

Academic Counselling 2022

AIST

Patrick P. C. Lee

CUHK

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About Me

- Patrick P. C. Lee (<http://www.cse.cuhk.edu.hk/~pcee>)
 - B. Eng. in IE, CUHK, 2001
 - M. Phil. in CSE, CUHK, 2003
 - Ph. D. in Computer Science, Columbia, 2008
 - Associate Professor, CSE, CUHK, now
- Research interests:
 - Applied/systems topics on improving the dependability of large-scale software systems, including storage systems, distributed systems and networks, and cloud computing.
 - Focus on system prototyping and implementation

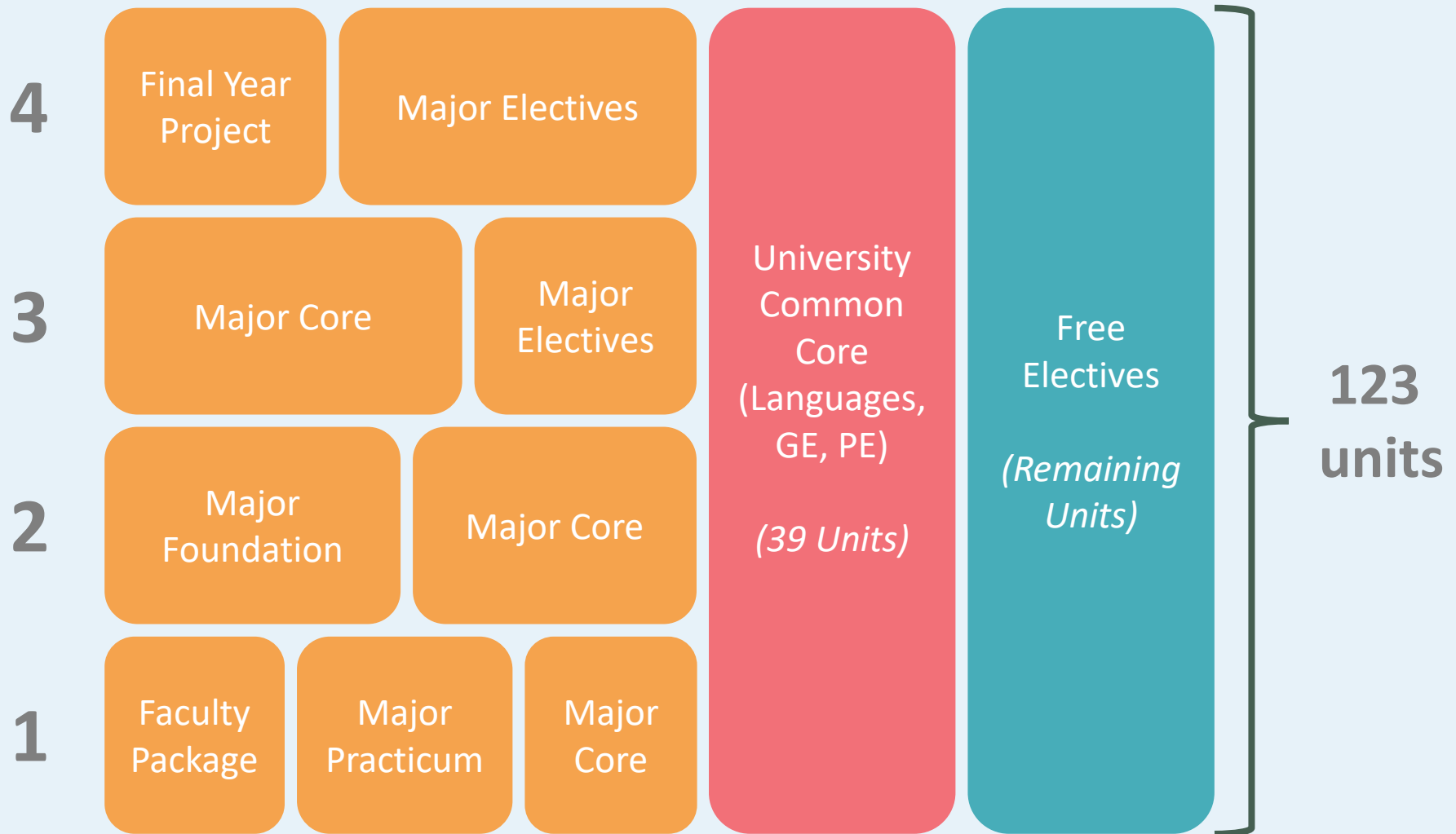
Welcome

- Welcome to AIST
- We are always here to help out

Curriculum Structure



Curriculum – Overview



University Core Requirements

University Core Courses		Units Requirements
Language	English	8
	Chinese	5
General Education	University Foundation	6
	University GE	7 (At least 2 units in each Area A, C & D)
	College GE	6
Understanding China (UGCP1001) <i>(online course - complete before graduation in any one term, including summer term)</i>		1
Hong Kong in the Wider Constitutional Order (UGCP1002) <i>(online course - complete before graduation in any one term, including summer term)</i>		1
Digital Literacy and Computational Thinking (ENGG1003 or ENGG1004)		3
Physical Education		2
Total of units required		39

