hall.
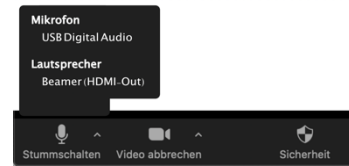
8. In Zoom, the **board camera** is also shared via **screen sharing**, so the resolution and readability are significantly better. To do this, select "Share screen" in the Zoom toolbar and then select "Content from 2nd camera" under "Expand". If Zoom does not select the correct camera signal, there is a "Change Camera" button at the top left of the window that appears. Press this until the correct content is displayed.
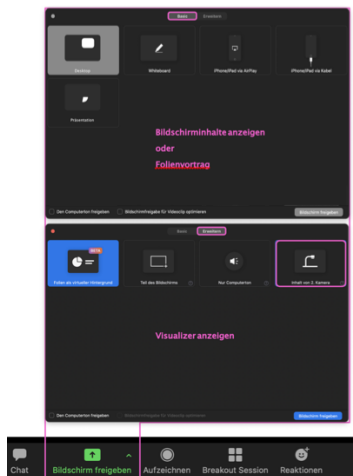
9. Stand in the middle of the image of the OBSbot Tiny camera and activate tracking for yourself by using the "open palms next to your head" gesture. To deactivate tracking, use the same gesture again. Alternatively, you can move and align the camera by hand when tracking is deactivated.

10. Begin the lecture.

Camera control

During the lecture you can control the camera with 2 gestures. Both gestures are done with the hand next to one's own face. Make sure that your hand is held approximately at head height and is clearly next to your head from the camera's perspective. If the camera tries to recognize a gesture, the status LED on the camera turns blue. If the gesture is successfully recognized, the LED turns green again, otherwise it briefly lights up yellow.

- **Tracking on- or off** with the palm of your hand next to your head
  Be sure to spread your fingers slightly to improve detection.
- **2x Zoom on/off** with L gesture next to head
  Make sure there is a clear L, your thumb and index finger should form a right angle.
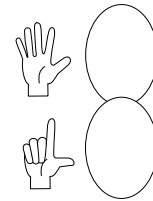
Alternatively, the camera can also be controlled via the PC using additional software from the manufacturer. You can get the "Obsbot Tiny Cam" software at https://www.obsbot.com/download. In the software you can control the camera with a joystick and save positions (e.g. board 1, board 2) as a preset position before the start of the lecture. These positions can then be quickly accessed in the session with a click or keyboard command.

More information

- Notes on recording and other topics can be found in separate instructions at
  https://www.zml.kit.edu/hybride-lehre.php
- Try out which light in the lecture hall doesn't make the boards reflect too much.

Infos & contact

Last update 11.08.2022

License notice

Impressum

Publisher Karlsruher Institut für Technologie (KIT) Kaiserstraße 12 76131 Karlsruhe

contact Karl-Friedrich-Str. 17 76133 Karlsruhe Deutschland Tel.: +49 721 608-48200 Fax: +49 721 608-48210 E-Mail: info@zml.kit.edu