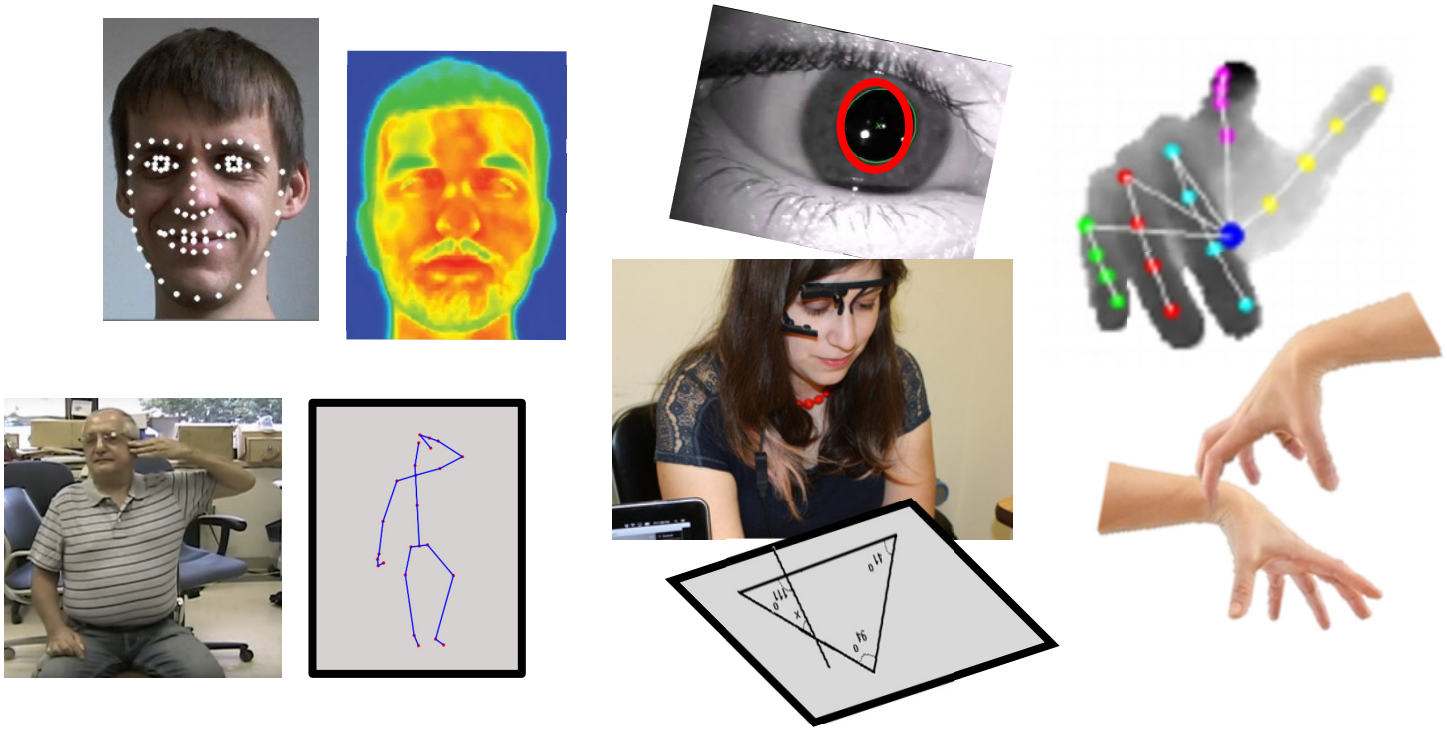
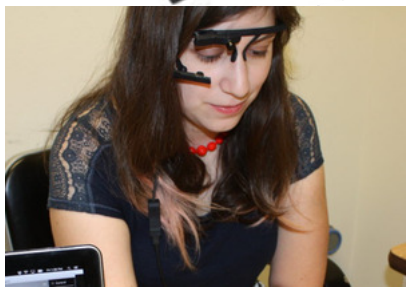
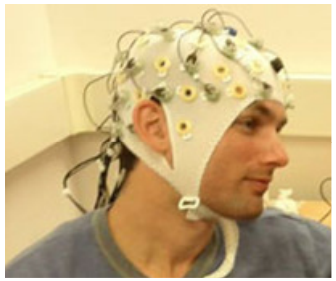
Computational Human Behavior Lab (CHB)

