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Technische Universität Berlin

Course Multimodal Interaction at NPTEL

Stefan Hillmann | Quality and Usability Lab | MIELES Study Visit Berlin, April 15–16, 2019

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Motivation

- Criteria from meeting in Bangalore
- Lack of HCI-related courses at NPTEL
- Existing know-how and resources at TU Berlin

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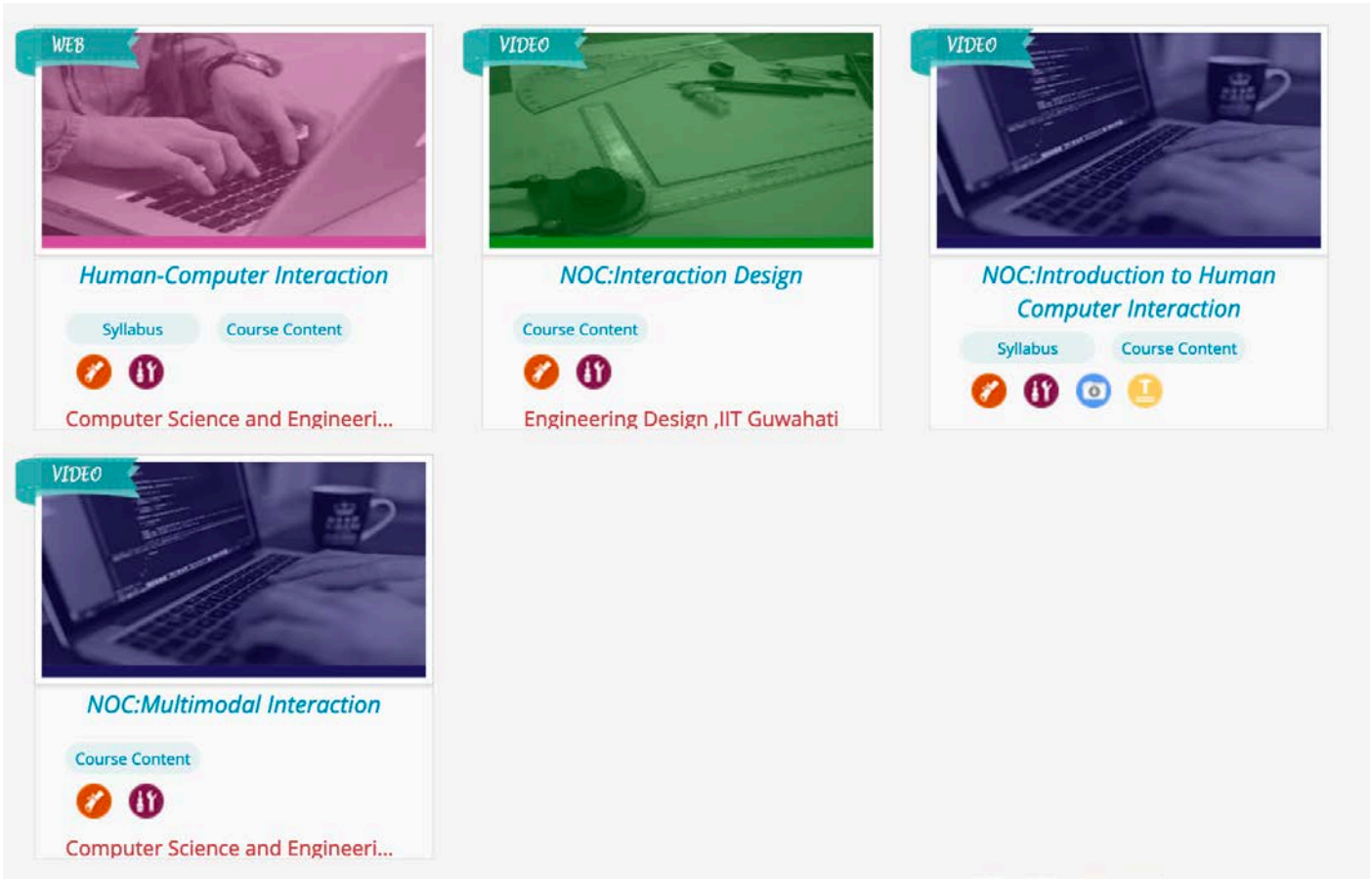
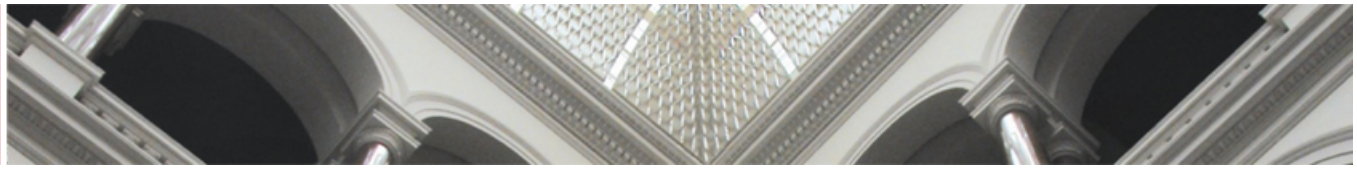
(Only Few) Related Courses





