Literature Review for CS 6751, Spring 2017
Grasping and Prehensile Manipulation Project

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GRASPING end-effectors are one of the most commonly employed manipulation tools in robotic arms. Most literature on grasping-based manipulation [1] considers the scenario in which the robotic arm firmly grips the object, immobilizing it and making it a part of the arm. To place the object in its desired goal configuration is then considered to be a path-planning problem in the C–space of the robotic arm [2], [3], which has been augmented with the grasped object.

On the contrary, humans tend not to manipulate objects in their environment with merely pick-and-place style grasping. For instance, to move a box across a table, one may slide it over the surface by pushing [4]. This form of motion is termed as *prehensile* manipulation. In this class of motion, the object is not assumed to be completely immobilized by the manipulator.

REFERENCES

[1] D. Prattichizzo and J. C. Trinkle, "Grasping," in *Springer handbook of robotics*. Springer, 2016, pp. 955–988.
[2] O. Brock, J. Kuffner, and J. Xiao, "Motion for manipulation tasks," in *Springer Handbook of Robotics*. Springer, 2008, pp. 615–645.
[3] L. E. Kavraki and S. M. LaValle, "Motion planning," in *Springer handbook of robotics*. Springer, 2016, pp. 139–162.
[4] N. Chavan-Dafle and A. Rodriguez, "Prehensile pushing: In-hand manipulation with push-primitives," in *Intelligent Robots and Systems (IROS), 2015 IEEE/RSJ International Conference on*. IEEE, 2015, pp. 6215–6222.