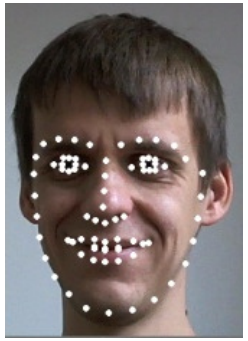
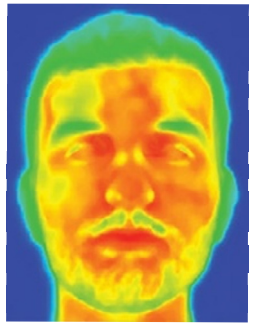
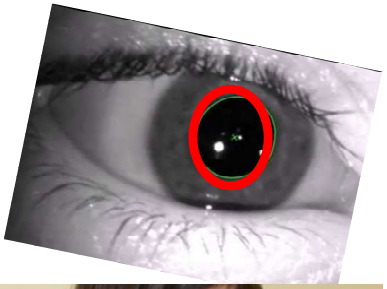
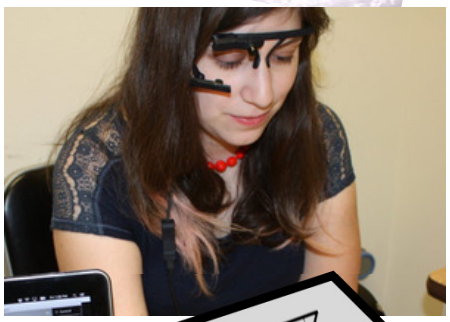
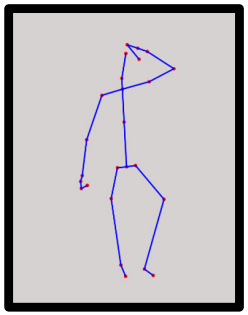
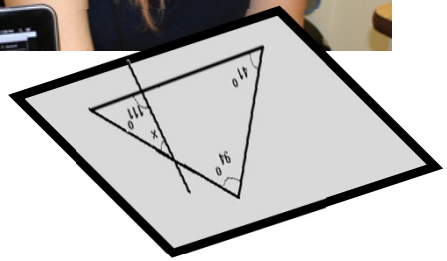
Computational Human Behavior Lab (CHB)