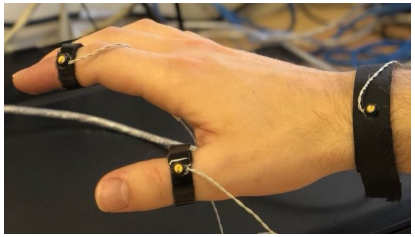


Prof Hagit Hel-Or
Dept. of Computer Science
University of Haifa

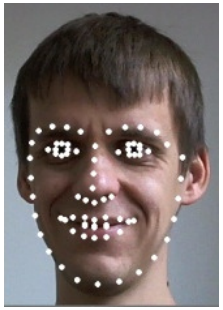
SENSING TECHNOLOGY

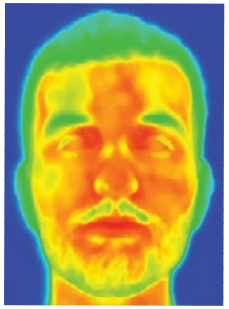


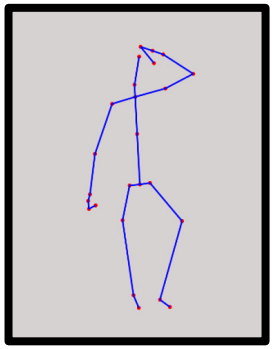




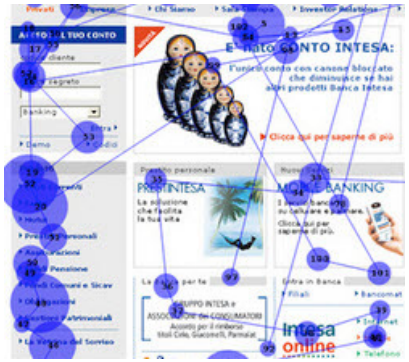
DATA COLLECTING ALGORITHMS

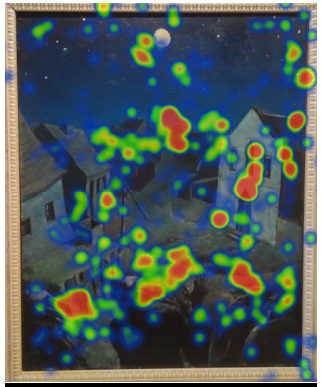


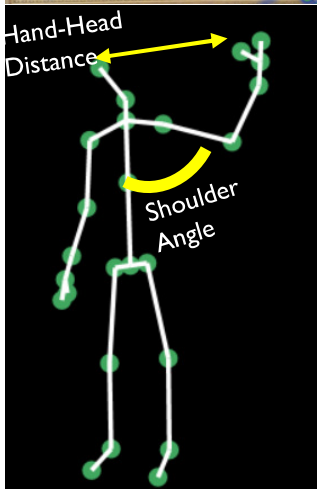




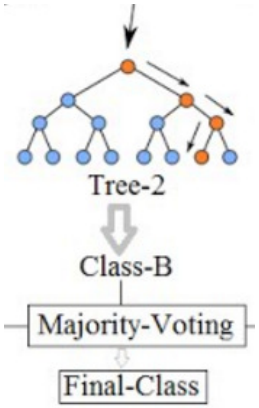
FEATURE EXTRACTION

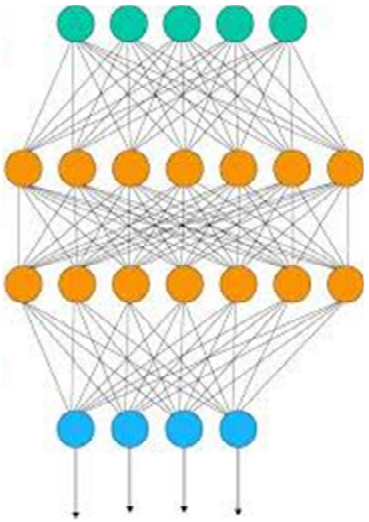






MACHINE LEARNING FOR ANALYSIS





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 עם צוותי הפרויקטים כל שבועיים בשעת השעור (יום
רביעי 16-19).

חובות הקורס:
* נוכחות חובה בשעור הראשון
* נוכחות חובה ב 2 השעורים האחרונים (הצגת פרויקטים)
* הגשת פרויקט סיום. והצגתו.

התנהלות הקורס:
ציון הקורס יקבע עפי איכות הפרויקט, הגעה למפגשים אישיים והצגת
הפרויקט (פירוט ינתן בשעור הראשון).

