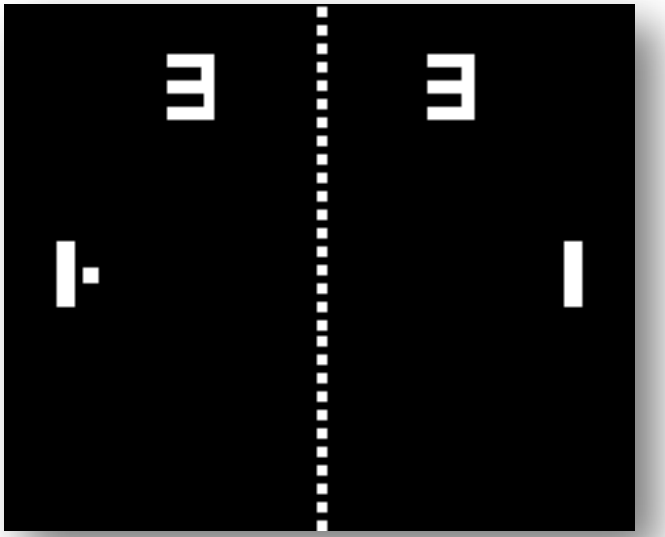
TECHNISCHE UNIVERSITÄT BERLIN

MultiTouch project

Motivation

- Playing PONG manually
- SIGGRAPH 2006 in Boston
  - Jeff Han's MultiTouch walls at Emerging Technologies
- Table built at Bauhaus University Weimar
- Popular construction manuals for low cost devices *(e.g. NUI Group)*

→ Constructing such a table during a regular course



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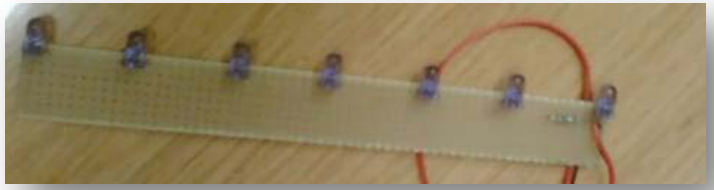
Technical scope

- FTIR
- Setup
  - Big and robust table
  - Multiple users
  - Users work in upright position
  - Client/Server architecture
  - Wireless transmission

  → **Separation of Application and Touch Detection**



Learning targets

- Teamwork
- Project coordination
  - Table, LEDs, acrylic plate, silicone layer…
- Programming, CV, CG, HCI and networks in practice
- Good looking and motivating final result
- Possibility to further work on it
- Presentations in public

