Slot Liner Insertion Using a UR robot



XXX thesis in study program XXX

Friedrich-Alexander-Universität Erlangen-Nürnberg  
Lehrstuhl für Fertigungsautomatisierung und Produktionssystematik  
Prof. Dr.-Ing. Jörg Franke

Insert a meaningful image here that represents the content of the work.

of the work. Position the image in front of the text to prevent the lower information from being

(right-click on image, line break, behind the text).

Image width: 16.88 cm (flush with logo)

Author: Alen Sebastian, (M. Sc.,)  23221507

Supervisor: Prof. Dr.-Ing. Jörg Franke  
 (Dipl.-Ing.) Vorname Nachname(, M. Sc.)  
 Vorname2 Nachname2, M. Sc., M. Sc.

Submission date: XX.XX.202X  
Project duration: XX months

Erklärung

Ich versichere, dass ich die Arbeit ohne fremde Hilfe und ohne Benutzung anderer als der angegebenen Quellen angefertigt habe und dass die Arbeit in gleicher oder ähnlicher Form noch keiner anderen Prüfungsbehörde vorgelegen hat und von dieser als Teil einer Prüfungsleistung angenommen wurde. Alle Ausführungen, die wörtlich oder sinngemäß übernommen wurden, sind als solche gekennzeichnet.

Erlangen/Nürnberg, the XX.XX.202X

XXFirst Name Last NameXX

Table of Contents

1 Abstract 1

2 Grundlagen... 3

2.1 Subchapter XXX 3

2.1.1 Unterunterpunkt XXX 4

2.2 Unterpunkt YYY 4

3 Zusammenfassung und Ausblick 6

Literaturverzeichnis 7

Anhang A 8

Anhang B 9

Lebenslauf 10

Table of Figures

Figure 1: Logo Faps [2] 3

List of Tables

Tabelle 1: Bezeichnung der Tabelle 4

Table of Abbreviations

ABC A… B… C…

# Abstract

Slot liners are inserted into the stator of a motor to provide electrical insulation between the windings and the core, preventing short circuits and mechanical damage to the windings during operation. In large-scale industries, such as the automotive sector, slot liners are typically inserted automatically using slot liner insertion machines. These machines are highly efficient for mass production of motors of a constant size. However, in small-scale production, where batches of varying motor sizes are manufactured, the slot liner insertion process is often performed manually. This project aims to develop a flexible slot liner insertion process using the UR10e Universal Robot. By utilizing a robot, this process can be adapted to motors of different sizes, thereby increasing the flexibility and efficiency of slot liner insertion in small-scale production.

**State of the Art Process for Slot Liner Insertion**

A circular metal object with white lines

AI-generated content may be incorrect.

Figure 1. Slot Liner insertion machine

For large scale production a slot liner insertion machine is used which provides quick and efficient insertion of slot liners.

# Methodology

Lorem ipsum his ut accumsan adipiscing dissentiet. Per amet persecuti at, tota enim conclusionemque eos. An cum ludus minimum senserit. Utamur albucius hendrerit in mea, aperiri discere mel at.

## Subchapter Figures

Lorem ipsum his ut accumsan adipiscing dissentiet. Per amet persecuti at, tota noluisse duo et, mollis copiosae mediocrem no eum. Cum mutat latine temporibus at, civibus delectus sea an, et enim conclusionemque eos. An cum ludus minimum senserit. Utamur albucius hendrerit in mea, aperiri discere mel at.

***Each image/table must be referenced in the text! Insert reference by Insert-Reference-Cross-reference-Image-Category and number only. Example:***

Figure 1 shows the logo of FAPS. For similar logos compare [1].

***Insert a graphic, then right-click on the table/image and insert the caption.***



Figure 1: Logo Faps [2]

## Subchapter Formulas

It is recommended to format formulas as tables as shown for equation 2.1 below

The magnetic field of a coil is idealised as follows:

|  |  |  |
| --- | --- | --- |
|  |  | *2.1* |
| with: | magnetic flux densit  magnetic field constant  permeability of the surrounding space  current flowing through the coil  number of turns of the coil  magnetically effective length of the coil |  |

### Subsubchapter XXX

Lorem ipsum his ut accumsan adipiscing dissentiet. Per amet persecuti at, tota noluisse duo clusionemque eos. An cum ludus minimum senserit. Utamur albucius hendrerit in mea, aperiri discere mel at.

Subchapter without numbering

Lorem ipsum his ut accumsan adipiscing dissentiet. Per amet persecuti at, tota noluisse copiosae ***Hervorhebung*** mediocrem no eum. Cum mutat latine temporibus at, civibus delectus sea an, et enim conclusionemque eos. An cum ludus minimum. Utamur albucius hendrerit in mea, aperiri discere mel at.