Lectures

Prof. Dr.-Ing.
Sebastian Möller

Prof. Dr.-Ing.
Jens Ahrens

Dr. Benjamin Weiss

Dr.-Ing. Stefan Hillmann

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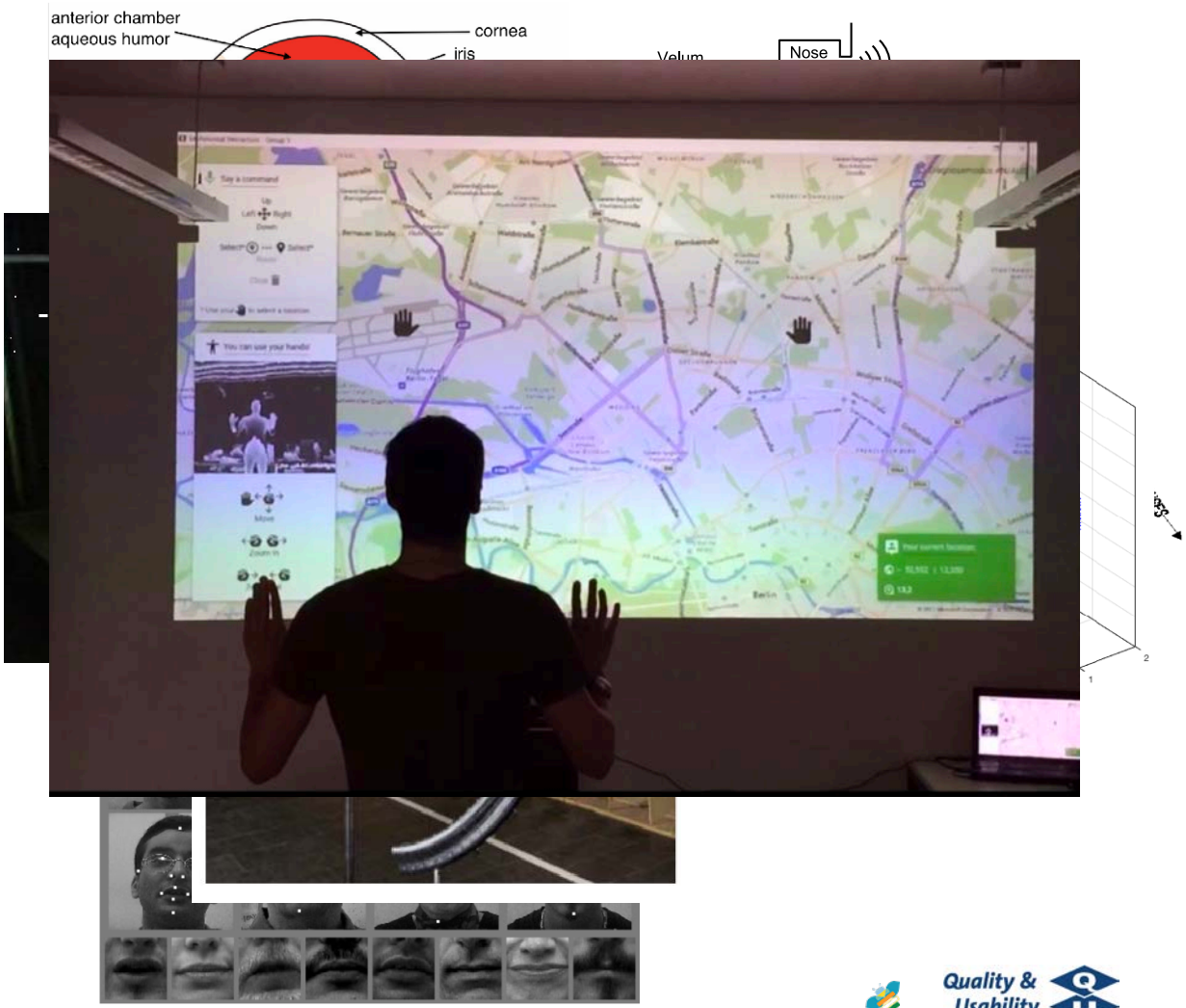
Course Content