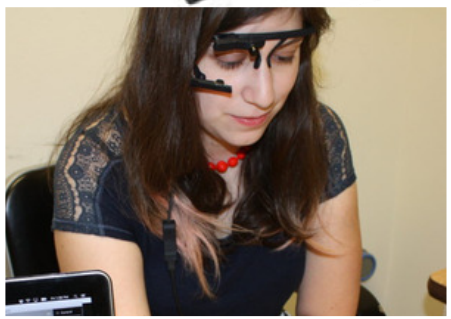





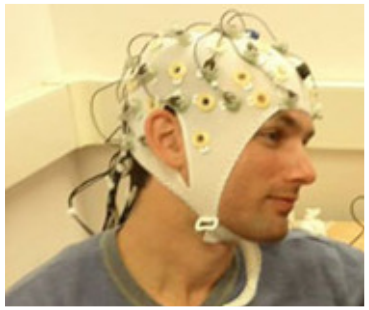


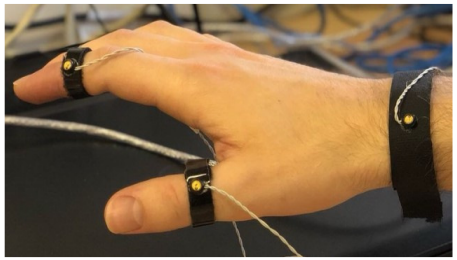



Prof Hagit Hel-Or
Dept. of Computer Science
University of Haifa

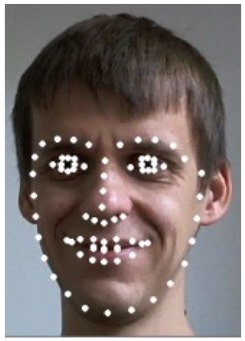
SENSING TECHNOLOGY

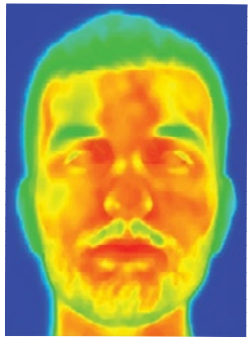


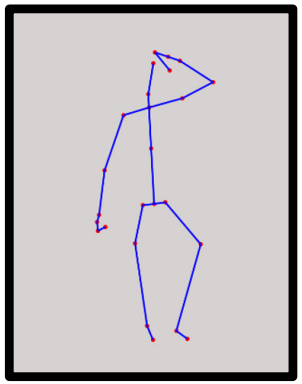




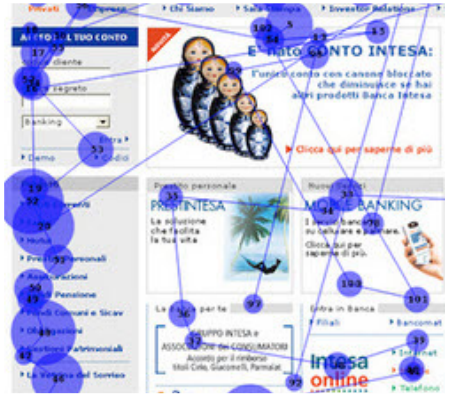
DATA COLLECTING ALGORITHMS

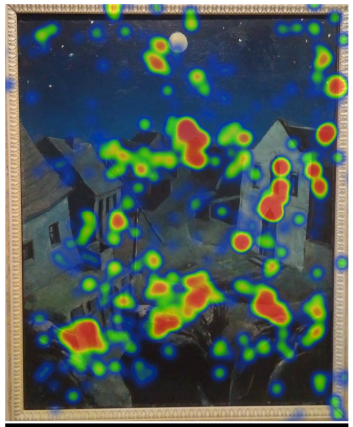


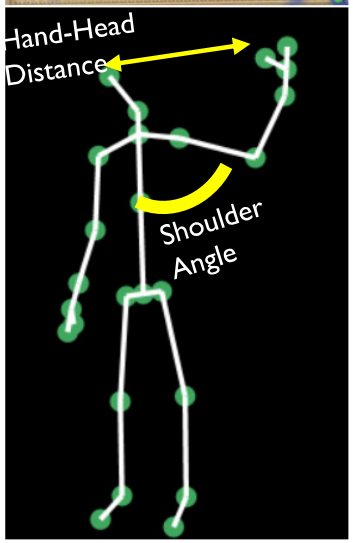




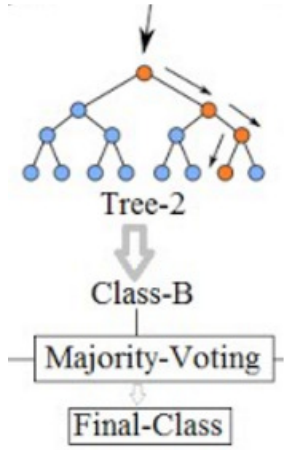
FEATURE EXTRACTION

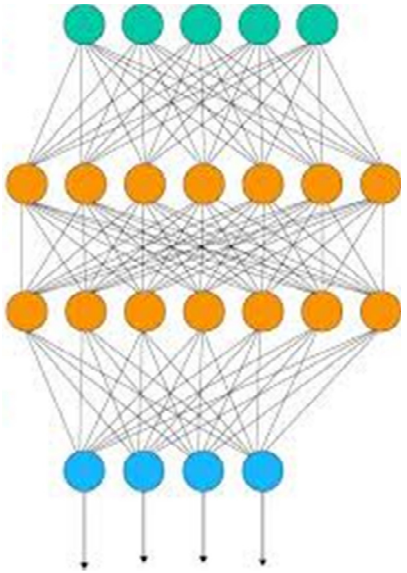






MACHINE LEARNING FOR ANALYSIS





קורס זה הוא קורס מעבדה במסגרתו תבצעו פרויקט מעשי בזוגות.
הפרויקט יכלול אלמנטים טכנולוגים (מצלמות, חיישנים וכו),
אלגוריתמים ראיה ממוחשבת ולמידה ממוכנת. מלבד מפגש שעור
ראשון ו 2 שעורים אחרונים, לא יתנהלו שעורים פרונטלים והקורס
יתנהל במפגשים שבועיים לכל פרויקט בנפרד.

חובות הקורס:
* נוכחות חובה בשעור הראשון
* נוכחות חובה ב 2 השעורים האחרונים (הצגת פרויקטים)
* מפגשים אישיים שבועיים/דו-שבועיים – להרשם ל SLOT קבוע
* הגשת פרויקט סיום. והצגתו.

התנהלות הקורס:
ציון הקורס יקבע עפי איכות הפרויקט, הגעה למפגשים אישיים והצגת
הפרויקט.

Computational Human Behavior Lab (CHB)
Schedule outline

Project submission is in 3 stages + Presentation/Demo:

Project proposal submission due	**6/3/22**
Mid-submission due	**24/4/22**
Class Demos and Presentations	**1/6/22. 8/6/22**
Final submission due	**24/6/22 (approximately)**

Project Proposal – A short description of your chosen project. The papers/methods you will use, and the equipment and source code you will rely on. Preliminary also includes Web Page (outline – basically the info in the description).