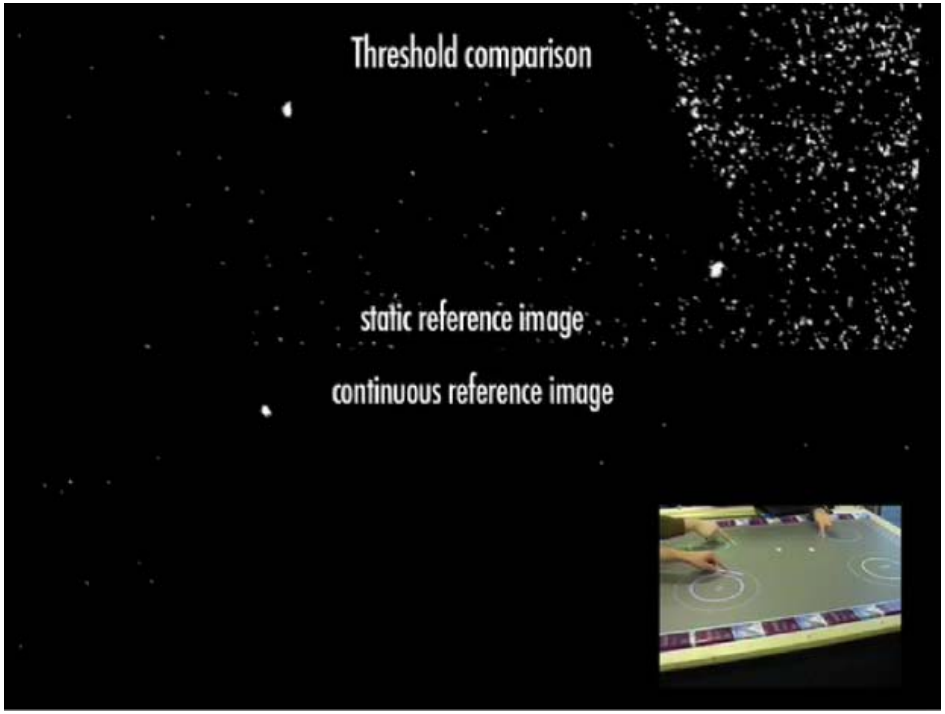
Teaching structures

- Mainly computer science students (some computer engineering) → We probably won't win a design award, however the table does not wobble!
- Combination of several fields (even carpentry)
  - \+ Interdisciplinarity
  - \- Students tend to become experts in just one single field (bad if it's carpentry)
- Many good ideas emerged in discussions during the course