- Multimedia and Multimodality
- Hearing and Speech
- Vision
- Other Senses,
- Integration and Cognition
- Multimodal Perception
- Human Multimodal Interaction
- Multimodal Input and Output Systems
- Multimodal Interactive Systems
- Virtual Environments



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Soft Criteria from Meeting in Bangalore

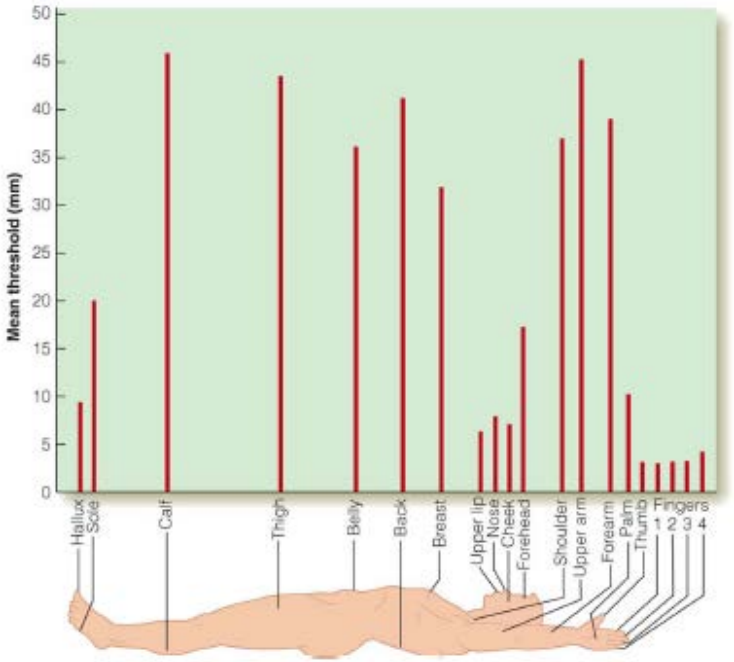
- The proposal should include collaboration between Indian and European institutions
  - IIT Madras
  - National Programme on Technology Enhanced Learning (NPTEL), initiated by 7 IITs and IIS Bangalore ☛ large multiplicator
  - TU Berlin, Chalmers University of Technology
- How can we become e-learning ambassador in our institution? We must promote the interest at our Faculties.
  - Intrinsic interest at TU Berlin ☛ improvement of the existing material, increased awareness
- How can we help the lower level institutions to add value using e-learning?
  - Additional teaching material for smaller institutions
- The outcome should create impact on society.
  - Hard to measure
  - Still, multimodal human-computer interaction becomes more and more relevant with AI-based natural interfaces (e.g. as indicated by smart assistants from Google, Apple, Amazon etc.)

Hard/Technical Criteria from Meeting in Bangalore

- Scalability issues
  - MOOCs designed to scale
  - (manual grading of one assignment hast to be replaced)
- Lack of Internet Band
  - NPTEL maintains a service to exchange course content by courier
  - (further thoughts on that topic are planned for tomorrow)
- Language differences (diversity)
  - The course is in English
  - (2 examples used in the course should are very German-centric and should be replaced)