Mid-submission - at this point your project should be running but not at its best. That is there could be bugs, works on part of the input, needs enhancing and tweaking etc. Consider that at this point you should be able to show a basic/partial demo.

Presentation/Demo – we will have a Demo meeting (probably 2-3 meetings due to the number of students). Real time run of your project + presentation slides if needed in addition to demo.

Final submission includes – Everything!

Computational Human Behavior Lab (CHB)
Final Project Submission

Final Project will include:

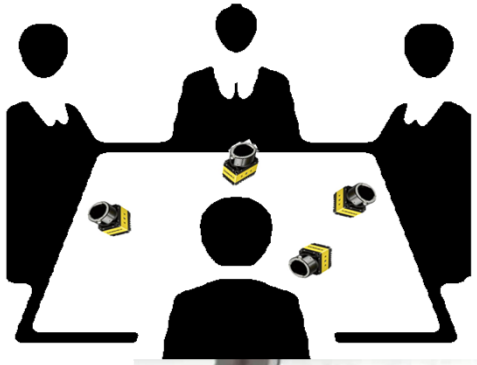
* A Project Report
* Web Page
* Video Clip
* Code
* Demos
* Documentation

Web page should include explanations of your project, background on the problem, your approach and solution, and results (see examples).
Project report should describe the project, expand the web page and give details. Include description of the
implementation, (possibly screen shot of the application), experimental results, further details, conclusions and references.
Code should be clean, organized and documented. There should be a Readme file describing the layout of the
code: code files and what each function does. There should also be a UserGuide explaining how to use the
code, including a specific example (example data should also be submitted).
Demos – project will be evaluated by running a real-time demo of the project.
Video Clip – a short video should be submitted showing your project running in real time.

CHB – Project Grade Form

		Points
Weekly reports + meets		10
Preliminary Submission	Submitted On time + Quality	5
Mid Submission	Submitted On time + Quality	5
Class Presentation		10
Final Submission		70
	Submitted On time	
	Correct Submission Format	
	Project Doc (goal, background, proposed method, results, conclusion and discussion)	
	Demo Movie	
	Code (Code Directory, Code Documentation)	
	Instructions file - How to run (Example Script/parameters)	
	Live Demo - Quality of Results (+ runs on supplied data and on new data, fulfills expectations)	
	Web page	
	Project Complexity/Difficulty	