Major Requirements

Major Requirements	AIST
Faculty Package	9
Foundation Courses	16
Major Required Courses	22
Research Components	6
Stream Requirements	22
Total of units required	75

Curriculum – Major Requirements

4

Final Year
Project

Major Electives

3

Major Core

Major
Electives

2

Major
Foundation

Major Core

1

Faculty
Package

Major
Practicum

Major
Core

75 units

Curriculum – Faculty Package and Foundation

4

Final Year
Project

Major Electives

3

Major Core

Major
Electives

2

Major
Foundation

Major Core

1

Faculty
Package

Major
Practicum

Major
Core

Faculty Package and Foundation (15 units)

- » Programming (ENGG1110)
- » Linear Algebra (ENGG1120)
- » Multivariable Calculus (ENGG1130)
- » Calculus for Engineers (MATH1510)
- » General Physics (PHYS1003)

Curriculum – Major Practicum

4

Final Year
Project

Major Electives

3

Major Core

Major
Electives

2

Major
Foundation

Major Core

1

Faculty
Package

Major
Practicum

Major
Core

Major Practicum (3 units)

- » Technology, Society and Engineering Practice (AIST2601)
- » Engineering Practicum (AIST2602)



Curriculum – Major Foundation

4

Final Year
Project

Major Electives

3

Major Core

Major
Electives

2

Major
Foundation

Major Core

1

Faculty
Package

Major
Practicum

Major
Core

Major Foundation (10 units)

- » Intro to Computing Using Python (AIST1110)
- » Discrete Maths (ENGG2440)
- » Probability (ENGG2760)
- » Statistics (ENGG2780)

ROLL	DICE CHART	PROBABILITY
2		1/36
3		2/36
4		3/36
5		4/36
6		5/36
7		6/36
8		5/36
9		4/36
10		3/36
11		2/36
12		1/36



Curriculum – Major Core

4

Final Year
Project

Major Electives

3

Major Core

Major
Electives

2

Major
Foundation

Major Core

1

Faculty
Package

Major
Practicum

Major
Core

Major Core (19 units)

- » Intro to AI and Machine Learning (AIST1000)
- » Numerical Optimization (AIST3030)
- » Intro to Computer Systems (AIST3020)