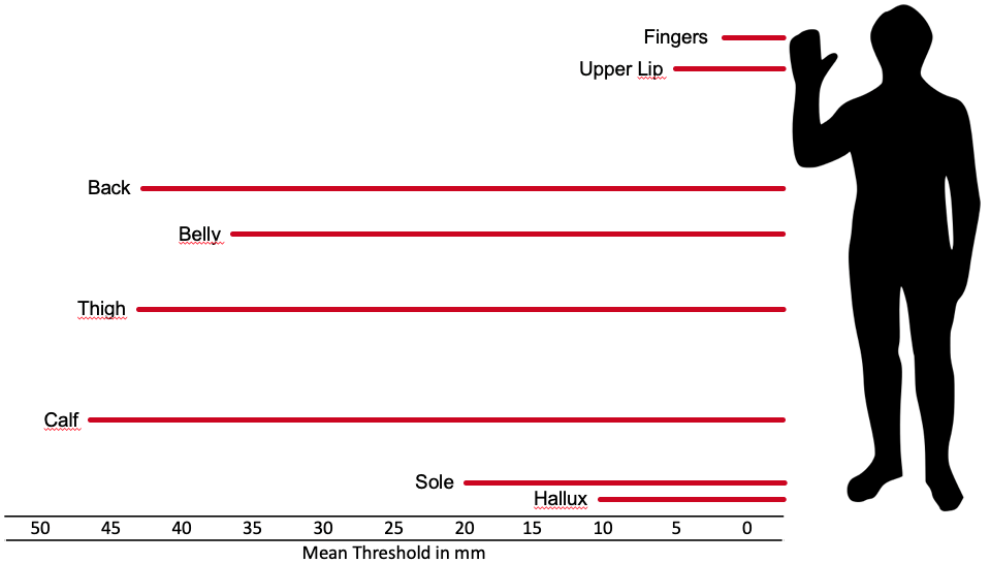
Revision of the Teaching Material (Copyright)

Old



Goldstein, 2009
Fig. 14.10

New



Course Creation

- Material
  - 4 topics completely revised and were newly post-producted
    - Multimedia and Multimodality, Hearing and Speech, Vision, Other Senses
  - 1 topic completely new produced (Audio in Virtual Environments) + introductions to all topics
  - New weekly assignments (instead of a manually graded programming task)
  - 1 additional electronic exam
- Course at NPTEL
  - Strong support by different teams at NPTEL (course creation, examination and assignments, video transcriptions)
  - All videos were uploaded and integrated in the lessons
  - Exams and assignments were implemented and checked by two-man rule (4-eyes authorization))
  - Transcriptions of all videos
  - Not to mention the operation of the entire infrastructure

Running the Course

- 4 weeks (February 25 until March 24)
- ”business as usual” in a MOOC
  - Answering questions in the forum
  - Publication of material in time (thanks to NPTEL again)
  - grading of assignments (problems with plagiarism for one question)
- Exams happen in the next weeks

Assignments and Exams

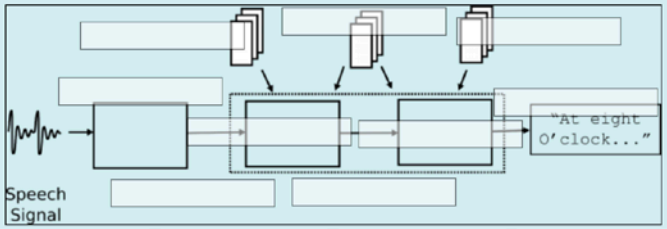
Compared with Moodle or platform like edX: Drag&Drop or cloze text are missed

Rods and Cones

Select the correct words in the following sentences!

On the retina, there much more [ ] than [ ]. Cones are [ ], while rods are [ ].

Drag and drop each term to its corresponding part in the scheme of a speech recognition model.



Feature Vectors | Most probable Sentence | Decoder | Neural Network or HMM | Feature Extraction | Language Model