CHB – Project Examples from past courses

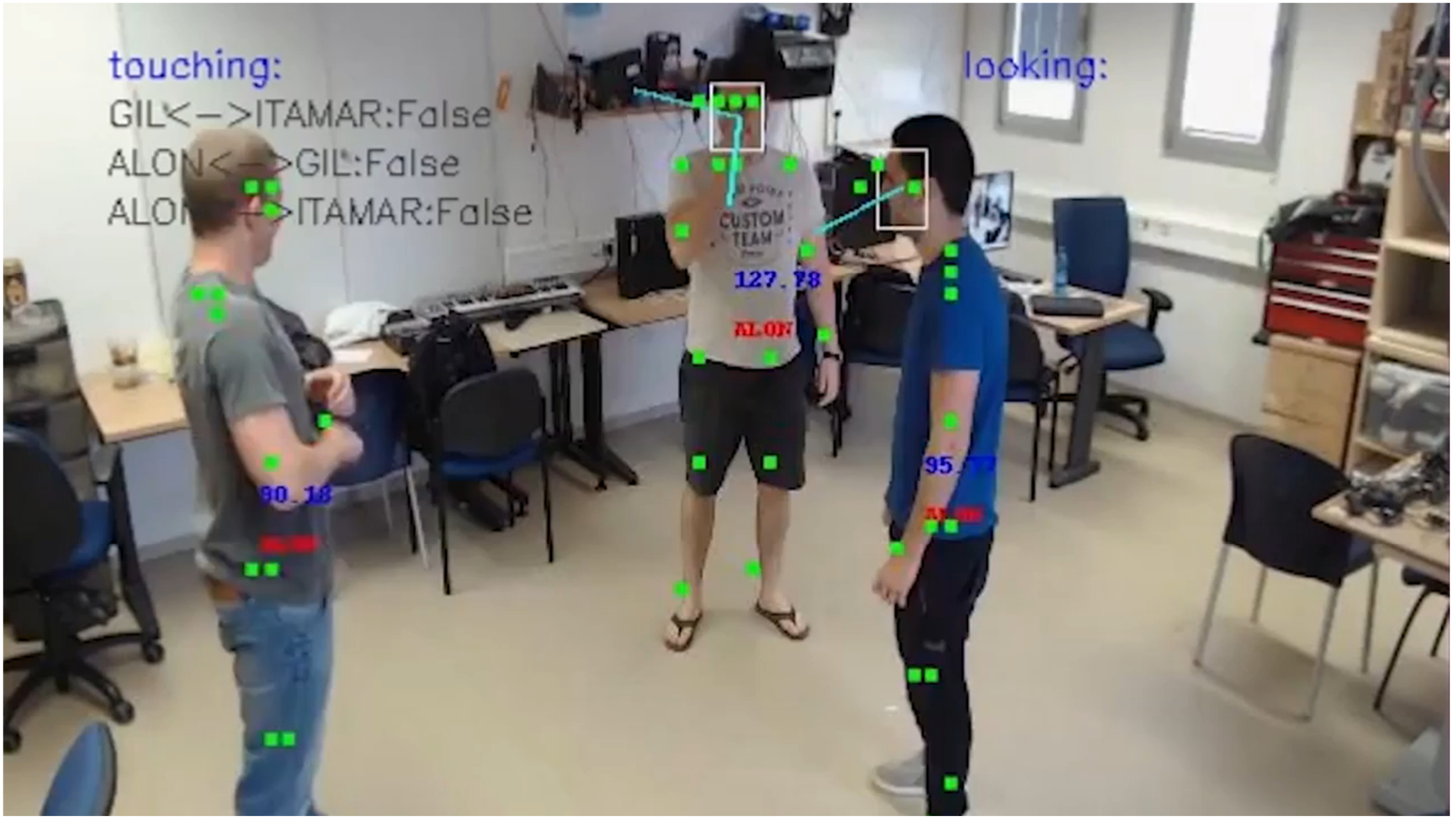


Detect Sight Engagement Using RGB web cams

Itai Guy
Elias Jadon

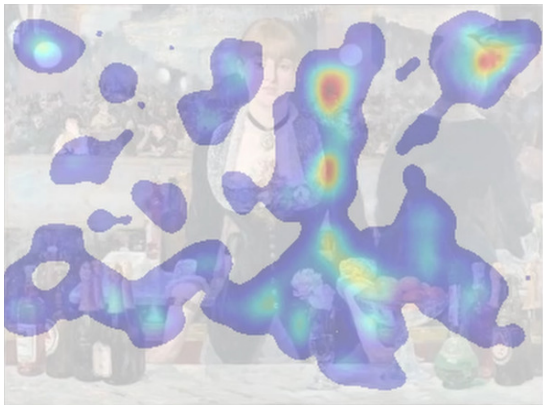
Interaction detection
Using RGB web cams

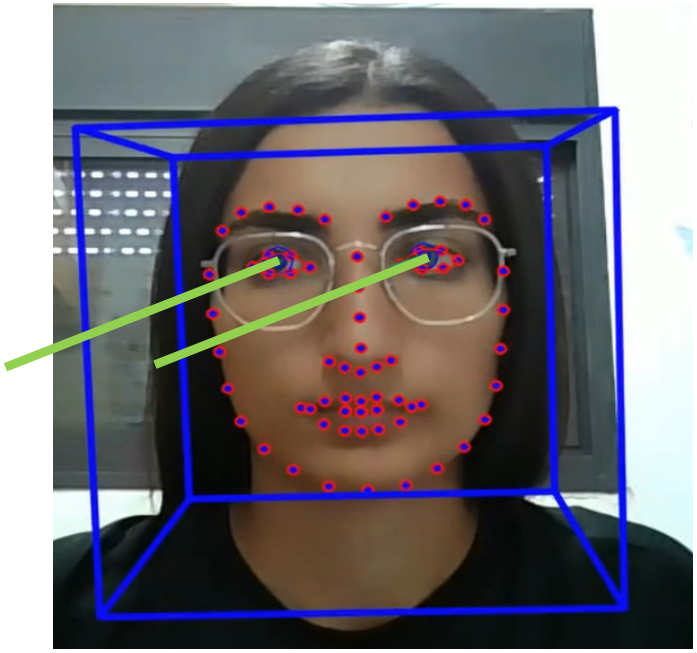
Gil Maman
Itamar Shenhar
Alon Melamud



Analyzing Art Appreciation VIA ZOOM

Carol Hallaso, Layan Haddad





Before

After

CHB – Projects offered this year

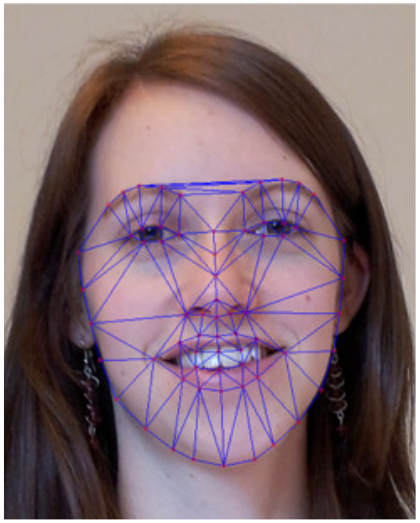
Project 1

Emotion Analysis during 2-person interaction (Doctor + Patient)