Curriculum – Major Core

4

Final Year
Project

Major Electives

3

Major Core

Major
Electives

2

Major
Foundation

Major Core

1

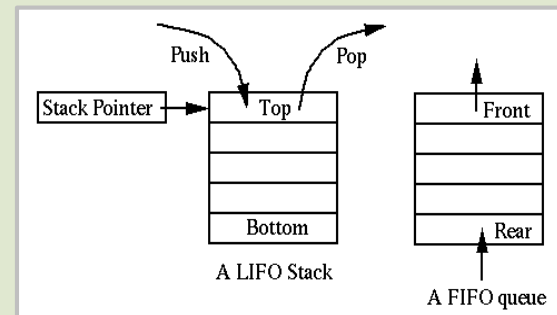
Faculty
Package

Major
Practicum

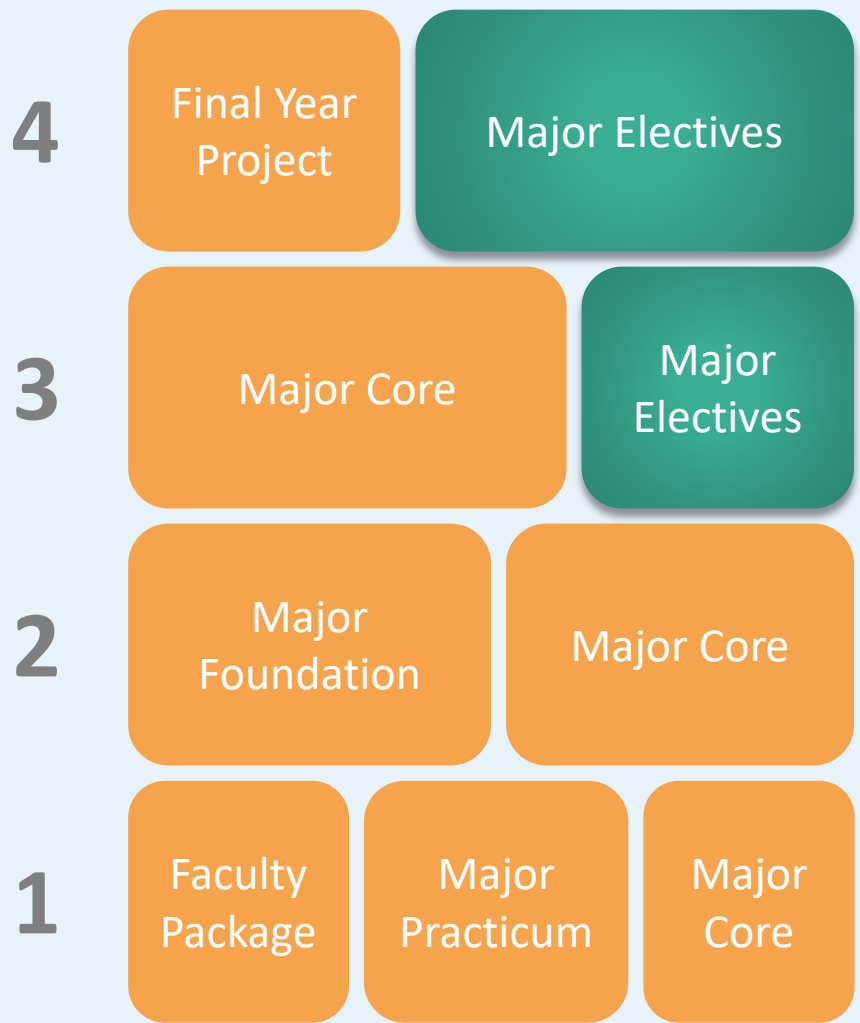
Major
Core

Major Core (19 units)

- » Data Structure (CSCI2100)
- » Design and Analysis of Algorithms (CSCI3160)
- » Fundamentals of Artificial Intelligence (CSCI3230)
- » Fundamentals of Machine Learning (CSCI3320)



Curriculum – Major Electives



Major Electives (22 units) Streams

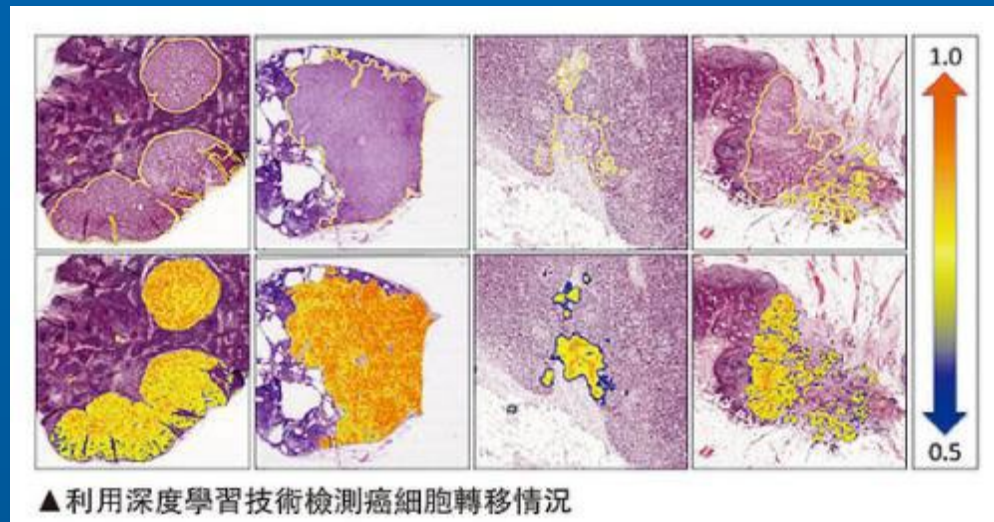
1. Biomedical Intelligence
2. Intelligent Multimedia Processing
3. Large-scale Artificial Intelligence – Theory and Systems
4. Intelligent Manufacturing and Robotics

Non-Stream

5. General Artificial Intelligence: Systems and Technologies

Stream 1: Biomedical Intelligence

- Study how to build **intelligent biomedicine** and **healthcare applications**
- Two emerging markets:
 - » **Personalized genomics** and **precision medicine** (e.g. disease prevention, prediction, early diagnosis and treatment)
 - » **Clinical record systems** (e.g. electronic medical records and pharmacy prescription information and insurance records)



Stream 2: Intelligent Multimedia Processing

- Study how to **bridge AI and human brain functions** and design models, algorithms, and systems for multimedia processing with **high performance** and **high accuracy**.
- Areas: **digital image processing**, face recognition, computer animation, **human-computer interactions**, **speech and audio processing**, computer linguistics



