Master-/Bachelor Thesis
Safe, comfortable, and legible motions for collaborative robots

The research field of **collaborative robots** entails requirements that normal industrial robots, that do not come in contact with humans, do not have to meet. A collaborative robot has to, for example, move in a way that the **comfort of a human** is not affected negatively while simultaneously monitoring the movements of the human and **avoiding collision** at all cost. **Legibility**, not to be confused with but closely related to predictability, of **robot motions** is another issue that has a huge impact on how well a human accepts the robot in a collaborative setting. Only when these three topics, safety, comfort, and legibility are addressed by motion planning algorithms can the robot be used efficiently in a collaborative setting.

The goal of this thesis is to **design a metric** that quantifies safety, comfort, and legibility of **robot configurations and motions** in a collaborative setting. This thesis thus should gather a comprehensive state of the art on the three topics (safety, comfort, and legibility) and see whether good metrics exist to quantify robot configurations and motions respectively. These metrics should then be combined to one metric and adapted if necessary.

As a final step, a scene of a robot and a human in a simple domestic environment should be implemented in an appropriate **simulation environment** (e.g. Gazebo) to test and demonstrate the new metric. This thesis offers working in a very **active and relevant research field in robotics** and provides a possibility to **contribute scientifically**.

Motivated students of all fields are welcome.

Language: German or English

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