

# App-controlled LEGO 3-DoF robotic arm

Project of lecture "Mobile Computing" (winter term 2018/2019)

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**Abstract**—it's reasonable to write this after all other sections of this paper have been completed

## I. INTRODUCTION / MOTIVATION

- control of a robotic arm is a fundamental task in robotics - easy hands on experience for everybody to this fundamental robotic application with this paper and the created low cost LEGO 3-DoF robot arm (incl. instructions)
- application and hardware could be used in basic lecture "Grundlagen der mobilen Robotik" to better understand robot kinematics, ROS and a bit of perception
- recycling of old and unused hardware of the robotics lab at the HTWG Konstanz
- typical industrial applications to control a robotic arm run on more powerful hardware and often offer a complicated and - for beginners - confusing GUI,

Christoph: insert example(s)

so we developed an easy to use mobile application for Android platforms

- ROS because widely used, very modular/extensible and basic framework which almost every student starting with robotics has to get in touch with
- new paragraph

Christoph: description of background and main "problem"

## II. STATE OF THE ART

Christoph: find two or three example applications/hardware components, analyze and compare them, also look at mobile application programming techniques used in these works

- <https://www.hackster.io/slantconcepts/control-arduino-robot-arm-with-android-app-1c0d96>
- <https://www.instructables.com/id/Robot-Arm-Arduino-App/>
- <https://www.kuka.com/en-us/products/robotics-systems/software/application-software/kuka-hrc-guide-app>

## III. PROPOSED APPROACH

### A. Requirements Engineering

Christoph: what should the arm be able to achieve in the end? How should the app look like and which functions does it have to provide?

### B. Arm Construction

Christoph: graphics, moment/transmission calculations, ...

### C. Algorithms

Christoph: implementation of forward and backward kinematics

### D. App Development

Christoph: communication/process description, ROS, navigation strategy, ...

### E. Expected Results

Christoph: speed, accuracy, ...

## IV. RESULTS

## V. CONCLUSION

## VI. FURTHER WORK

- 3D graphics in App
- ...

## QUELLENVERZEICHNIS

- [1] Khronos - OpenGL: Primitives - Triangle Primitives,  
<https://www.khronos.org/opengl/wiki/Primitive>

## TODO LIST

insert example(s)	1
description of background and main "problem"	1
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speed, accuracy, ... . . . . .	1