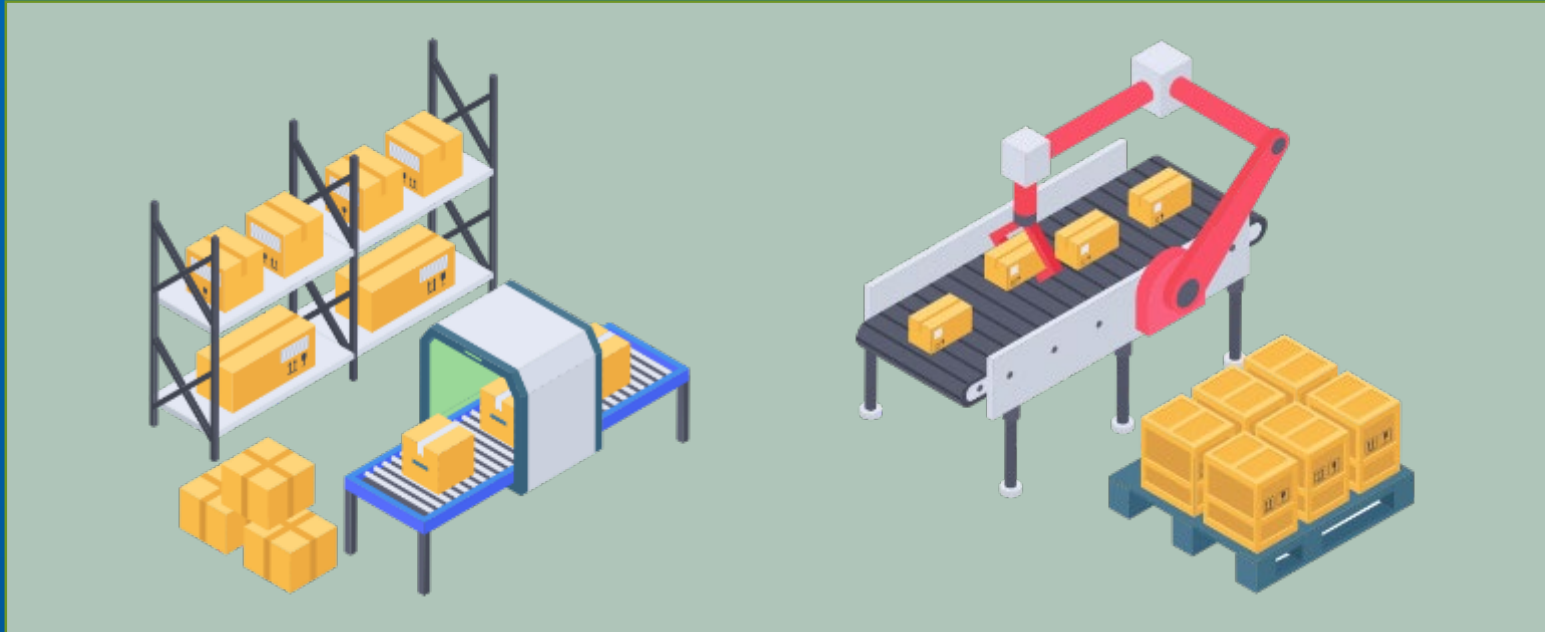
Stream 3: Large-scale AI – Theory and Systems

- Study the **advanced techniques** of realizing large-scale artificial intelligence from both theory and system perspectives
 - » **Theory:** **machine learning theory**, statistical inference, online algorithms, *etc.*
 - » **Systems:** high performance computing, distributed storage, **big data management**, *etc.*



Stream 4: Intelligent Manufacturing & Robotics

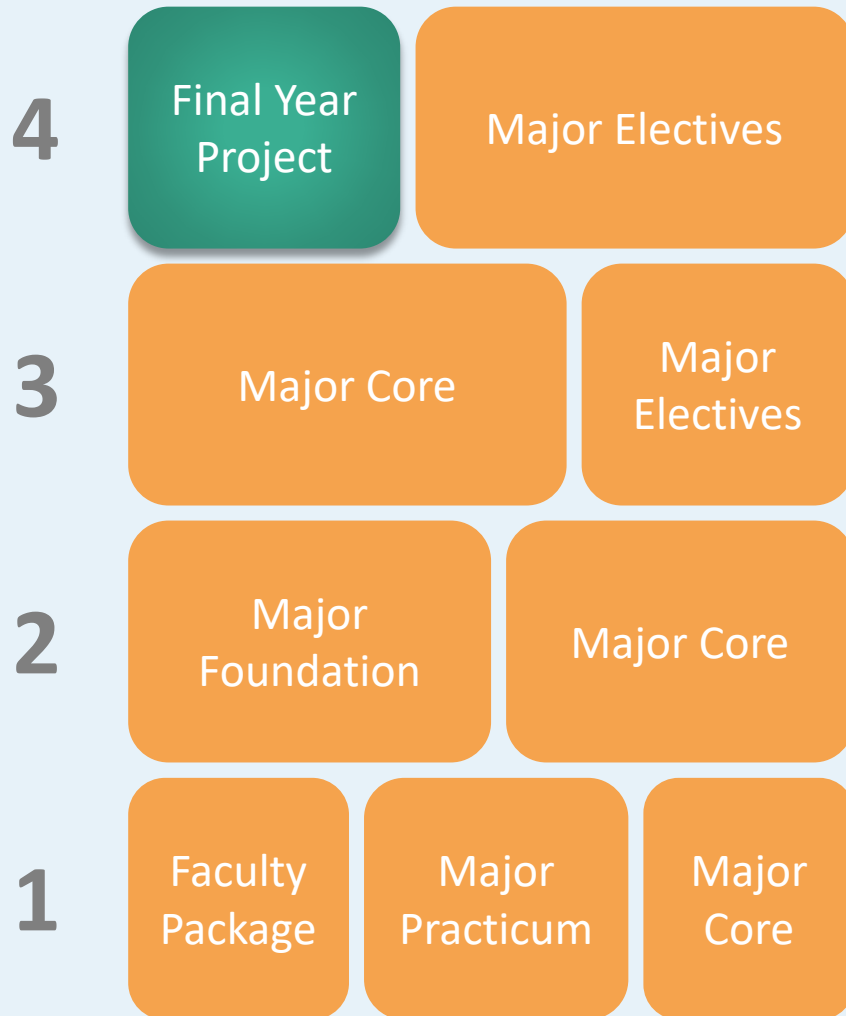
- Study **how to integrate manufacturing and robotics with AI** for different aspects of human activities.
- Focus on the topics of **mechanics**, sensing and control, design & manufacturing, **human-robot interactions**, *etc.*



