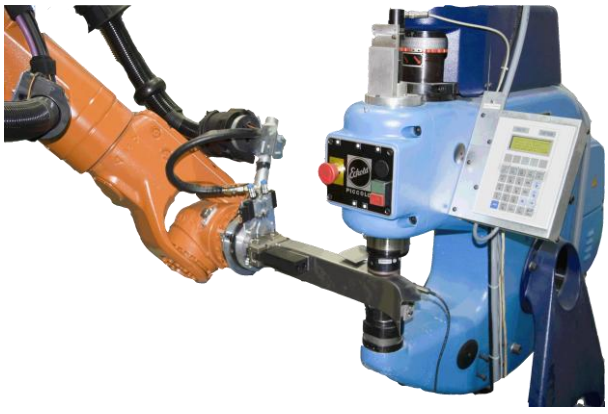
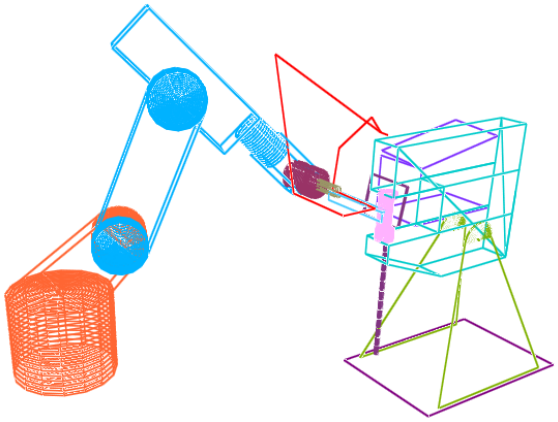
Virtual manufacturing

A growing demand for individualized sheet metal parts requires flexible manufacturing methods, which also enable cost-effective small batch production. Compared to large batch production, the manual methods are mainly utilized for small series and often lead to high labor costs and poor reproducibility. Traditionally, driving as a manual sheet metal forming method uses universal tools (e.g. stretching and shrinking tools), which can generate almost any 2D and 3D geometries of metal parts. Enormous application potentials of this method are identified through automation of the process.

Within the scope of the EFB-project, an industrial robot is used to replace the manual manipulations. The robot paths for the manufacturing can be created from the trajectories of the metal parts in the manual driving process. They can be also generated from a model-based simulation. But they must be checked before starting the manufacturing process. The positions in the paths that can't be reached by the robot should be changed or even eliminated. In order to find these position leaks, it is proposed to process an automatic detection in a virtual manufacturing environment. Thus, the aim of this project is to build a virtual manufacturing environment of the robot and the driving machine that must conforms to the real machines, so that the robot path can be revised for a smoothed movement in the manufacturing process.





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References

[1] **Yang Z., Scherer D., Hoffmann H., Echtler F., Klinker G.:** An Automation Scheme for the Driving Process: Copy manual Manipulations for Robot handling. *CARV 2009, 3rd International Conference on Changeable, Agile, Reconfigurable and Virtual Production*, Munich, Germany, 5-7 October 2009.

[2] **Yang Z., Scherer D., Golle M., Hoffmann H.:** Geometrical Modeling of the sheet metal parts in the incremental shrinking process. *14th International Conference on Sheet Metal*, Leuven, Belgium, 18-20 April 2011.