برنامج ماجستير

برنامج ماجستير الذكاء الاصطناعي التنفيذي

الكلية التابعة لها البرنامج
علوم وهندسة الحاسب الآلي

القسم المقدم للبرنامج
علوم الحاسب الآلي والمعلومات

مقر الدراسة للطلاب
المدينة الجامعية

مقر الدراسة للطالبات
مجمع أجا للطالبات

الفئة المسموح لها بالتقديم
طلاب وطالبات

نوع الدراسة
انتظام (يقدم خلال نهاية الاسبوع)

التقدير المطلوب
(جيد جدا) على الأقل في المرحلة الجامعية ويجوز بناءً على توصية مجلس القسم والكلية وموافقة عمادة الدراسات العليا قبول الحاصلين على تقدير جيد مرتفع.

الشروط الخاصة
- أن يكون حاصلاً على شهادة البكالوريوس في اي من تخصصات الحاسب الالي من جامعة سعودية أو من جامعة اخرى معترف بها.
- اجتياز اختبار اللغة الانجليزية بمعدل 4.5 في اختبار الايلس أو ما يعادلها.

مدة الدراسة
أربعة فصول دراسية

رسوم البرنامج
60.000 ستون ألف ريال.

وكالة الجامعة للدراسات العليا والبحث العلمي
عمادة الدراسات العليا

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المملكة العربية السعودية
وزارة التعليم
جامعة حائل
وكالة الجامعة للدراسات العليا والبحث العلمي
عمادة الدراسات العليا

الدليل الإرشادي لطلاب الدراسات العليا

ماجستير
الذكاء الاصطناعي التنفيذي

مقدمة

يعتبر الذكاء الاصطناعي من أهم العلوم التقنية الحديثة حيث يشمل كل ما يتعلق بإكساب الآلة صفة الذكاء، وذلك بهدف محاكاة أسلوب القدرات الذهنية عن الانسان. كما يجعل الأجهزة قادرة على الاستنتاج والتفكير والتعلم ورد الفعل على أوضاع لم تبرمج عليها الآلة. لقد استطاع الذكاء الاصطناعي انتاج أساليب تكنولوجية حديثة ناجحة من الممكن ان تغير نمط الحياة التي نعيشها هذا العصر. ويشهد الذكاء الاصطناعي تطور على نحو متسارع حيث من المتوقع أن يصبح جزءاً مهماً من حياتنا اليومية من خلال تطبيقات مختلفة.

وتقدم كلية علوم وهندسة الحاسب الالي بجامعة حائل برنامج ماجستير الذكاء الاصطناعي التنفيذي للمساهمة في تحقيق التطلعات الوطنية فيما يتعلق في الجانب الرقمي اتساقاً مع رؤية 2030 ويسعى البرنامج إلى المساهمة في تطوير الحاضر الرقمي وبناء مستقبل يعتمد على الذكاء الاصطناعي يساهم في تعزيز مكانة المملكة في مجال التنقية والابتكار في ظل عصر الابتكارات العلمية والتقنية غير المسبوقة. حيث يوفر الماجستير في الذكاء الاصطناعي الكفاءة والخبرة القوية في مجالات التأسيس والتطبيقات المبتكرة للذكاء الاصطناعي، ويتبنى البرنامج مجموعة متنوعة من الموضوعات في الذكاء الاصطناعي، مثل التعلم الآلي، والتفكير الآلي، وعلوم البيانات، وأنظمة دعم القرار، واكتساب الخبرة في العمل مع أدوات وتقنيات التعرف على الأنماط. مع تقديم معلومات في العلوم العصبية المعرفية وفي القضايا الأخلاقية والاجتماعية في مجال الذكاء الاصطناعي. وسيكتسب الطلاب المهارات التي تسمح لهم بالتفاعل المهني مع سوق العمل.

Vision
الرؤية

تحقيق التميز المحلي والإقليمي في مجال الذكاء الاصطناعي.

Mission
الرسالة

إعداد خريجين مؤهلين لمواكبة التطور الهائل في مجال الذكاء الاصطناعي من خلال توفير المعرفة التقنية المتقدمة وتنمية قدرات الباحثين للإبداع في استخدام تقنيات الذكاء الاصطناعي وايجاد حلول تقنية مبتكرة.

Object
الأهداف

1. تأهيل الخريجين بأحدث المعلومات والمهارات في مجال الذكاء الاصطناعي.
2. تطوير المهارات العملية لدى الخريجين من أجل تصميم وبناء أنظمة ذكاء اصطناعي.
3. الالتزام بالمسؤوليات الأخلاقية والمهنية في الذكاء الاصطناعي.
4. مساعدة الخريجين من أجل الحصول على وظائف تلاءم سوق العمل.