CHB – Project Grade Form

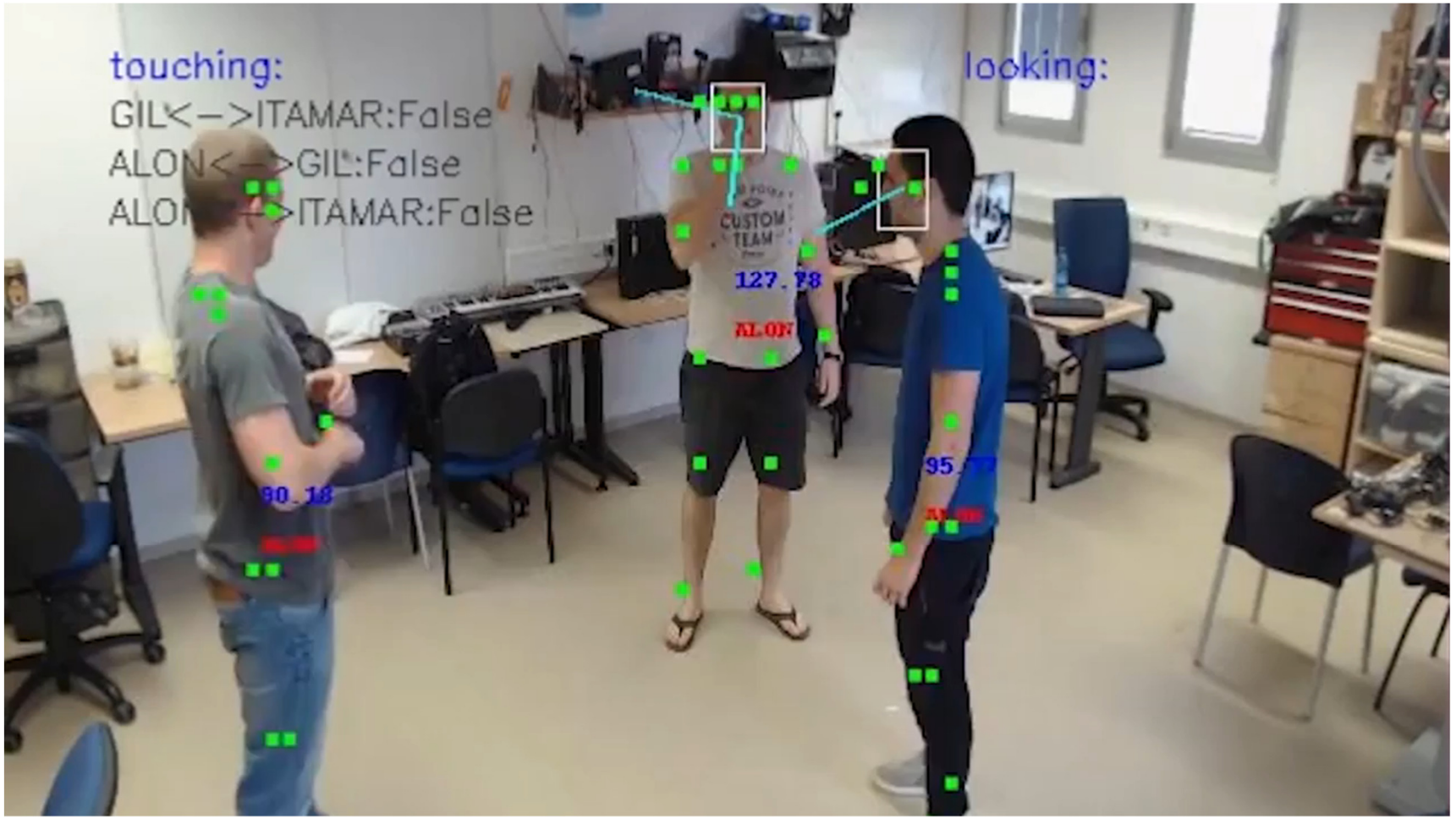
		Points (Max that can be deducted)
Lectures + Demo Sessions required Participation		10 each lesson
Preliminary Submission	Submitted On time	5
	Quality	5
Mid Submission	Submitted On time	5
	Quality	10
Class Presentation		10
Final Submission	Submitted On time	10
	Correct Submission Format	10
	Project Doc (goal, background, proposed method, results, conclusion and discussion)	20
	Demo Movie	10
	Code (Code Directory, Code Documentation)	20
	Instructions file – How to run (Example Script/parameters)	10
	Live Demo – Quality of Results (+ runs on supplied data and on new data, fulfills expectations)	50
	Web page	10
	Project Complexity/Difficulty	5

