Postgraduate Certificate
Automatic Control Systems in Robotics

tech technological university

Postgraduate Certificate

Automatic Control Systems in Robotics

- » Modality: **online**
- » Duration: **6 weeks**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: **www.techtitute.com/in/information-technology/postgraduate-certificate/automatic-control-systems-robotics**

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01
Introduction

From painting and assembling cars, to tidying up warehouses, to streamlining household chores. In all these actions are present robots and the work behind the IT professionals who have made possible their correct and efficient operation. The improvement of machine control technology requires, therefore, a deep knowledge in which the students who take this program will be immersed in an up-to-date syllabus in the field of robotics. All of this with a specialized teacher team that will provide you with the knowledge you need to thrive in a booming technology industry.

The Robotics industry is waiting for your talent. Expand your knowledge and gain access to a booming sector"

In this Postgraduate Certificate, the Computer Science professional will delve into one of the main foundations of Robotics: Control Theory. From the point of view of specialization, the faculty that teaches this online program will provide the students with the control tools most used today in the field of Robotics research. A starting point from which ideas and concepts are developed and put into practice.

An education where the students will obtain deep knowledge in Kinematics, Dynamics, Planning, Vision and Control. With a theoretical approach, but at the same time practical, the IT professional will verify through real cases the direct applications of all the knowledge acquired throughout the 150 teaching hours that make up this university program. From robotic arms to ground or aerial vehicles. All shown with the most up-to-date syllabus in the field of Robotics.

An excellent opportunity for the IT professional looking to advance in a booming sector. Your goals can be achieved with a 100% online education, without fixed schedules, and which can be accessed at any time and from an electronic device with an Internet connection. The multimedia content and the Relearning learning system will facilitate the agile acquisition of knowledge while enabling the students to achieve their goals and boost their careers.

This **Postgraduate Certificate in Automatic Control Systems in Robotics** contains the most complete and up-to-date program on the market. The most important features include:

- Case studies presented by experts in robotic engineering
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection

Progress in your professional career where you will master dynamics and kinematics in Robotics"

Advance your career with a specialized team and the most up-to-date content in the field of Robotics.

Access the entire syllabus, download its content and view it whenever you want. Enroll now.

" *The real cases provided by the teacher's team will facilitate the understanding and application of the concepts of control architectures"*

The program's teaching staff includes professionals from the sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

The design of this program focuses on problem-based learning, through which the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

02
Objectives

At the end of this Postgraduate Certificate, the IT professional will have achieved an improvement in their knowledge of Robotics, which will allow them to give a boost to their career. A teaching that will focus on Automatic Control Systems in Robotics, so that the students will be able to master the control models, the design of nonlinear controllers or implement controllers and evaluate them through a simulator. All this with an eminently practical application, which will help you grow in the Robotics industry.