1. Compulsory Courses:

Course Code	Course Name	Credit Hours	Pre-requisite
Semester 1			
CSAI 501	Artificial intelligence	3	
CSAI 502	Artificial Neural Networks	3	
CSAI 503	Introduction to Robotics	3	
CSAI 504	Ethical Issues in AI	1	
		10	
Semester 1			
CSAI 601	Search Algorithms & Optimizations	3	
CSAI 602	Machine learning Applications	3	
CSAI 603	Research Methods	2	
CSAI 604	Data mining	3	
		11	

Course Code	Course Name	Credit Hours	Pre-requi-site
Semester 1			
CSAI 701	Deep Learning	3	CSAI 502
CSAI 702	Machine learning for big data	3	CSAI 602
CSAI 703	Project - Part I	3	Based on track
CSAI XXX	Elective	3	
		12	
Semester 1			
CSAI 704	Project - Part 2	3	Project - Part I
CSAI XXX	Elective	3	
CSAI XXX	Elective	3	
		9	
		11	
Total		42	

II. Elective Courses:

Course Code	Course Name	Credit Hours	Pre-requi-site
CSAI 612	Advanced robotics	3	CSAI 503
CSAI 613	Image processing	3	
CSAI 614	Simulation and modeling	3	CSAI 501& CSAI 601
CSAI 615	Patten recognition	3	

Courses Description :

CSAI 501: Artificial intelligence Credit Hours: 3

This course is designed to provide a wide and basic knowledge about artificial intelligence including the relevant background, hypotheses, techniques and applications and it also explains how AI can make a computer learn, plan and solve problems autonomously. Also, this course explains the strengths and weaknesses associated with each method. During this course, the boundaries of AI in each field will be explored and the challenges that face developers when attempting to improve their systems and the future of AI will be discussed.

Pre-requisite: None

CSAI 502: Artificial Neural Networks Credit Hours: 3

This course provides a thorough knowledge of artificial neural networks including where they come from and the methodology, structure, challenges and problems associated with ANN and the various types of artificial neural network. Later in the course, applications that run using ANN will be presented. Also, this course provides knowledge about how complex data can be analyzed using ANN and how it can be integrated with other AI techniques to build hybrid intelligence systems.

Pre-requisite: None

CSAI 503: Introduction to Robotics Credit Hours: 3

Introduction to robotics is lab-based course. It uses hands-on approach to introduce basic concepts of robotic. Robotics is a branch of mechanical, electrical, electronic engineering and computer science. It deals with design, construction, operation, and application of robots. The course also covers computer systems for robots' control and information processing. In robotics course, students discover motion planning, acceleration and chain mechanisms. Concepts of Robotic engineering, Motion planning, Artificial intelligence, Machine learning, Computer programming for robotics are covered in such course.

Pre-requisite: None

CSAI 504: Ethical Issues in AI — Credit Hours: 1

We have become reliant on machines more than any time in the history of human kind. We should expect to see changes in the society as Artificial Intelligence (AI) systems are being utilized in many aspects of our daily lives, a famous case being self-driving cars. As a result, many open questions are being discussed in respect to philosophy, law, society and ethics within AI. In this course, you will be challenged to discuss questions such as: Should we hold AI systems accountable as we treat humans? How to deal with algorithmic bias? Are there future threats to us as AI systems become more intelligent?

Pre-requisite: None

CSAI 601: Search Algorithms & Optimizations — Credit Hours: 3

This course offers a more advanced level in AI. After acquiring basic knowledge and AI techniques, this course offers students the opportunity to learn how to implement and optimize a smart or hybrid system using one or more AI techniques as well as searching algorithms such as hill and greedy search to extract useful information from big data for implementation in expert systems. Moreover, this course also focuses on how any combination of AI algorithms is able to improve the outcome of smart systems.

Pre-requisite: None

CSAI 602: Machine learning Applications — Credit Hours: 3

Machine learning becomes recently an important component for business intelligence, homeland security, analyzing biochemical interactions, structural monitoring, and astrophysics, etc.

Machine learning can be applied on such different applications such as to:

- Robotic control, Data mining,
- Autonomous navigation, Bioinformatics,
- Speech recognition, Text and web data processing
- Virtual personal assistant.

This course delivers the ability for applying machine learning algorithms

to a real-world problems. It combines theory and practice in order to achieve the necessary knowledge to match in the ever-changing work environment.

Pre-requisite: None

CSAI 603: Research Methods Credit Hours: 2

This course will provide a strong foundation in the conceptualization and operationalization of research, how to design a research project and ‹hands-on› skills in the utilization of different research methodologies and key principles of research design. Topics to be covered in detail include sampling, surveying, interviewing, case study analysis, focus groups, interviewing and analyzing and presenting data. The imperative for ethical research practice will be presented. It will provide students with the training required to develop the skills to review and critically analyze extant theory (literature) on topics related to their research projects, justify the rationale for research, develop effective research designs for their projects, understand the role of theories in research, and learn to write research proposals. Students will acquire skills in both qualitative and quantitative research techniques and learn to report research findings (empirical work) with implications and draw conclusions.