Distinct Topics

- Many other practical and interesting courses in AI:
 - » Machine Learning
 - » Deep Learning
 - » Large Scale Distributed Computing
 - » Intelligent Embedded Systems
 - » Knowledge Representation/Inference
 - » Human-Computer Interactions
 - » Natural Language Processing
 - » Big Data Analytics
 -

Curriculum – Final Year Project (FYP)

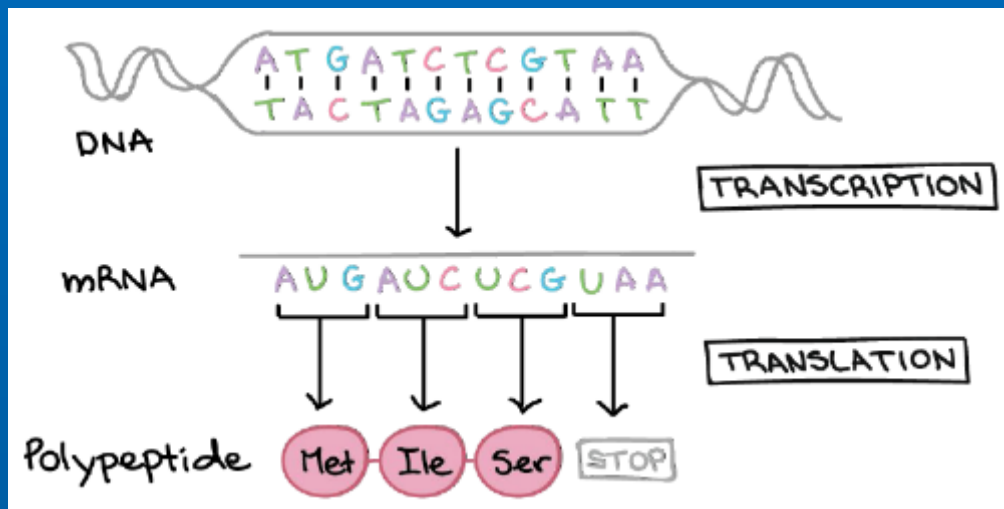


Final Year Project (6 units)

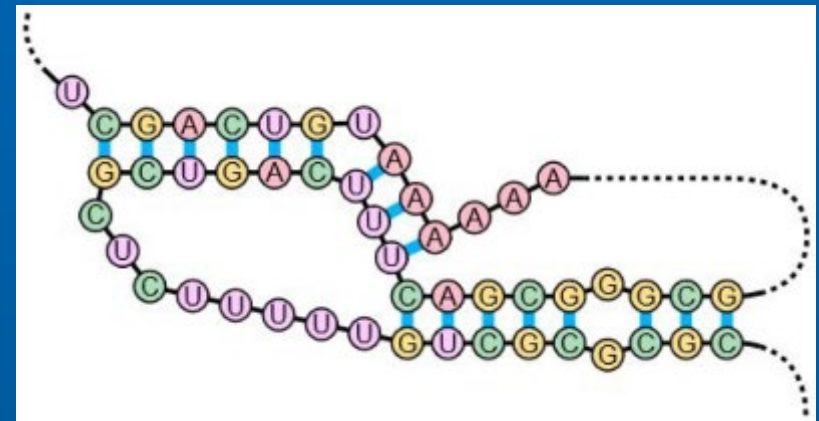
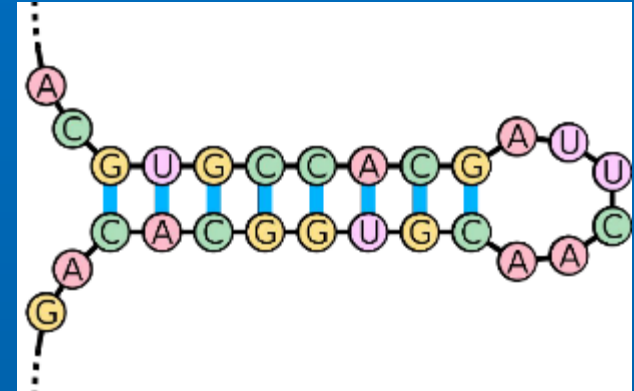
- » Pick an interesting topic
- » Interdisciplinary nature
- » Apply the knowledge learnt in the previous courses
- » Many open topics. Your creativity and discussion with the supervisor
- » Complete a project under the supervision of an advisor