Predictive control, automatic learning-based control there will not be any key technique that you will not develop in this Postgraduate Certificate"
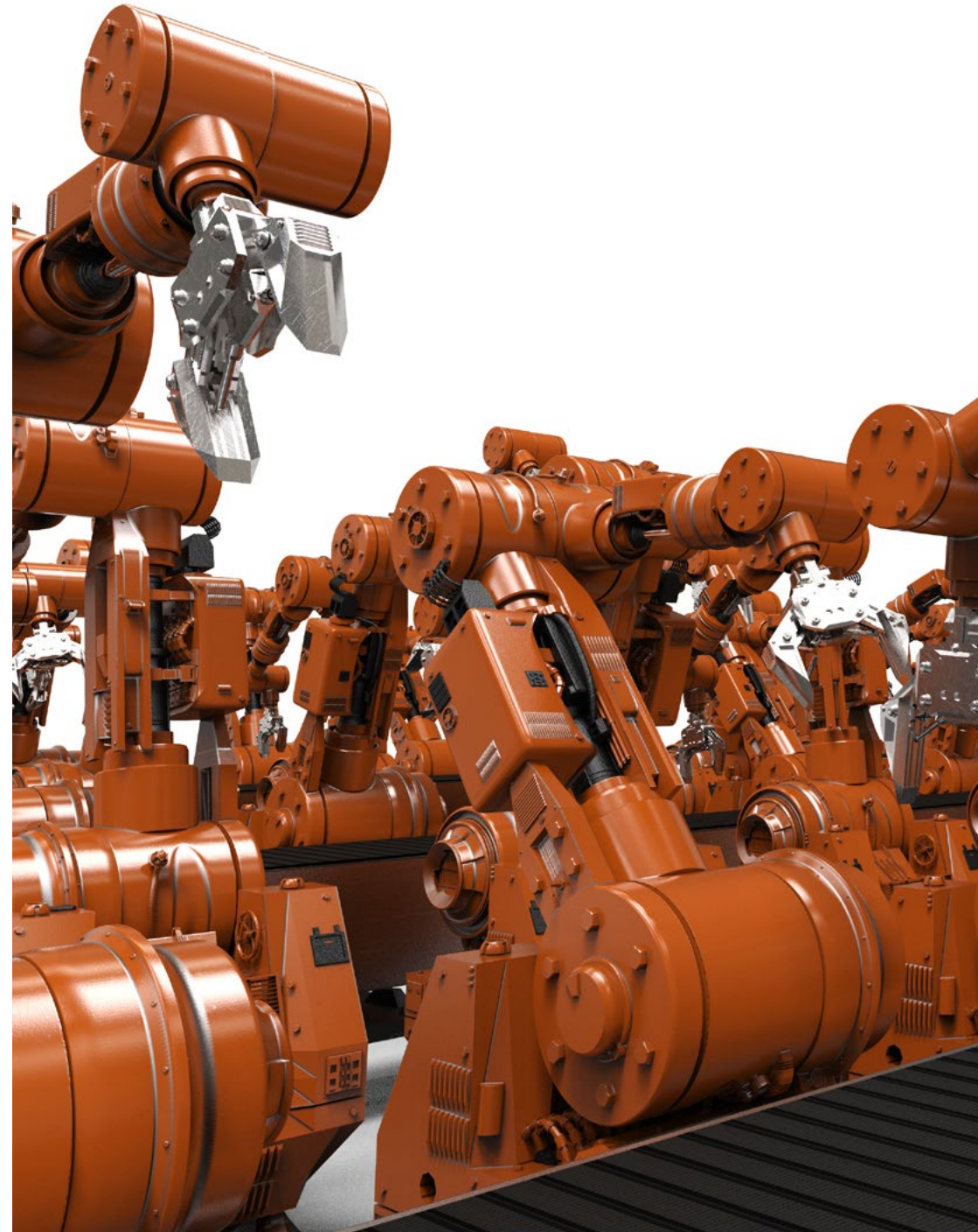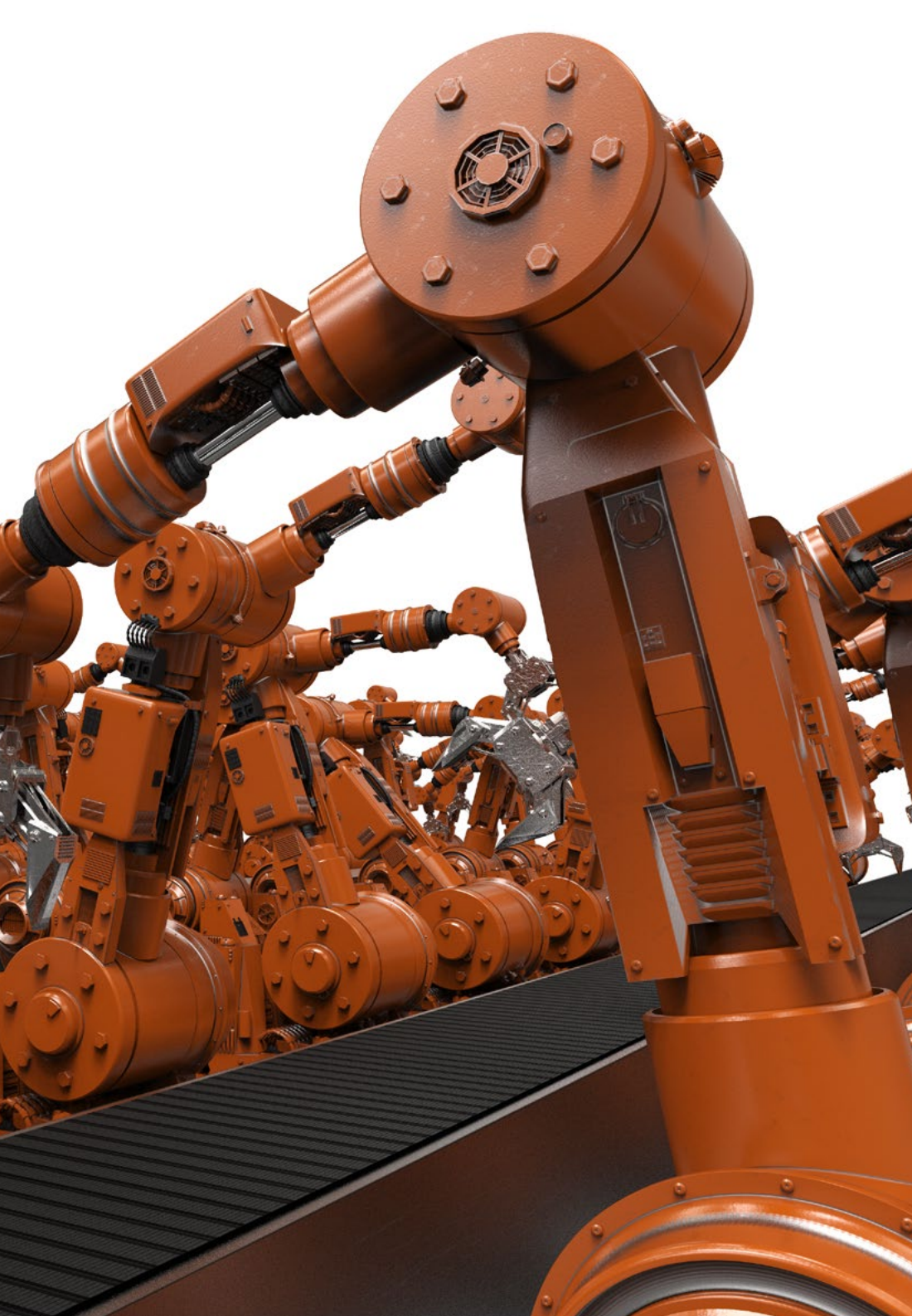
General Objectives

