OpenFusion
Real-time 3D surface reconstruction
By: Vered Cohen and Nurit Schwabsky
Advisors: Prof. Craig Gotsman and Mr. Aaron Wetzler

Overview
OpenFusion is an implementation of Microsoft's KinectFusion system. This system enables real-time tracking and reconstruction of 3D scene using a depth sensor.

Depth Map Conversion
Depth data is received from the camera and raw global vertex and normal maps are calculated according to the camera calibration and current position.

Camera Tracking
Find the 6DOF camera position using the ICP (Iterative Closest Point) algorithm.

Volumetric Integration
The model is stored in a voxel grid as a signed distance function, in which the zero-crossing defines the model's surface.

Raycasting
New depth maps are fused to the existing model using the transformation calculated in the camera tracking phase.

Dynamic scene interaction
The reconstructed model is adapted according to dynamic changes in the scene without losing accuracy.

Future Work
- Integration of RGB into reconstructed model
- Augmented reality applications
- Wide scale scanning
- 3D printing of reconstructed models

Bibliography