Detect Sight Engagement Using RGB web cams

Itai Guy
Elias Jadon

Interaction detection
Using RGB web cams

Gil Maman
Itamar Shenhar
Alon Melamud



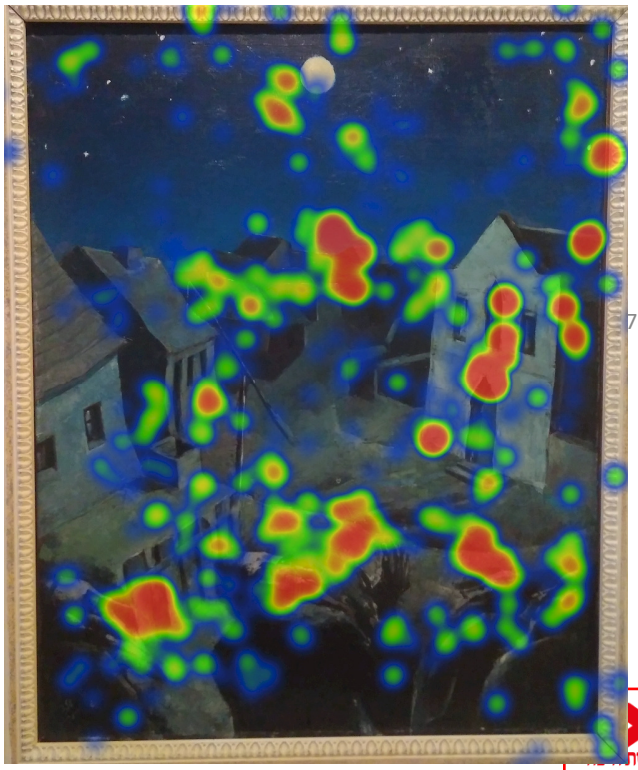
Project 1 Analyzing Art Appreciation

Dr. Emma Maayan-Fanar
Prof. Tsvika Kuflik

Sensor: Eye tracker

Procedure:

1) Capture Eye movement while scanning art
2) Participate in Art Appreciation Course
3) Capture Eye movement while scanning art
4) Compare Pre and Post scans

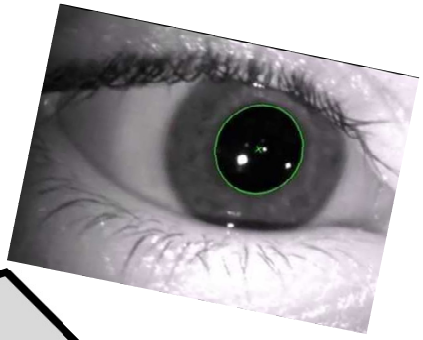


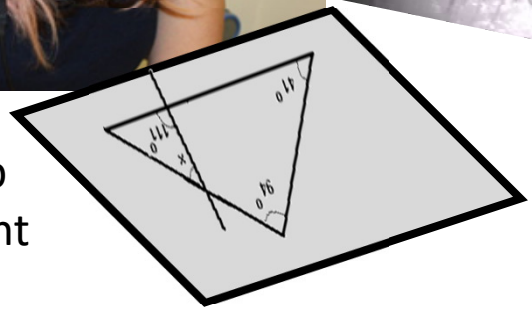
OUTPUT:

a) Calibration system for large field eyetracking
b) Feature extractor and data rep. system
c) Experiment Analysis results (20-30 subjects)

Project 2 Analyzing MATH Problem Solving

Prof. Roza Leikin
Dr. Batshi Haddad





Sensor: Eye tracker

Procedure:

1) Capture Eye movement while solving math prob
2) Compare scans and solutions of different student types.

OUTPUT:

a) Feature extractor and data rep. system
b) Experiment Analysis results (20-30 subjects)

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Project 3

Object handling tracking using Gyro in 3D printed objects

Prof. Tsvika Kufklik

Sensor: inside-object: Arduino + Gyro + Bluetooth + RGB video cam or 3D sensor

Develop a system that gives 3D info on position of object relative to body,
position of fingers on object (?)
(must somehow define coordinate axis of object)

OUTPUT:

a) Plug and Play system.
b) Feature extractor and data rep.
c) Example application and demo of experimental results.