- Develop the theoretical and practical foundations necessary to carry out a robot design and modeling project
- Provide the graduates with an exhaustive knowledge of the automation of industrial processes that will allow them to develop their own strategies
- Acquire the professional skills of an expert in automatic control systems in Robotics

Enroll in a Postgraduate Certificate that will allow you to develop the most advanced control techniques"

Specific Objectives

- Generate specialized knowledge for the design of nonlinear controllers
- Analyze and study control problems
- Master control models
- Design nonlinear controllers for robotic systems
- Implement controllers and assess them in a simulator
- Determine the different existing control architectures
- Examine the fundamentals of vision control
- Develop state-of-the-art control techniques such as predictive control or machine learning based control

03
Course Management

The course management and the teacher who delivers this program is highly qualified and has extensive experience in the field of Robotics. In this way, TECH maintains its commitment to offer the students a quality education, with up-to-date content applicable to their sector. A program where the proximity of the faculty to this technology industry will be reflected in all the syllabus to which the students will have access from the first day they start this program. Furthermore, the students will be accompanied during the six weeks of this program by the teacher's team, who will try to ensure that each student achieves their objectives.

"

In this Postgraduate Certificate, you will go hand in hand with the best specialists in the field of Robotics. They will help you achieve your goals"

Management

Dr. Ramón Fabresse, Felipe

- Senior Software Engineer at Acurable
- NLP Software Engineer at Intel Corporation
- Researcher in Aerial Robotics at the University of Seville
- Software Engineer at CATEC and Indisys
- PhD Cum Laude in Robotics, Autonomous Systems and Telerobotics at the University of Seville
- Degree in Computer Engineering at the University of Seville
- Master in Robotics, Automation and Telematics at the University of Seville

Professors

Dr. Jiménez Cano, Antonio Enrique

- Postdoctoral Researcher in Navigation Systems at CNRS-LAAS
- Researcher in European projects (ARCAS, AEROARMS and AEROBI) at the University of Seville
- PhD in Automatics, Electronics and Telecommunications at the University of Seville
- Graduated in Automatic Engineering and Industrial Electronics at the University of Seville
- Degree in Technical Engineering in Computer Systems at the University of Seville

04
Structure and Content

This Postgraduate Certificate has been developed so that, in the 150 teaching hours, the students reach an exhaustive and broad knowledge of Automatic Control Systems in Robotics. The teaching resources library, consisting of video summaries, specialized readings and real case studies, will help the IT professional to acquire up-to-date knowledge in the field of nonlinear system design, the main control techniques, architecture or key concepts in motion and force control. A syllabus that you can access 24 hours a day, without fixed timetable sessions, allowing you to study this program in a more flexible way.

You will be able to create automatic control systems for terrestrial or aerial robots in an optimal and professional way. Enroll now"

Module 1. Automatic Control Systems in Robotics

1.1. Analysis and Design of Nonlinear Systems

    1.1.1. Analysis and Modeling of Nonlinear Systems

    1.1.2. Feedback Control

    1.1.3. Linearization by Feedback

1.2. Design of Control Techniques for Advanced Non-linear Systems

    1.2.1. Sliding Mode Control (Sliding Mode control)

    1.2.2. Lyapunov and Backstepping Control

    1.2.3. Control Based on Passivity

1.3. Control Architectures

    1.3.1. The Robotics Paradigm

    1.3.2. Control Architectures

    1.3.3. Applications and Examples of Control Architectures

1.4. Motion Control for Robotic Arms

    1.4.1. Kinematic and Dynamic Modeling

    1.4.2. Control in Joint Space

    1.4.3. Control in Operational Space

1.5. Actuator Force Control

    1.5.1. Force Control

    1.5.2. Impedance Control

    1.5.3. Hybrid Control

1.6. Terrestrial Mobile Robots

    1.6.1. Equations of Motion

    1.6.2. Control Techniques for Terrestrial Robots

    1.6.3. Mobile Manipulators

1.7. Aerial Mobile Robots

    1.7.1. Equations of Motion

    1.7.2. Control Techniques in Aerial Robots

    1.7.3. Aerial Manipulation

A Postgraduate Certificate where you will advance your knowledge in predictive and vision-based control. Click and enroll now"

Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.

"
Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

"

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

"

Our program prepares you to face new challenges in uncertain environments and achieve success in your career"

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

This program offers the best educational material, prepared with professionals in mind:

Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.

30%

10%

8%

20%

25%

4%

3%

Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.

06
Certificate

The Postgraduate Certificate in Automatic Control Systems in Robotics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This **Postgraduate Certificate in Automatic Control Systems in Robotics** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Automatic Control Systems in Robotics**

Official Nº of Hours: **150 h.**

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Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.
For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Automatic Control Systems in Robotics

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

Unique TECH Code: AFWORD23S   techtitute.com/certificates

*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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