FYP (AI + Bioinformatics)

- Apply machine learning to predict RNA-protein interaction



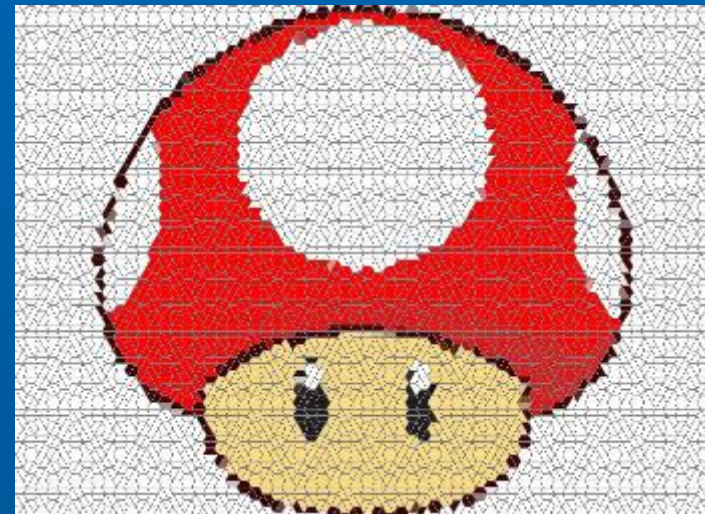
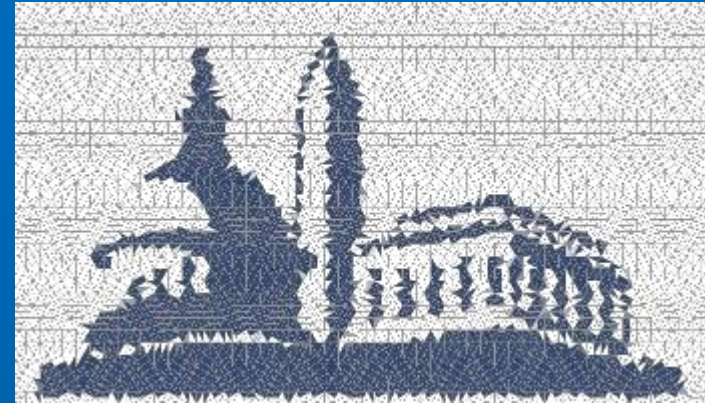
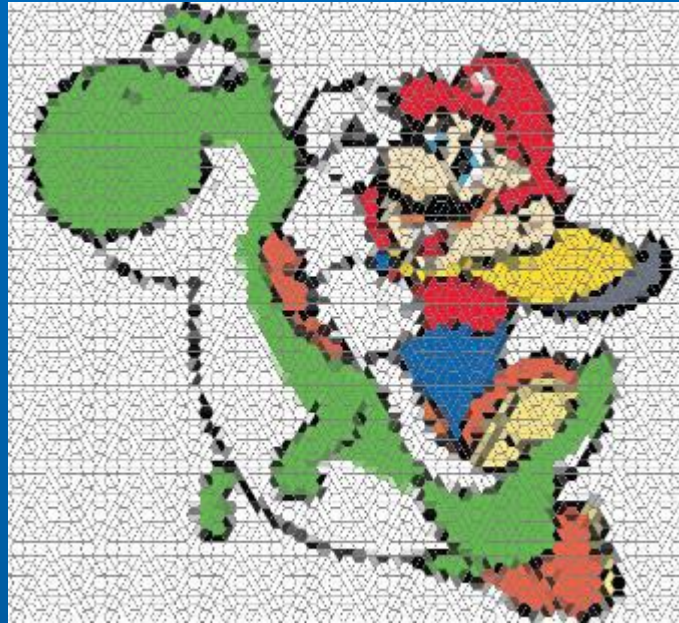
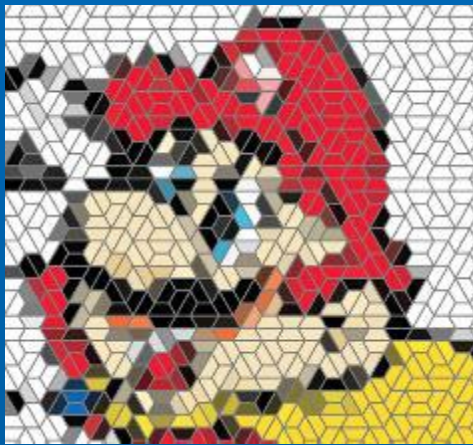
RNA-binding protein (RBP)