→ **Resulted in a scientific contribution**

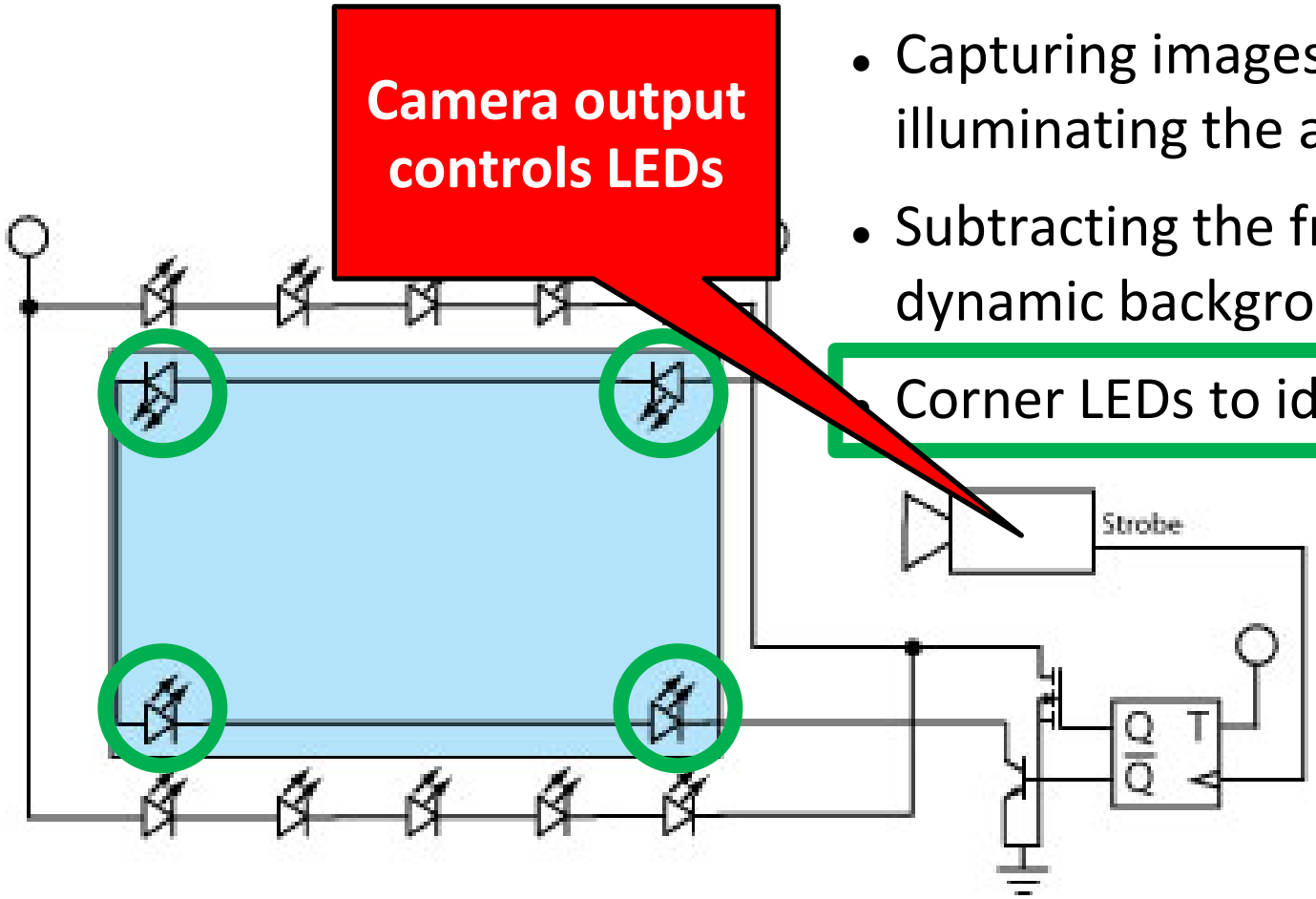
FTIR problems

- *Problem*: Ambient light leads to artifacts in the camera image → errors at blob detection
- *Usual solution*: Static reference image at the beginning
- *Our solution*: Continuous subtraction of reference frames



Contribution

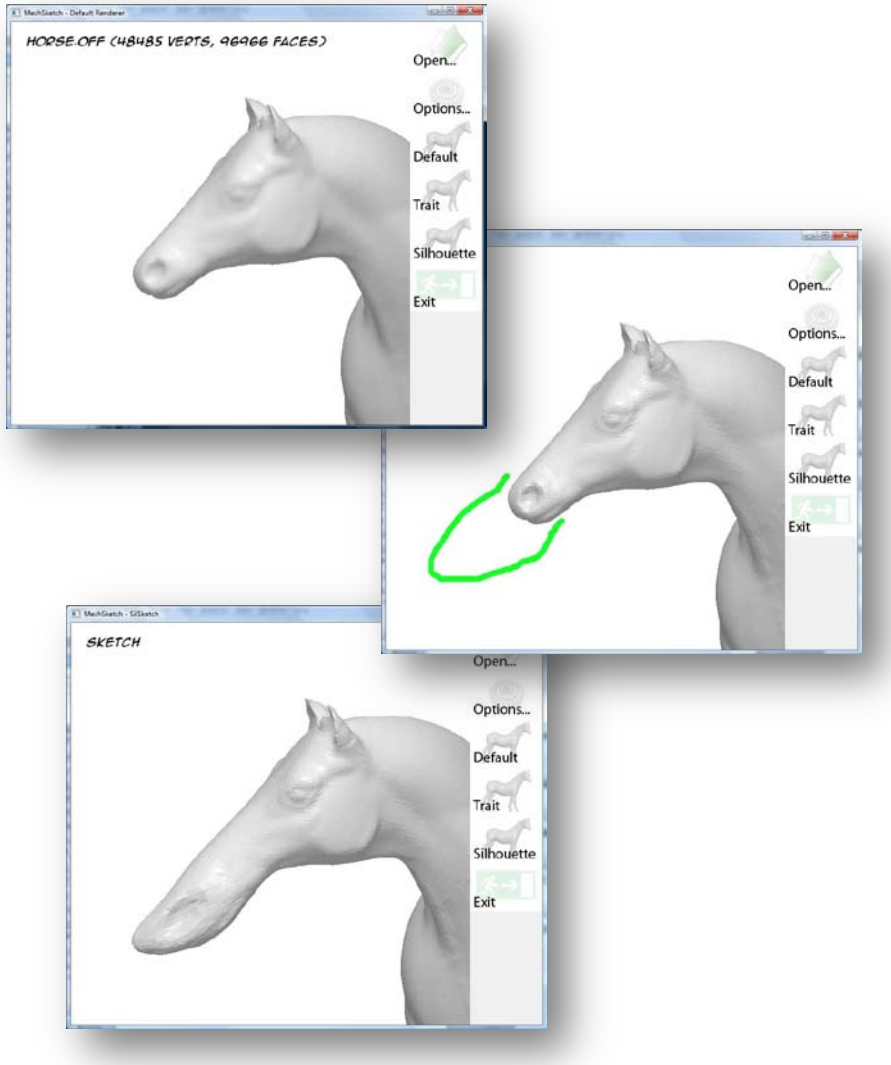
Pulsed LEDs



- Capturing images with and without illuminating the acrylic plate
- Subtracting the frames to suppress dynamic background lighting
- Corner LEDs to identify reference frames

Future work

- Research:
  - Use table for sketch based modeling applications
  - Combining multi touch and pen interaction
  - Apply enhanced CV methods for noise suppression
- Teaching:
  - Building a larger tiled display
  - *(Interdisciplinary projects with art students)*



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