Acoustic Model | Vocabulary | Phoneme Probabilities

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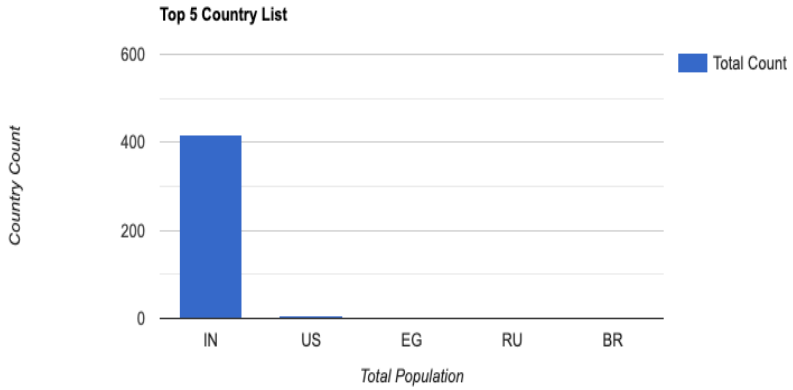
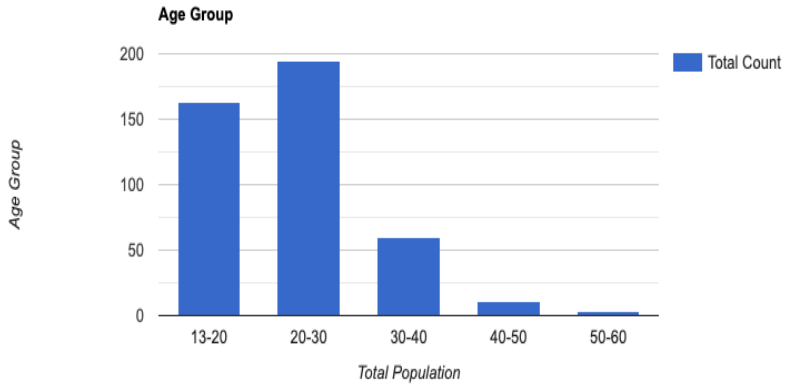
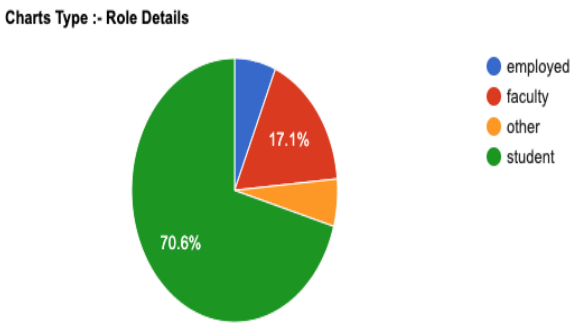
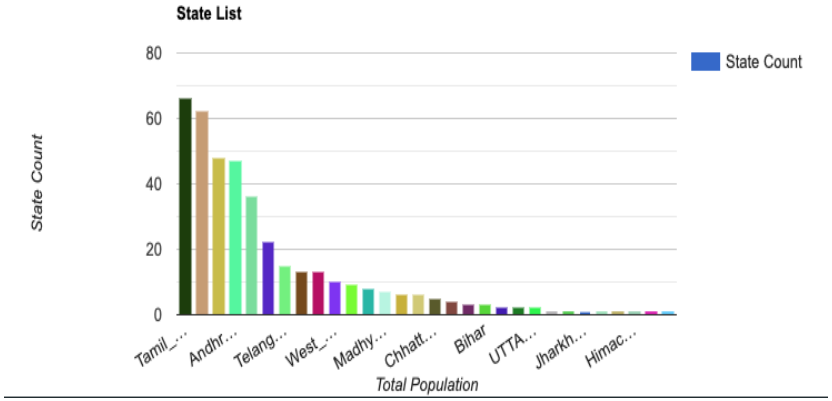
Enrollment profile - Multimodal Interaction