Project 4

Object handling tracking using passive RGB/3D cam

Prof. Tsvika Kufklik

Sensor: RGB video cam + 3D sensor

Develop a system that gives 3D info on position
of object relative to body,
position of fingers on object (?), direction of gaze
(must somehow define coordinate axis of object)

OUTPUT:

a) Plug and Play system.
b) Feature extractor and data rep.
c) Example application and demo of experimental results.

Project 5 Hand tracking tool coordinated with Kinect skeleton

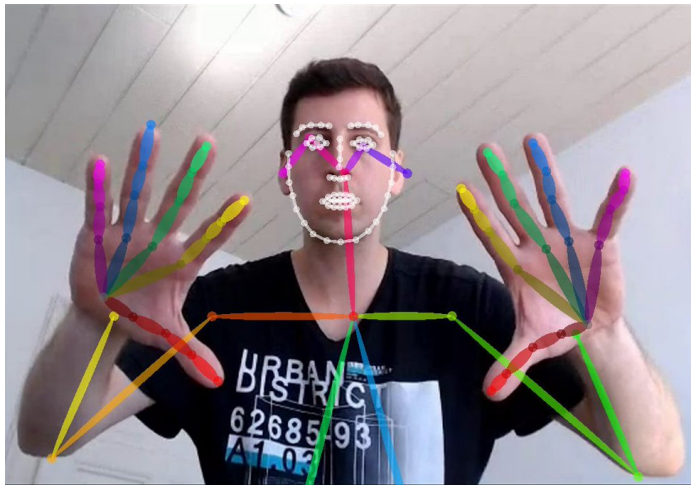
Sensor: RGB video cam + 3D sensor

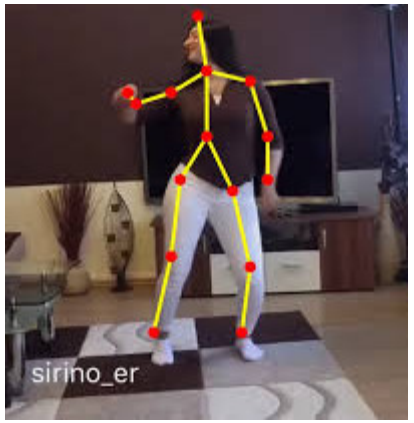
Develop a system that tracks both skeleton and hand (+fingers) and integrates the data.

Requires synchronizing and calibrating 2 cams. Tracking hand (possibly using openpose/openCV) and tracking 3D skeleton using KINECT.

OUTPUT:

a) Plug and Play system.
b) Output is easy to analyze.
c) Example application and demo of experimental results.





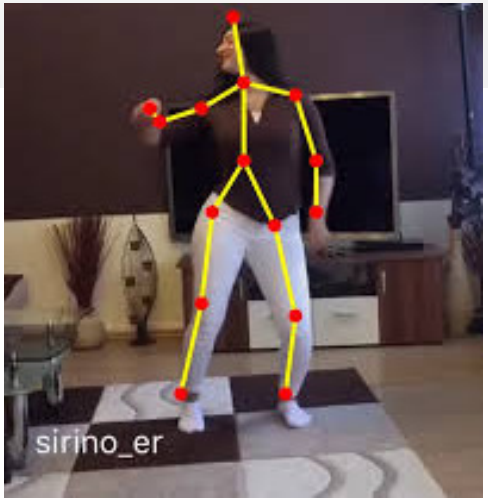
Project 6

Baby action detection (Baby tracking + Skeleton)

Sensor: RGB video cam and/or 3D sensor

Develop a system that tracks babies outputting Their skeleton. + Detects specific actions (crawl, Sit, walk, reach).

Test if existing trackers trained for adults will work. Test if action detectors for babies exist.



OUTPUT:

a) Plug and Play system.
b) Output is easy to analyze.
c) Example application and demo of experimental results.

Project 7 Balance Detector from Cell phone

Prof. Hilla Sarig-Bahat

Sensor: Cellular, Gyro, motion detector

Develop a system that evaluates balance of
human from cellular phone.
Analyzes motion, speed, continuity of motion, sway.
Compares with standard Physiotherapist evaluation.

Requires knowledge on app development in cell phone.