RNA folds to a specific structure to fit into the protein binding site

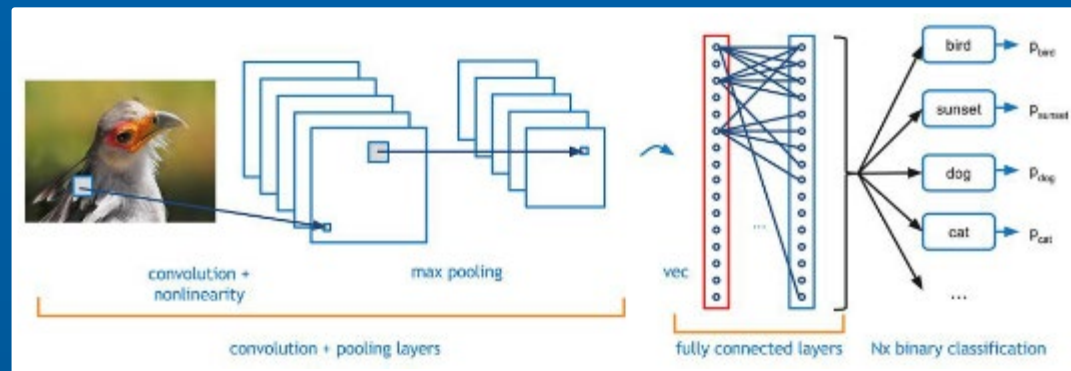
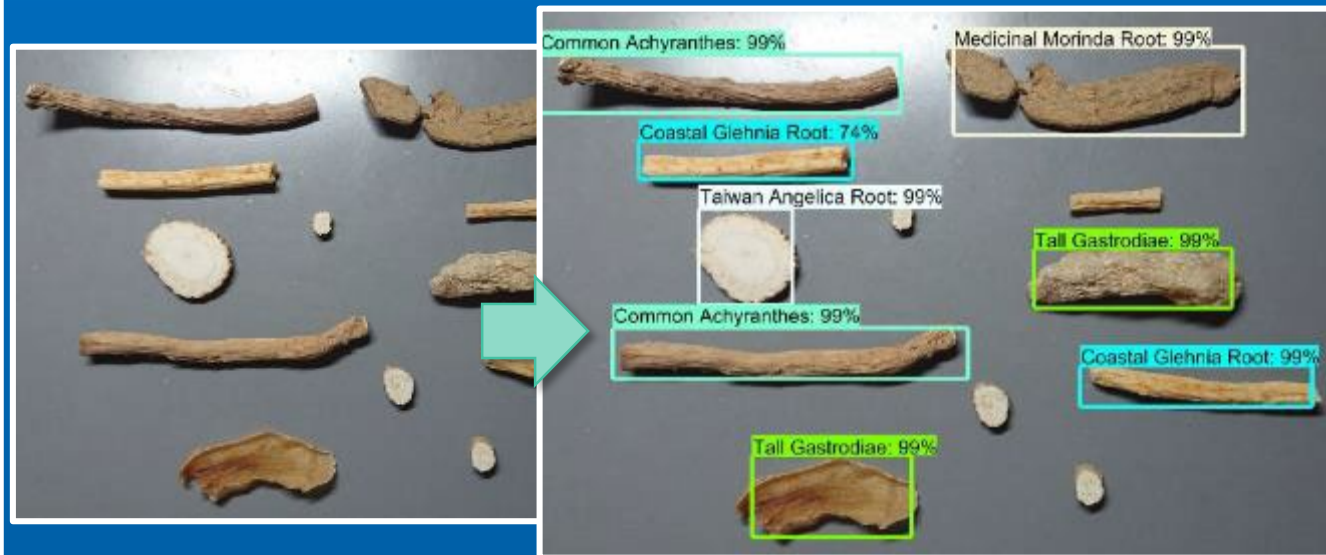
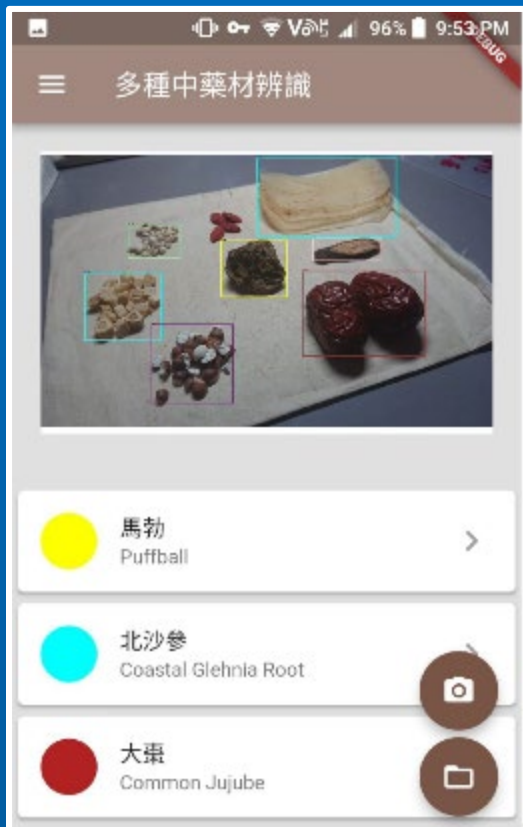
FYP (AI + Multimedia)