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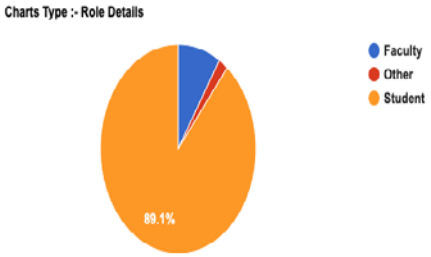
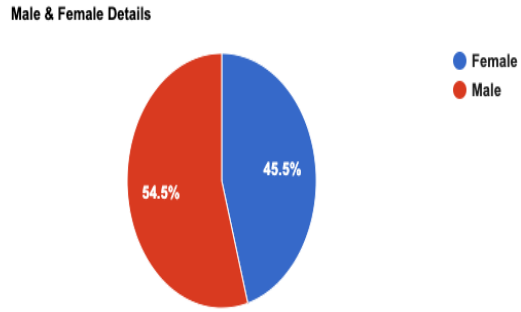
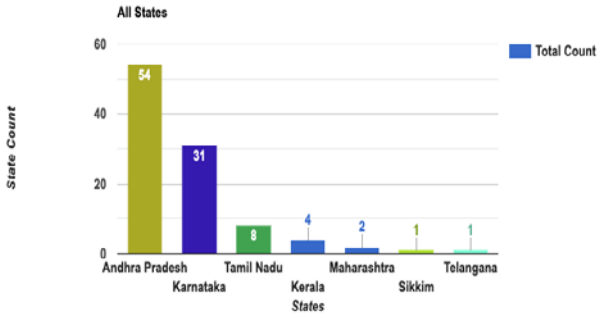
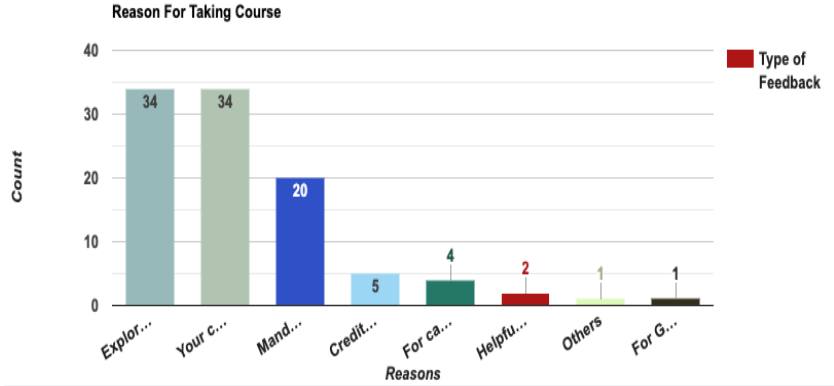
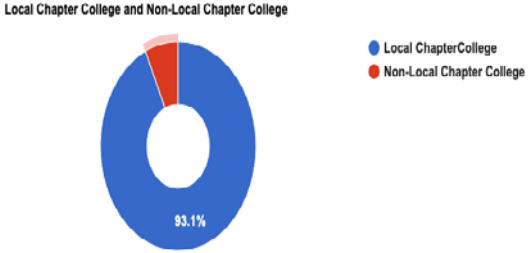
Exam registration profile - Multimodal Interaction











Top 5 Registered College - Multimodal Interaction

1. ADITYA ENGINEERING COLLEGE, SURAMPALEM, ANDHRA PRADESH.
2. NEW HORIZON COLLEGE OF ENGINEERING, BENGALURU, KARNATAKA.
3. PSG COLLEGE OF ARTS & SCIENCE, COIMBATORE, TAMIL NADU.
4. KONGU ARTS AND SCIENCE COLLEGE, ERODE, TAMIL NADU.
5. SMT KAMALA AND SHRI VENKAPPA M AGADI COLLEGE OF ENGINEERING AND TECHNOLOGY, GADAG, KARNATAKA.

Multimodal Interaction - Feedback

1. Lecturers speech are very clear. Showing examples of the concepts in video is phenomenal.Appreciate the fact the lecturer/session video is not beyond 30 minutes which is easy to understand.
2. Good exposure to the content.
3. Tough to answer and understand the concepts...
4. Content should be a bit more practical.
5. Interesting course.
6. The lecture delivered by Dr. Rahul Swaminathan was very informative, easy to grasp and understand.It was well organized and seamlessly delivered. In the remaining videos accent was an issue.
7. Content is a bit monotonous in terms of its application
8. The Content delivered in week 4 is very good and clear. Examples shown in the videos in relation to each topic helped to understand/relate the concept easy. From the presentation view point i.e Clarity of Lecturer speech(Without echo) & Seeing the slides should have been as how it was till week 3 i.e Prof.Dr.Sebastian Moller. Dr. Rahul & Jens Ahrens have delivered the content really well but the body language is very casual with Dr.Rahul and with Jens the tone of voice could have been better.