Prof. Sigal Zilcha-Mano
Tal Ben-David

Track facial features in patient during recorded session with psychiatrist.
Extract emotion features from the tracked data.
Use Machine Learning models to predict level of depression. from the emotional data.

(all data has already been collected).

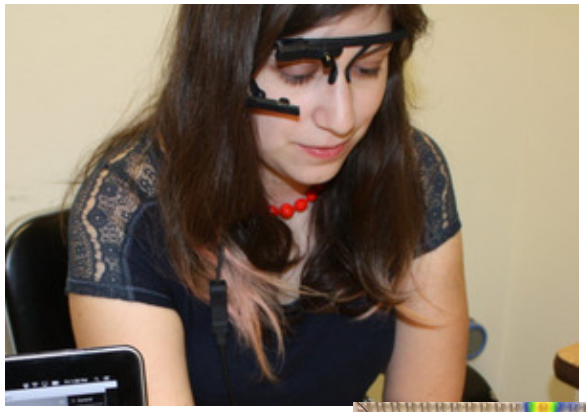


Preference: students with background in machine learning (not necessarily deep).
Programing in python.

Project 2

Analyzing Art Observation – Online vs FaceToFace

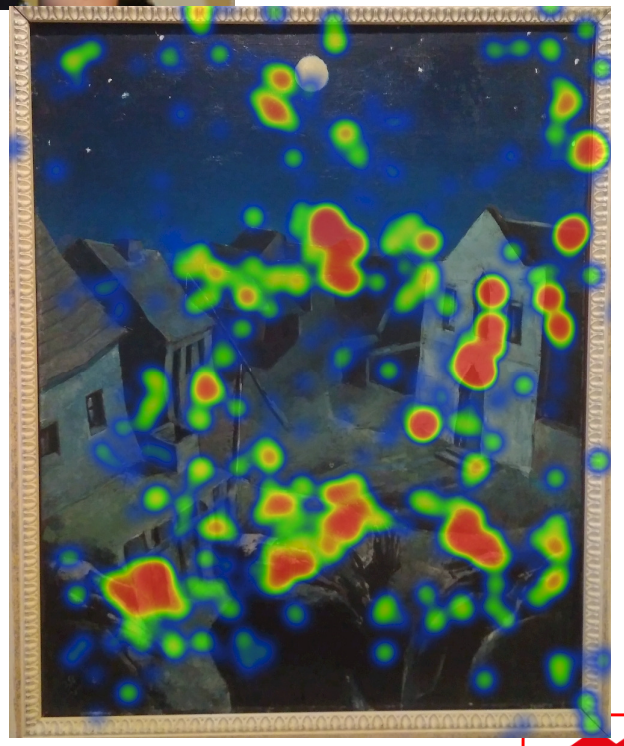
Dr. Emma Maayan-Fanar
Prof. Tsvika Kuflik



Sensor: Pupil Eye tracker

Procedure:

1) Develop Eye tracker calibration (large scale).
2) In Hecht Museum: Capture Eye movement while scanning art (20 participants)
3) On Computer: Capture Eye movement while scanning art (same (20 participants)
4) Extract Features, compare between the two scans.