OUTPUT:

a) Cell app , that collects and transmit data to server.
b) Analyze collected data.
c) Run experiment to compare with standard measures BBS getUPnGo etc.

Project 8

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.

Test existing NN apps. Improve.
Requires synchronizing and calibration.

OUTPUT:

a) Plug and Play system.
b) Output is easy to analyze.
c) Example application and demo of experimental results.

Project 9 Parent child Interaction in CP patients.

Dr. Efrat Sher-Censor

Sensor: 3X RGB video cam

Develop a system that detects when CP child is
Reacting to parent, or when impulsive motion.
Track direction of gaze, head movement and hands.
Track parent gaze and responses.
1 cam on each person, + overview cam.

OUTPUT:

a) Will run in real examples.
b) Analyze quantitative characteristics and
c) Compare with manual labelled.

Project 10

Gesture Detection

Sensor: RGB video cam + Kinect

Develop a system that detects Gestures (body and arm motion that exhibit some emotion).
Track, analyze, evaluate Gestures.
a) Specific Gesture recognition (brushing teeth)
OR
b) Gesture + facial expression to determine if gesture has specific meaning (excitement, anger etc)

OUTPUT:

a) Plug and Play system.
b) Output is easy to analyze.
c) Example application and demo of experimental results.

Project 11 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 tel the truth In Game Show.

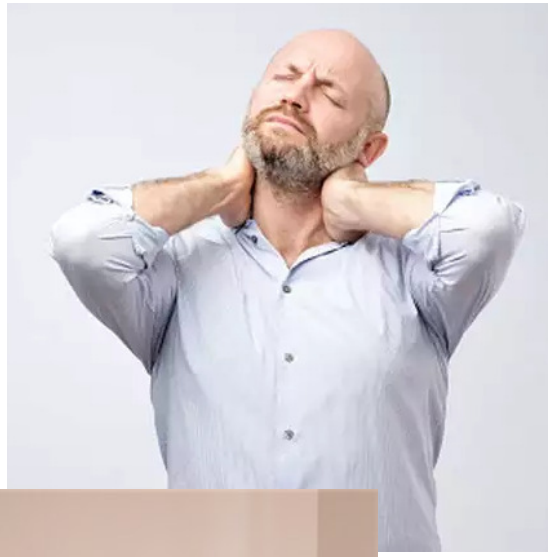
OUTPUT:

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.

Project 12

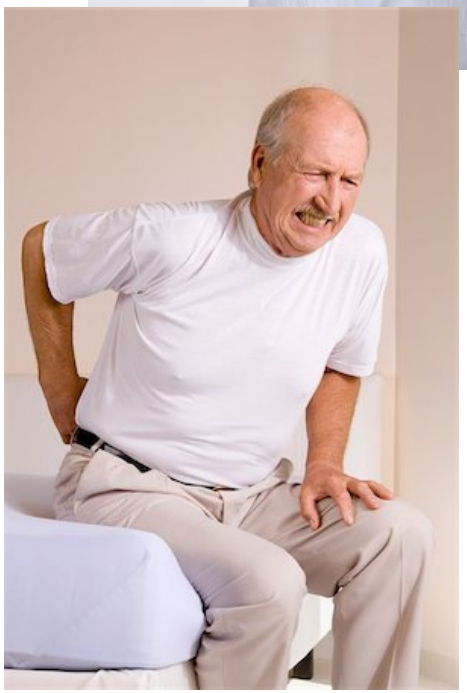
Pain From Video

Dr. Pavel Goldstein



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

Develop a system that is able to analyze individual level of pain from video interviews. Facial expression, Facial Color, body movement

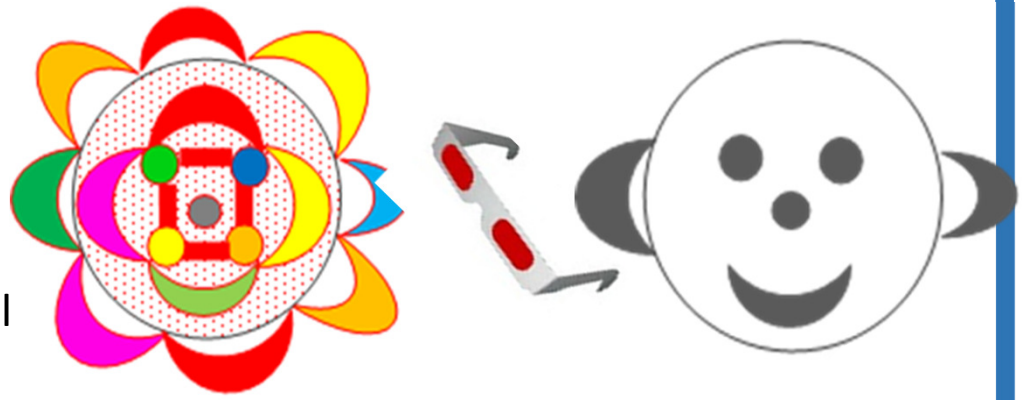


OUTPUT:

a) Analyze the video database from PAINSTORY web cite.

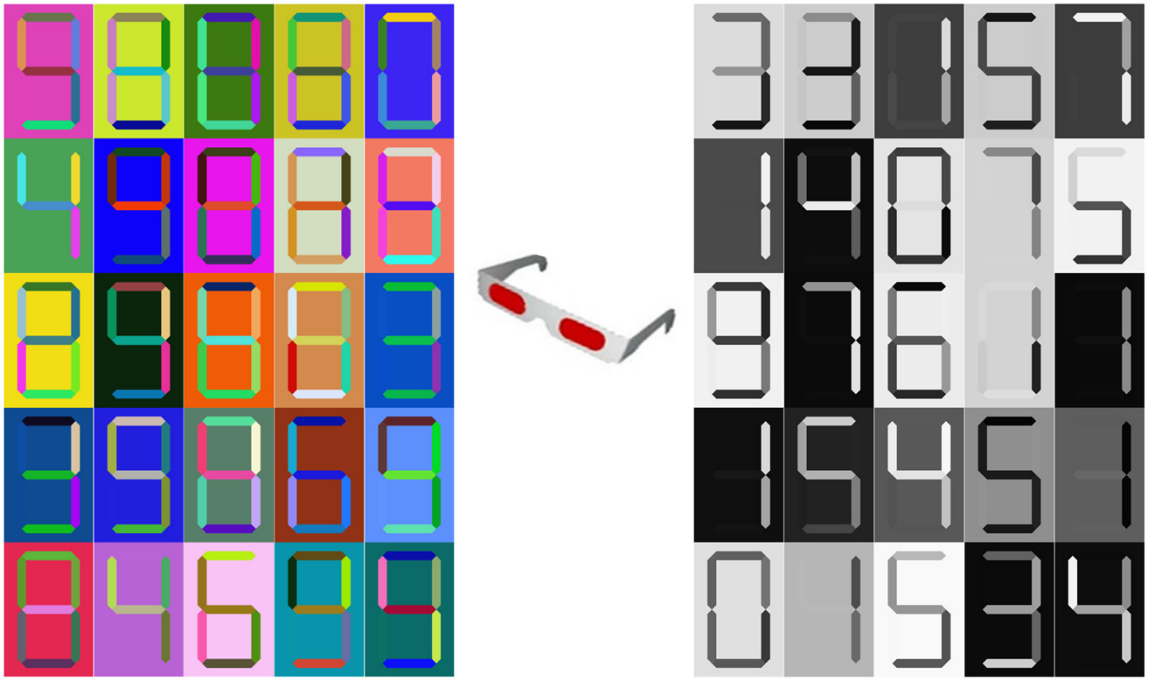
a) Analyze behavior and compare to self report.

Project 13 Hiding visual data via spectral filtering



Sensor: red filters.

Develop a system that is able to hide
Data (images) in an image using spectral
Filtering.
Uses ML.