Facts and Numbers

Week	Submissions	Average assignment score
1	105	60.9
2	95	54.9
3	92	39.3
4	89	57.7

Duration of the course: 4 Weeks (10 Hours)
Number of forum posts: 17

Link to the course: onlinecourses.nptel.ac.in/noc19_cs34/course
(user id: reviewer4@nptel.iitm.ac.in
Password: 4reviewer

nptel.ac.in/courses/106106200/

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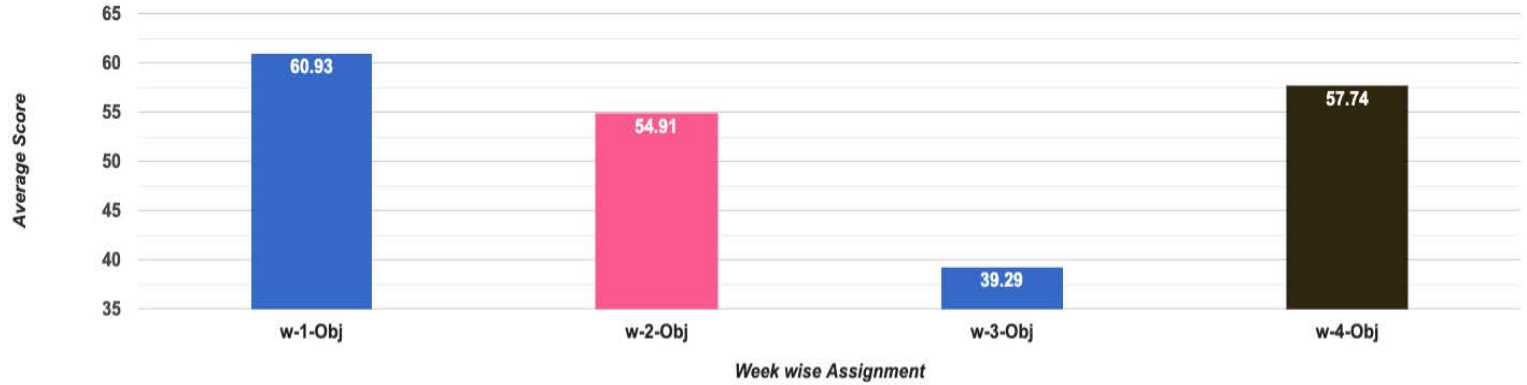
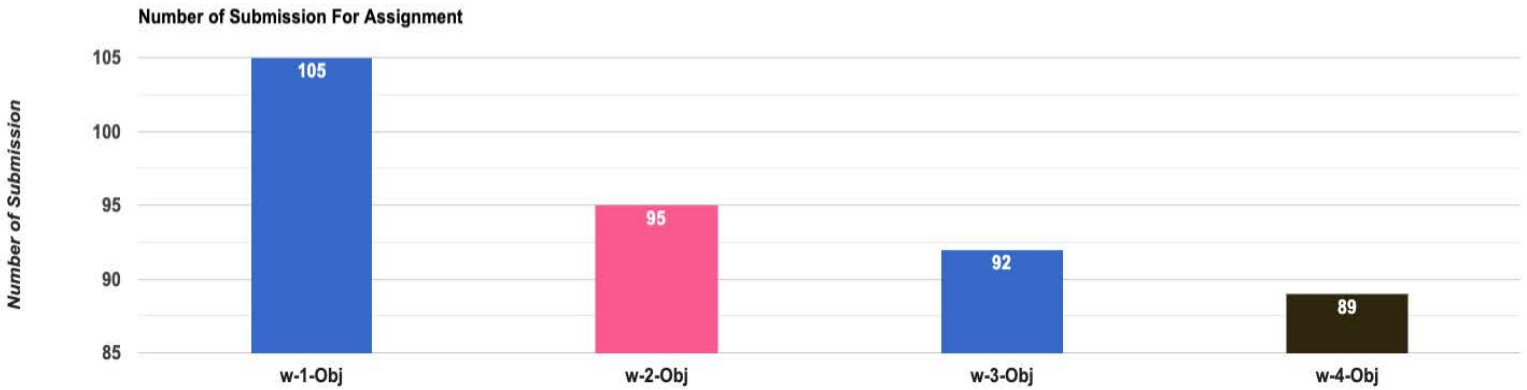
Weekly Assingments





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Recording process and Teaching assistants

- All videos created by Profs themselves and shared with IITM team
- Faculty managed the course themselves.
- Support extended by IITM in configuring the assignments and the end exam papers.
- Both computer based and manually graded assignments were given.

Acknowledgments

Thanks to Benjamin Weiss, Jens Ahrens and Rahul Swaminathan for there efforts in the content creation and giving the lectures!

Thanks to TU Berlin's ZEWK team for recording, producing and re-producing the videos!

Thanks to the team(s) at NPTEL for support in course creation, exams and assignments creation and transcription of the videos as well as very fast responding to all my requests!