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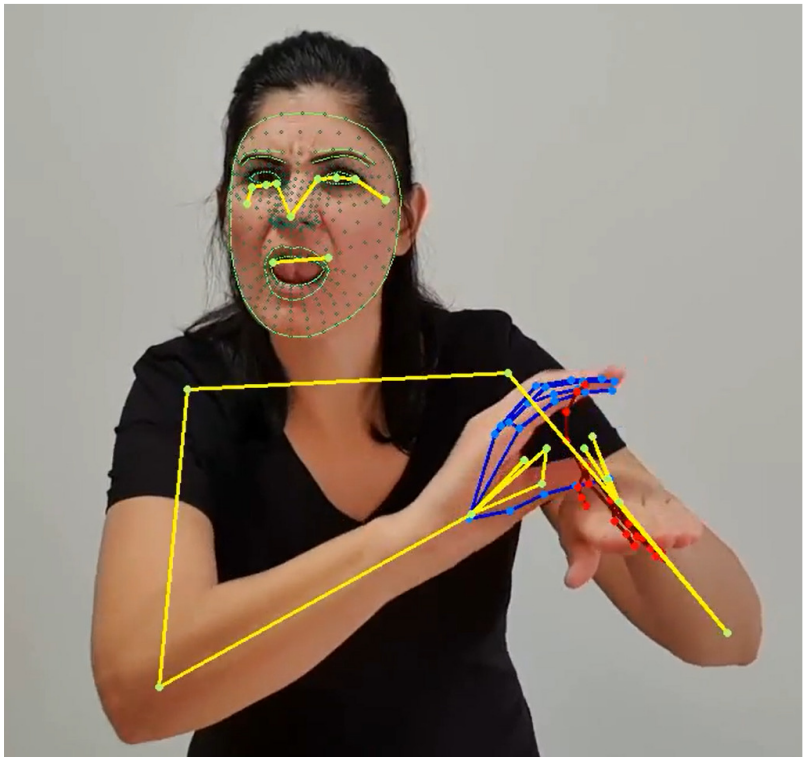
Project 3

Analyzing Facial Emotion in Hearing and non-hearing individuals

Dr. Rose Stamp

Three groups of people: deaf signers,
hearing signers and hearing non-signers.
They will take part in three tasks to elicit emotion:

- a voluntary expression task in which they are asked to produce a facial expression (anger, sadness and happiness (without language)
- a scenario task in which they need to describe a time when they felt anger, happiness and sadness
- sentence reading task in which they read/sign sentences which are lexically emotional



Project:
Track facial and body features.
Analyze: movement of facial and body features.
Compare between groups using machine learning models.

Project 4

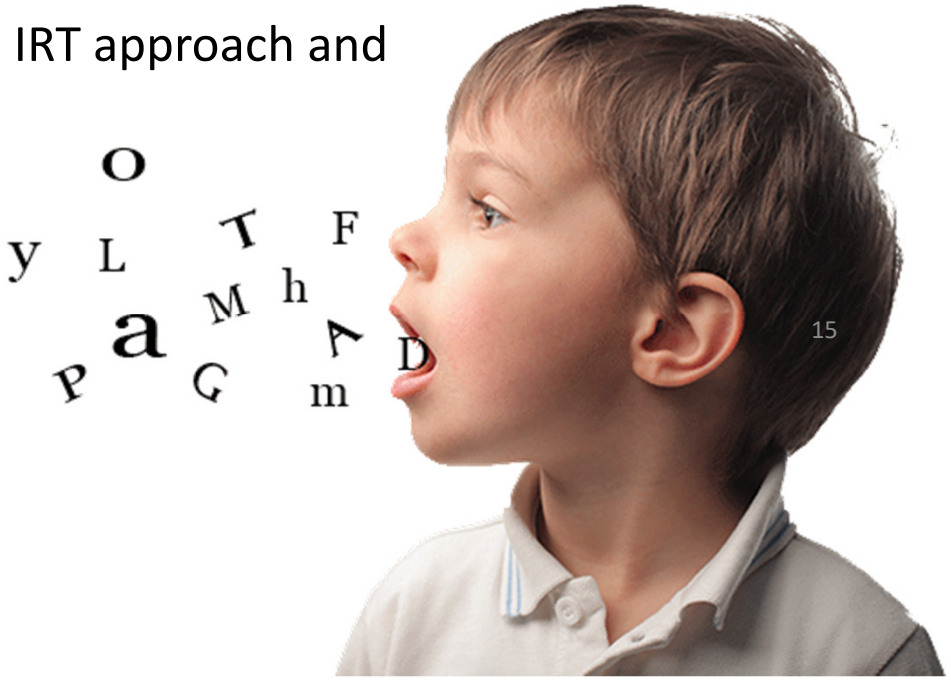
Automating Children's Vocabulary

Testing children's vocabulary requires going over some 1000 words!!
This is time consuming and redundant.
Several approaches were developed to shorten the test using IRT (statistics based).

In this project we will use a new approach (CAT) that creates an adaptive testing sequence that reduces the number of words tested to a very small number.

Implement the CAT approach. Implement the IRT approach and compare performance of the two.
(Large database exists online).

