

Data Driven Inverse Kinematics using Local Models

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Abstract—This electronic document is a template. The various components of your paper [title, text, heads, etc.] are already defined on the style sheet, as illustrated by the portions given in this document.

I. INTRODUCTION

II. LEARNINGCUBE

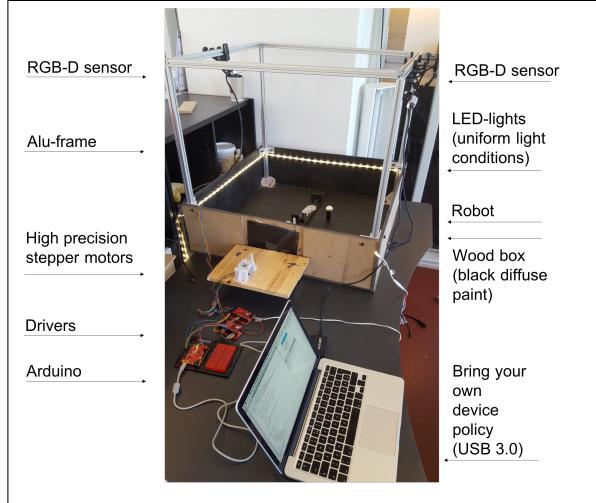


Fig. 1: Overview of the LearningCube

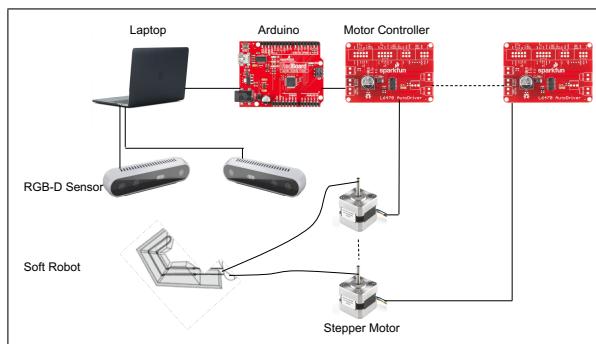


Fig. 2: Overview of the LearningCube

Soft robot with visual markers	Extracted shape	Shape vector
	(x_1, y_1, z_1) (x_2, y_2, z_2) (x_3, y_3, z_3) (x_4, y_4, z_4) (x_0, y_0, z_0)	$\vec{s} = \begin{bmatrix} x_0 \\ y_0 \\ z_0 \\ x_1 \\ y_1 \\ z_1 \\ \vdots \\ x_4 \\ y_4 \\ z_4 \end{bmatrix}$

Fig. 3: Overview of the LearningCube

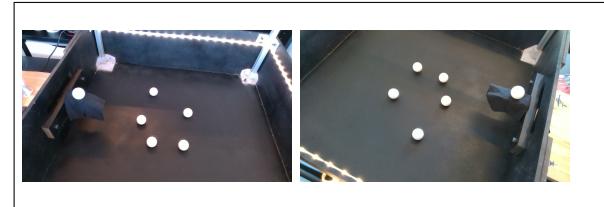


Fig. 4: Calibration balls seen from two sensors

III. DATA DRIVEN INVERSE KINEMATICS FOR SOFT ROBOTS

IV. DOMAIN DECOMPOSITION OF CONTROL SPACE

A. Efficient Polynomial Regression for Higher Order Models

V. EXPERIMENTS

VI. DISCUSSION AND CONCLUSION

REFERENCES

- [1] G. O. Young, “Synthetic structure of industrial plastics (Book style with paper title and editor),” in Plastics, 2nd ed. vol. 3, J. Peters, Ed.

