



Master's Thesis

Automated Harvesting of Autologous Full-Thickness Skin Grafts

Skin grafts are often used when a patient's skin is severely damaged, which can be caused by infectious diseases, burns, extensive wounding or traumas, or by the treatment of skin cancer. The best outcome is typically achieved when tissue is transferred from a different site of the same person (autologous skin graft) and full-thickness grafts are used, i.e. the whole dermis and epidermis are used.

A new technology to create autologous full-thickness skin grafts (FTSG) is under development by SkinDot GbR, a spin-off company of the University of Lübeck and Unfallkrankenhaus Berlin-Marzahn. The proposed technology will use a stencil to cut numerous very small (1-3 mm diameter) skin grafts from a patient's leg, back or any other suitable site and put them in a matrix to cover the treatment site.

Tasks

You will develop a first prototypical setup for automatic harvesting based on the KUKA LBR iiwa 7 robot. Ideally, a surface scanning system will be calibrated to the robot to scan the donor site, a physician selects the outline of the exact donor area and the number of seeds to be harvested. Then, optimal placement of the seeds is computed and displayed. Finally, an optimal trajectory for the robot is computed (orthogonal approach, shortest path, deposit of the seeds into the matrix).



Qualification

- Programming skills (C++ and/or C#)
- Interest in medical technology and image processing
- Experience with robot kinematics, path and trajectory planning



Interested? Contact Prof. Dr. Floris Ernst at ernst@rob.uni-luebeck.de!