## Unterpunkt YYY

Lorem ipsum his ut accumsan adipiscing dissentiet.

Table 1 behind the word mountains, far from the countries Vokalia and Consonantia, there live the blind texts. Separated they live in Bookmarksgrove right at the coast of the Semantics, a large language ocean. A small river named Duden flows by their place and supplies it with the necessary regelialia. It is a paradisematic country, in which roasted parts of sentences fly into your mouth. Even the all-powerful Pointing has no control about the blind texts it is an almost unorthographic life.

Table 1: Description of the table

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |

One day however a small line of blind text by the name of Lorem Ipsum decided to leave for the far World of Grammar. The Big Oxmox advised her not to do so, because there were thousands of bad Commas, wild Question Marks and devious Semikoli, but the Little Blind Text didn’t listen. She packed her seven versalia, put her initial into the belt and made herself on the way. When she reached the first hills of the Italic Mountains, she had a last view back on the skyline of her hometown Bookmarksgrove, the headline of Alphabet Village and the subline of her own road, the Line Lane. Pityful a rethoric question ran over her cheek, then she continued her way.

On her way she met a copy. The copy warned the Little Blind Text, that where it came from it would have been rewritten a thousand times and everything that was left from its origin would be the word "and" and the Little Blind Text should turn around and return to its own, safe country. But nothing the copy said could convince her and so it didn’t take long until a few insidious Copy Writers ambushed her, made her drunk with Longe and Parole and dragged her into their agency, where they abused her for their projects again and again. And if she hasn’t been rewritten, then they are still using her.

# Summary and Outlook

Far far away, behind the word mountains, far from the countries Vokalia and Consonantia, there live the blind texts. Separated they live in Bookmarksgrove right at the coast of the Semantics, a large language ocean. A small river named Duden flows by their place and supplies it with the necessary regelialia. It is a paradisematic country, in which roasted parts of sentences fly into your mouth. Even the all-powerful Pointing has no control about the blind texts it is an almost unorthographic life.

One day however a small line of blind text by the name of Lorem Ipsum decided to leave for the far World of Grammar. The Big Oxmox advised her not to do so, because there were thousands of bad Commas, wild Question Marks and devious Semikoli, but the Little Blind Text didn’t listen. She packed her seven versalia, put her initial into the belt and made herself on the way. When she reached the first hills of the Italic Mountains, she had a last view back on the skyline of her hometown Bookmarksgrove, the headline of Alphabet Village and the subline of her own road, the Line Lane. Pityful a rethoric question ran over her cheek, then she continued her way.

On her way she met a copy. The copy warned the Little Blind Text, that where it came from it would have been rewritten a thousand times and everything that was left from its origin would be the word "and" and the Little Blind Text should turn around and return to its own, safe country. But nothing the copy said could convince her and so it didn’t take long until a few insidious Copy Writers ambushed her, made her drunk with Longe and Parole and dragged her into their agency, where they abused her for their projects again and again. And if she hasn’t been rewritten, then they are still using her.

Bibliography

1. Autor: Titel. X. Auflage, XXX Verlag, Ort, 20XX
2. Autor: Titel. Y. Fachseminar....Logo, Ort, XX.XX.20XX

**Bibliography following DIN ISO 690 for German thesis and IEEE Editorial for English thesis.**

**Insert new source via Enter, numbering is continued accordingly.**

**Sort chronologically (in the same order as in the text)!**

**Insert reference in the text with : Insert-Reference-Cross-reference-Numbered element-Paragraph number(No context)**

Appendix A

Lorem ipsum his ut accumsan adipiscing dissentiet. Per amet persecuti at, tota noluisse duo et, mollis copiosae mediocrem no eum. Cum mutat latine temporibus at, civibus delectus sea an, et enim conclusionemque eos. An cum ludus minimum senserit. Utamur albucius hendrerit in mea, aperiri discere mel at.

Appendix B

**Data Carrier:**

Digital version of the work as Word and PDF,

Graphics in a modifiable (source) file format (PowerPoint, Visio, Corel...),

Images, videos, measurement data, simulation models, etc.

Digital sources/literature

Citavi project of the work (with attachments)

Data sheets

….

**Curriculum vitae**

Brief curriculum vitae for Master's and Bachelor's theses

Date of birth:

Place of birth:

**Education:**

MM/YYYY – MM/YYYY: XXBachelor of XX at YY….

**Practical experience:**

MM/YYYY – MM/YYYY: Internship at…

**Qualifications:**

Certificat of …