- Design a neural network that learns to produce a tiling



FYP (AI + Computer Vision)

• Chinese Medicinal Herb Recognizer



Recommended Course Pattern in Year 1

Term 1	Units	Term 2	Units
ENGG1110/ESTR1002 Problem Solving By Programming	3	ENGG1120/ESTR1005 Linear Algebra for Engineers	3
AIST1000 Introduction to Artificial Intelligence and Machine Learning	1	ENGG1130/ESTR1006 Multivariable Calculus for Engineers	3
MATH1510 * Calculus for Engineers	3	AIST2601 Technology, Society and Engineering Practice	2
PHYS1003 / 1110 Physics course	3	AIST2602 Engineering Practicum	1
ENGG1003 / 1004 Digital Literacy and Computational Thinking	3	UGFH / UGFN University Foundation GE	3
CHLT1001 University Chinese I	3	ELTU1001 Foundation English for University Studies	3
College GE	0-3	College GE	0-2
PE	1	PE	1
MATH1020 * General Mathematics <i>(only for students who could not pass the placement test of MATH1510)</i>	3		
	17-20		16-18

Recommended Course Pattern in Year 2

Term 1	Units	Term 2	Units
AIST1110 Introduction to Computing using Python	3	AIST3020 Introduction to Computer Systems	3
ENGG2440/ESTR2004 Discrete Mathematics for Engineers	3	CSCI2100/ESTR2102 Data Structures	3
ENGG2760/ESTR2018 Probability for Engineers	2	ENGG2780/ESTR2020 Statistics for Engineers	2
CHLT1002 University Chinese II	2	ELTU2014 English for Engineering Students I	3
UGFH / UGFN University Foundation GE	3	University GE	2-3
University GE	2-3	Minor / Free Electives	Remaining units
Minor / Free Electives	Remaining units		
	15-18		13-18

Recommended Course Pattern in Year 3

Term 1	Units	Term 2	Units
AIST3030/ESTR3114 Numerical Optimization	3	CSCI3320 Fundamentals of Machine Learning	3
CSCI3160/ESTR3104 Design and Analysis of Algorithms	3	Stream electives	9-12
CSCI3230/ESTR3108 Fundamentals of Artificial Intelligence	3	ELTU3014 English for Engineering Students II	2
Stream electives	3-6	Minor / Free Electives	Remaining units
University GE	2-3		
Minor / Free Electives	Remaining units		
	15-18		14-18

Recommended Course Pattern in Year 4

Term 1	Units	Term 2	Units
AIST4998 Final Year Project I	3	AIST4999 Final Year Project II	3
Stream electives	6-9	Stream electives	4-8
Minor / Free Electives	Remaining units	Minor / Free Electives	Remaining units
	9-18		9-18

Study Scheme

➤ Personal advice

- Take as many credits as possible in the 1st year
- Maximum = 18 units per semester
- Year 1 Term 1 Max. units: 19 (default)

Courses

➤ Where can I find course information?

➤ CUSIS

- **Teaching timetable by Subj/Dept**
 - Make sure to select “view all”
- **Browse Course Catalog**: Course syllabus, learning outcomes
- **Browse Program Information**: Study scheme

Exchange

- Students often do overseas exchange in the 2nd or 3rd year
- Credit transfer
 - Make sure you check with the department first if the courses are eligible for credit transfer
 - Grade B is required for credit transfer

Life at CSE

- CSE Corner: <https://i.cse.cuhk.edu.hk/>
- Facebook pages:
 - Faculty of Engineering
<https://www.facebook.com/cuhkengg>

Life at CUHK

- Living on Campus:
<http://www.cuhk.edu.hk/english/campus/accommodation.html>
- Library: <https://www.lib.cuhk.edu.hk/>
 - Past papers
- Independent Learning Center (ILC)
<https://www.ilc.cuhk.edu.hk/>
- Facebook pages:
 - 中大人資訊專頁 <https://www.facebook.com/cuhkinfo>