Pre-requisite: None

CSAI 604: Data mining Credit Hours: 3

This course is an introductory course on data mining introducing the basic concepts, principles, methods, implementation techniques, and applications of data mining, Data mining refers to a set of techniques that have been designed to efficiently find interesting pieces of information or knowledge in large amounts of data. In this course we explore how this interdisciplinary field brings together techniques from databases, statistics, machine learning, and information retrieval. We will discuss the main data mining methods currently used, including data warehousing and data cleaning, clustering, classification, association rules mining, query flocks, text indexing and searching algorithms, how search engines rank pages, and recent techniques for web mining. Designing algorithms for these tasks is difficult because the input data sets are very large, and

the tasks may be very complex. One of the main focuses in the field is the integration of these algorithms with relational databases and the mining of information from semi-structured data, and we will examine the additional complications that come up in this case.

Pre-requisite: None

CSAI 701: Deep Learning Credit Hours: 3

The Development of Machine Learning techniques have shown great deal of attraction in last years. A major example which has revolutionized various applications is the proposal of Deep Learning technique. This results in major improvements included Computer Vision, National Language Processing and Speech Analysis. Thanks to affordable GPGPU, large datasets as well as a selection of algorithms, Deep Learning proved its accurate results across various other Machine Learning techniques. In this course, you will be introduced to how Deep Learning actually work, this will cover both theoretical background as well as practical implementations of Deep Learning.

Pre-requisite: CSAI 502 -Artificial Neural Networks

CSAI 702: Machine learning for big data Credit Hours: 3

This course provides an overview of machine learning techniques to explore, analyze, and leverage big data systems. Tools and algorithms will be introduced that can create machine learning models that learn from data, and to scale those models up to big data problems. Some of the main topics include machine learning models for big data, performance and scalability of big data systems, application of big data systems in smart city infrastructures, smart data analytics and recommender systems. The course provides theoretical knowledge and practical exposure to exploit machine learning techniques to engineer big data systems.

Pre-requisite: CSAI -602Machine Learning Applications

CSAI 703: Project - Part I Credit Hours: 3

The course is intended to provide a problem analysis and system design experience (very similar to professional practice) related any topic to AI, and an opportunity to practice and perfect the skills of technical writing

and oral presentation.

Pre-requisite: Based on track

CSAI 704: Project - Part 2 Credit Hours: 3

Upon completion of this course, students will have improved their skills significantly in: (i) How to analyze and design a specific problem related to AI; (ii) How to write a technical report; (iii) How to express oneself clearly in a specific topic related to AI; (iv) How to work with a team; and (v) How to complete a project in time.

Pre-requisite: CSAI -703Project - Part I

CSAI 612: Advanced robotics Credit Hours: 3

The advanced robotic course is an advanced programming course. It teaches students methods of programming and system design set-up. The course deals with design, construction, operation, and application of robots. This course also covers computer systems for robots control, sensory feedback, and information processing. Furthermore, algorithms for robotics are also covered. Such algorithms represent the abstractions of controlling motion and perception in the physical world. The course also includes geometric approaches to motion planning, grasping, positioning, control, navigation, and assembly.

Pre-requisite: CSAI -503introduction to Robotics

CSAI 613: Image processing Credit Hours: 3

This course will cover the fundamentals of image and video processing. We will provide a mathematical framework to describe and analyze images and videos as two- and three-dimensional signals in the spatial, spatio-temporal, and frequency domains. In this class not only will you learn the theory behind fundamental processing tasks including image/video enhancement, recovery, and compression - but you will also learn how to perform these key processing tasks in practice using state-of-the-art techniques and tools. We will introduce and use a wide variety of such tools – from optimization toolboxes to statistical techniques. Emphasis on the special role sparsity plays in modern image and video processing will also be given. In all cases, example images and videos pertaining to

specific application domains will be utilized.

Pre-requisite: None

CSAI 614: Simulation and modeling Credit Hours: 3

This course is designed to provide the basic concepts of computation through modeling and simulation that are increasingly being used by software engineers, and to evaluate modeling designs and simulate the impacts of alternative approaches. This course provides the foundations for the student to understand computer simulation needs, and to implement and test a variety of simulation and data analysis libraries and programs.

Pre-requisite: CSAI -501Artificial Intelligence, CSAI -601Search algorithm & optimization

CSAI 615: Pattern recognition Credit Hours: 3

Pattern recognition is the process of recognizing patterns by using machine learning algorithm. This course is designed to provide wide and basic knowledge about Pattern recognition, which used to classify and analyze gained information to recognize certain status. Also, in this course it will shows how unorganized and unrecognized knowledge can be identified by use supervised or unsupervised pattern algorithm.

Pre-requisite: None

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