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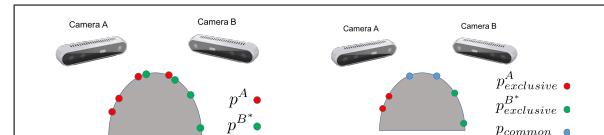


Fig. 5: Calibration balls seen from two sensors

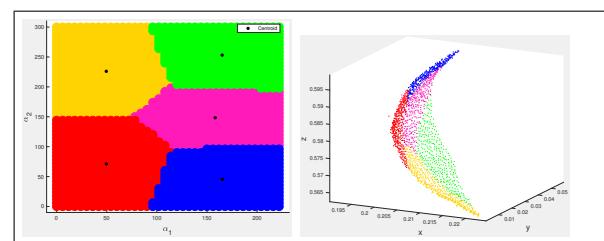


Fig. 6: Calibration balls seen from two sensors

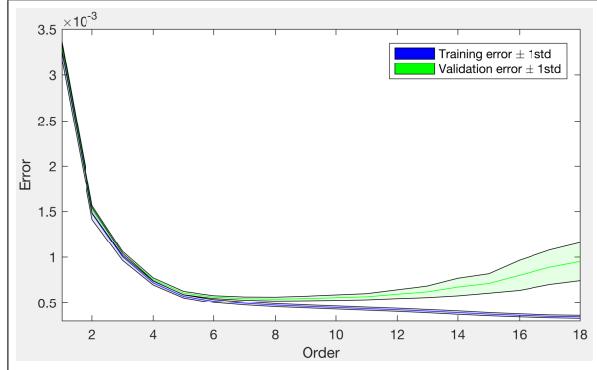
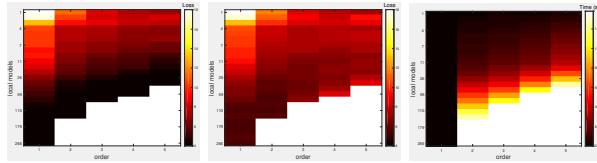
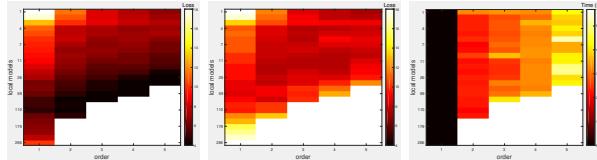


Fig. 7: Overview of the LearningCube



(a) Training error (b) Validation error (c) Execution time



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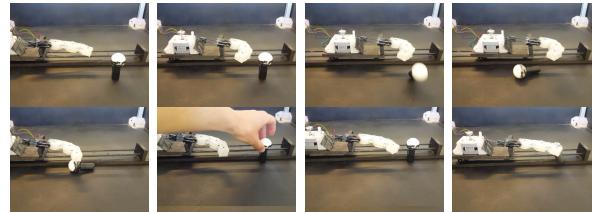
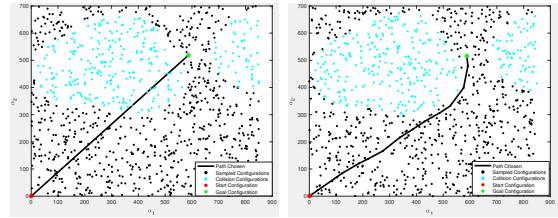


Fig. 10: The finger tries to tip the ball over



(a) Naive path (b) Collision avoiding path
 (c) Minimize probability of collision (d) Importance sampled

Fig. 11: Paths through the configuration space

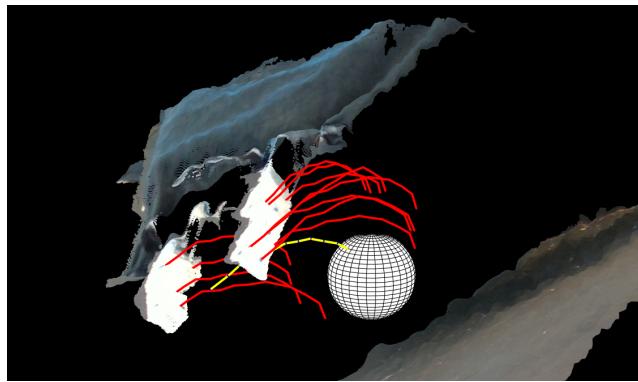


Fig. 12: Trajectory of real markers (red) and phantom marker (yellow) in work-space.



Fig. 13: Grabber choosing collision free trajectory