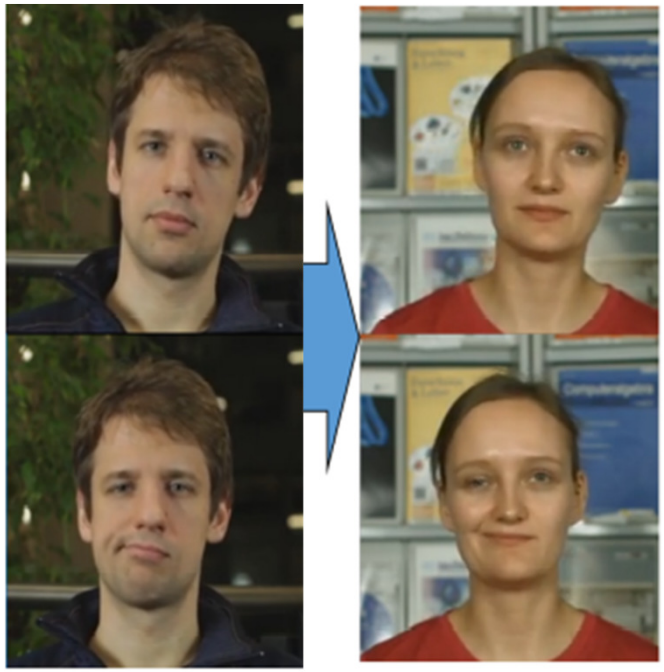
Preference:
students with background in
machine learning (no need of deep learning).
Programing in python.



Project 5

Head Replacement for privacy protection

Implement a method to replace heads of subjects for Privacy protection. Replace heads in video sequence while preserving pose and expression.



Input Output

Use CV and ML methods of re-enactment.
Simplify to single target subject.

Preference: students with background in machine learning (and deep).
Programing in python.

Project 11

Dr Patient interaction
“Looking at each other” from video

Prof. Sigal Zilcha-Mano
Prof Ilan Shimshoni

Sensor: 3X RGB video cam

Develop a system that detects when one person looks at the other or when looking at each other.
Must be precise.
1 cam on each person, + overview cam.

Project 12

Truth or Lie – Prisoners Deilema

Prof. Doron Kliger

Golden Ball Game show

Sensor: video data, facial expression and facial color analysis.

Develop a system that is able to predict Whether subject will lie or tell the truth In Game Show.

OUTPUT:

a) Analyze the video database and show high levels of prediction.
b) Analyze behavior differences due to gender and, past experience, and along a time sequence.

CHB – Additional Projects probably wont be offered this year

Project 6?

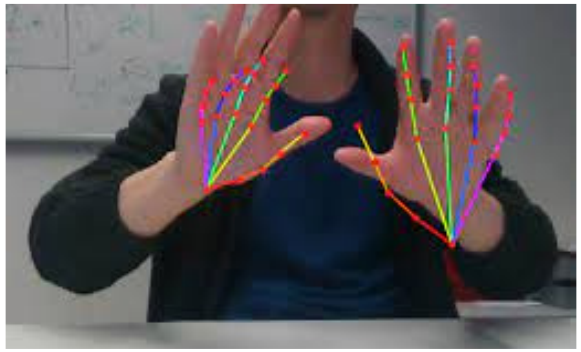
Hand movement Analysis during 2-person interaction (Doctor + Patient)

Prof. Sigal Zilcha-Mano
Tal Ben-David

Analyze patient hand movement and position during recorded session with psychiatrist.
Extract hand motion features from the tracked data.
Use Machine Learning models to predict session outcomes from the hand motion data.

(all data has already been collected, hand tracking programs available).

Preference: students with background in machine learning (not necessarily deep).
Programing in python.



Project 7?

Gesture Detection
Teeth Brushing

Prof. Batsheva Haddad

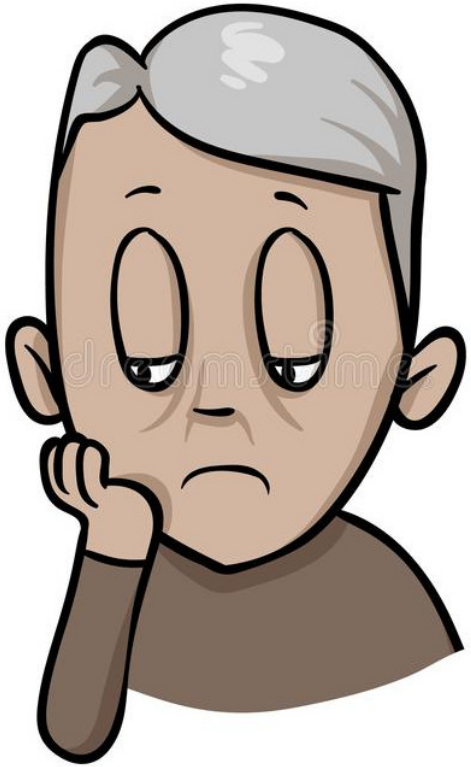
From RGB video cam detects
Teeth Brushing steps:

- Water tap
- Drink from cup
- Brush teeth
- Rinse

Project 8?

