



**Zagazig University, Faculty of Engineering, Mechatronics
Program**

**Application of Industrial Robotic Arm in
Three-Dimensional Milling
(ZUKA)**

a B.Sc. Graduation Project

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to
All, Whom, we, and love.
The best in my life and after ...

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“There is nothing more difficult to take in hand, more perilous to conduct or more uncertain in its success than to take the lead in the introduction of a new order of things.”

— Niccolo Machiavelli, (Italian writer and statesman, Florentine patriot, author of ‘The Prince’, 1469-1527)

1 Introduction

just some text for text

1.1 overview

some data

1.1.1 Flower Power

"It is impossible for us, who live in the latter ages of the world, to make observations in criticism, morality, or in any art or science, which have not been touched upon by others. We have little else left us but to represent the common sense of mankind in more strong, more beautiful, or more uncommon lights."

— Joseph Addison, (English essayist, poet, and politician, 1672–1719), *Spectator*, No. 253

2 State of the Art

“A computer would deserve to be called intelligent if it could deceive a human into believing that it was human.”

— Alan Turing, (British pioneering computer scientist, cryptanalyst, and philosopher, 1912–1954)

3 Architecture Overview

“Be sure you put your feet in the right place, then stand firm.”

— Abraham Lincoln, (American 16th President, 1809–1865)

4 Robot Foot Ground Contact

*“Look up at the stars and not down at your feet.
Try to make sense of what you see, and wonder
about what makes the universe exist. Be curious.”*

—Stephen Hawking, British theoretical physicist, and cosmologist

5 Short–Range Embodied Terrain Classification

"I think setting a goal, getting a visual image of what it is you want. You've got to see what it is you want to achieve before you can pursue it."

— Chuck Norris (American martial artist, actor, film producer and screenwriter)

6 Long–Range Visual Terrain Classification

"You have brains in your head. You have feet in your shoes. You can steer yourself in any direction you choose. You're on your own, and you know what you know. And you are the guy who'll decide where to go."

—Dr. Seuss, American writer and cartoonist, 1904–1991)

7 Path Planning and Following

*"It doesn't matter how beautiful your theory is, it
doesn't matter how smart you are. If it doesn't
agree with experiment, it's wrong."*

—Richard P. Feynman, (American theoretical physicist, 1918–1988)

8 Experiments and Results

The true function of philosophy is to educate us in the principles of reasoning and not to put an end to further reasoning by the introduction of fixed conclusions.

(Georg Wilhelm Friedrich Hegel, *Aesthetics*, Critic of literature, 1817–1878)

9 Conclusions and Future Outlook