OUTPUT:
a) System that produces
Spectral Hiding images

Project 14

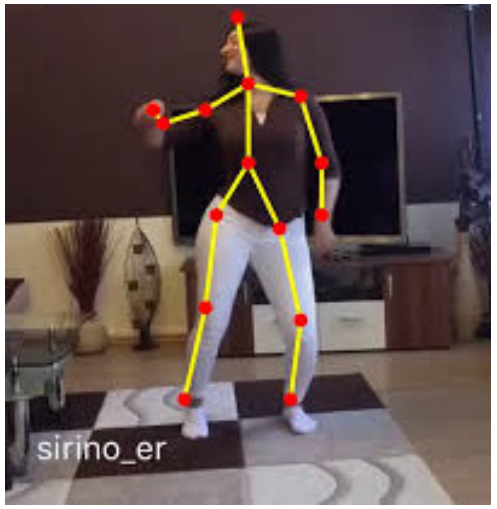
Merging 3D and 2D skeletons

Sensor: Kinect

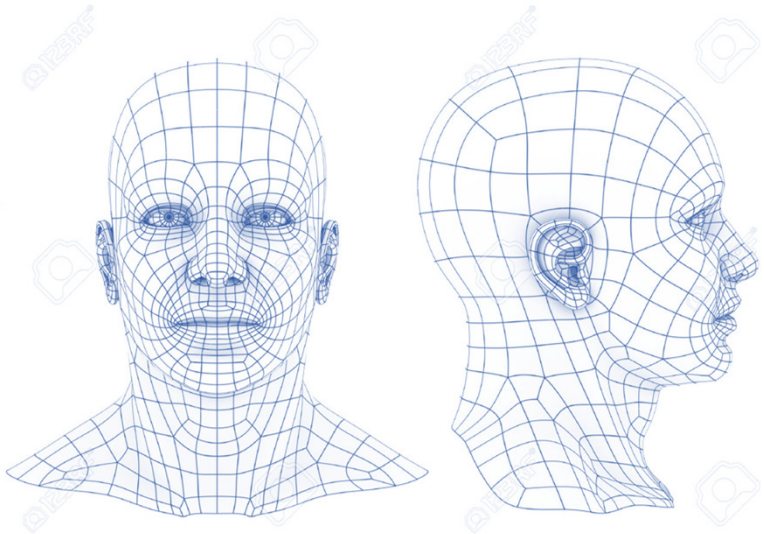
Develop a system that merges the 3D skeleton data from the kinect with the 2D skeleton obtained via OPENPOSE on the RGB data. Show Improved 3D skeleton tracking on difficult cases.

OUTPUT:

a) Plug and Play system.
b) Output is merged data
c) Example application and demo of experimental results showing improved 3D skeleton.



Quantification of Plagiocephaly, head deformations in infants



Dr Hila Sarig-Bahat
Prof. Hagit Hel-Or

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

Project submission is in 3 stages + Presentation/Demo:
Project proposal submission due **18/3/20.**
Mid-submission due **22/4/18.**
Class Demos and Presentations **17/6/20, 24/6/20**.
Final submission due **26/6/20**

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)
חקר חישובי של התנהגות אנושית

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.

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.

שלחו דואל **החל מ 20:00** ביום חמישי 12.3.20

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

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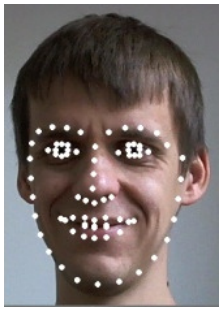
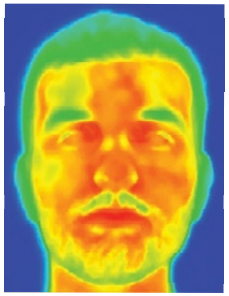
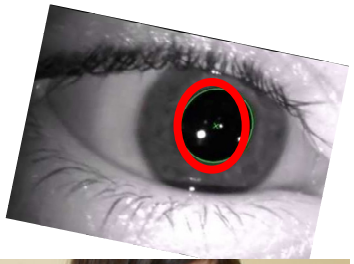
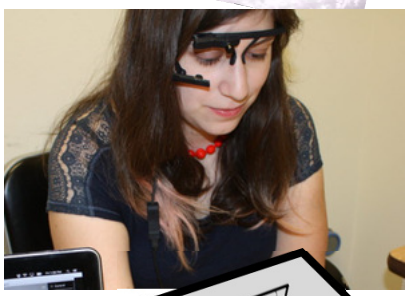
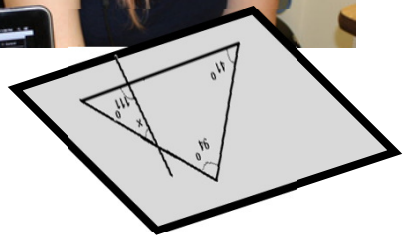
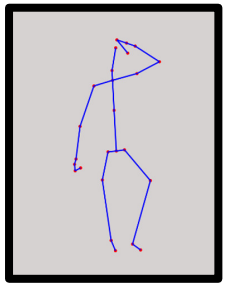
University of Haifa
hagit@cs.Haifa.ac.il

Computational Human Behavior Lab (CHB)



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