Social interaction data extraction from cell phone

Prof. Sigal Zilcha-Mano



Develop a tool to extract social info from cellphone data
(rate of whatsapp,num pictures, wake time)
Use to determine mental state from cellphone data.
Determine type of therapy recommended and predict success rates.

Project 9?

Embed Faces in Objects

Embed faces in objects using deep Neural networks such as GAN.

(extra: transition between male and female faces in objects)

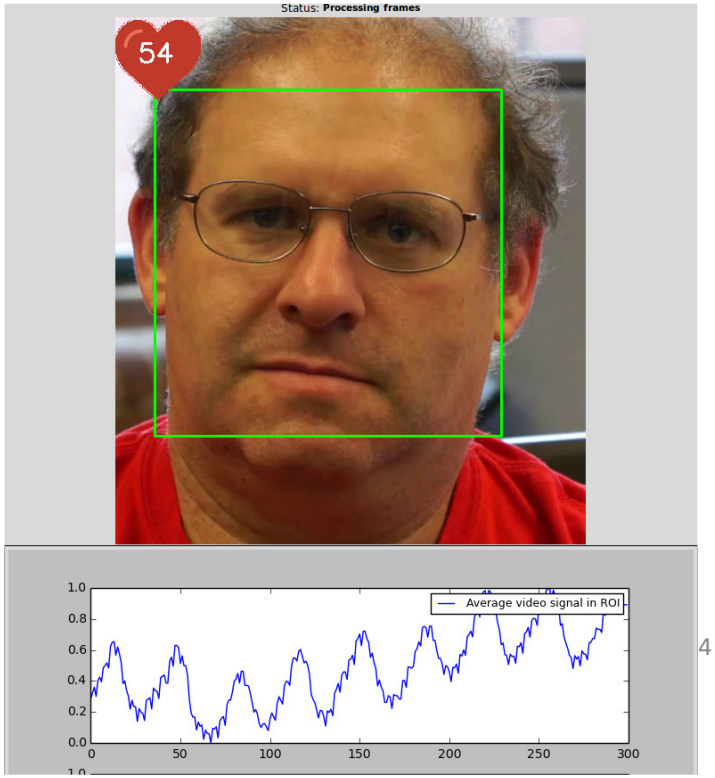
Idea based on work of Susan Wardle on Face Pareidolia.
https://www.youtube.com/watch?v=CF69hLyt-FQ

Preference:
students with background in machine learning (and deep).

Project 10?

HeartRate from RGB videos

Implement several methods for heart rate from RGB vides, compare performance and combine to single more robust system for Heart Rate prediction.



Computational Human Behavior Lab (CHB)
חקר חישובי של התנהגות אנושית

לשלוח לי דואל עם העדפות שלכם. רשמו 2-3 העדפות.
בבקשה לכתוב את מספר הפרויקט **וגם** שם הפרויקט
לכתוב שמות + ת.ז. של שני בני הזוג.

Course web page: http://cs.haifa.ac.il/hagit/courses/CHB

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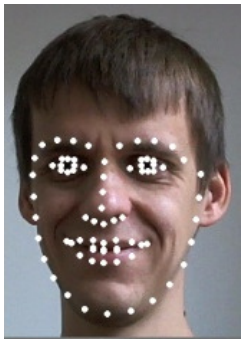
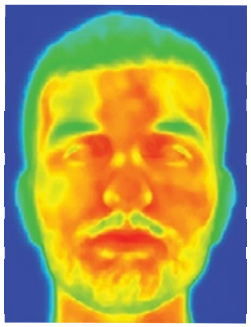
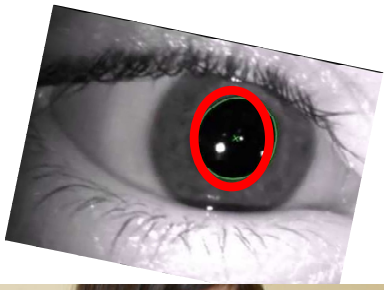
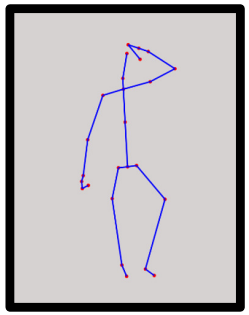
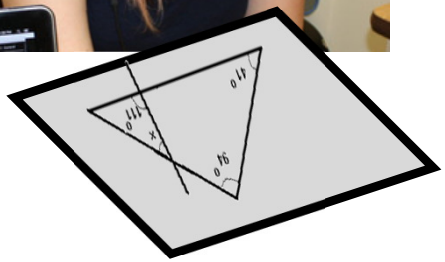
Computational Human Behavior Lab (CHB)

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