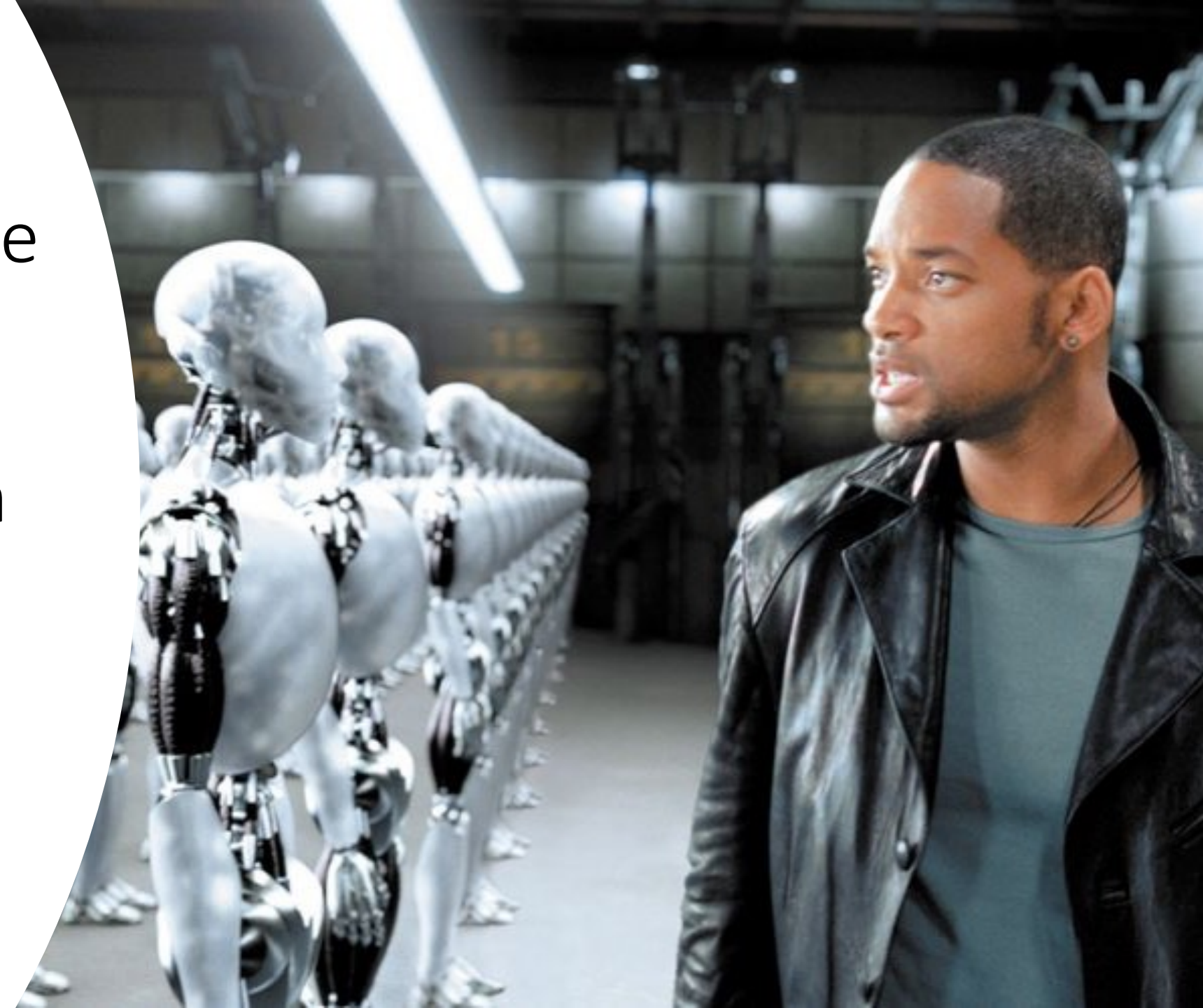
ECE 5400 Applied Machine Learning

L1: Introduction to AI/ML

Prof. Xun Jiao



Outline

Background Survey

Course Logistics

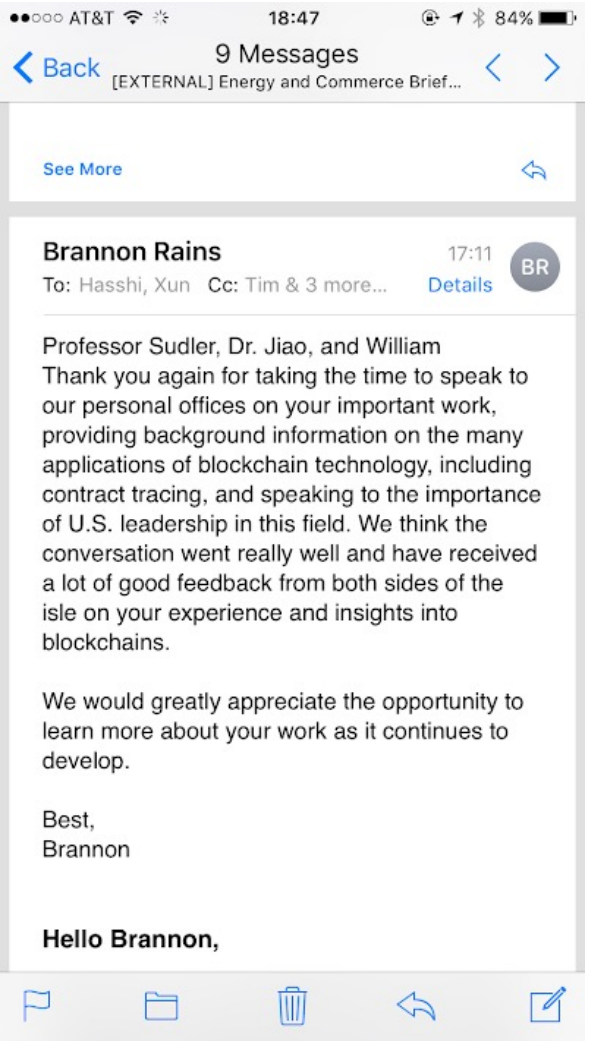
Introduction to AI/ML

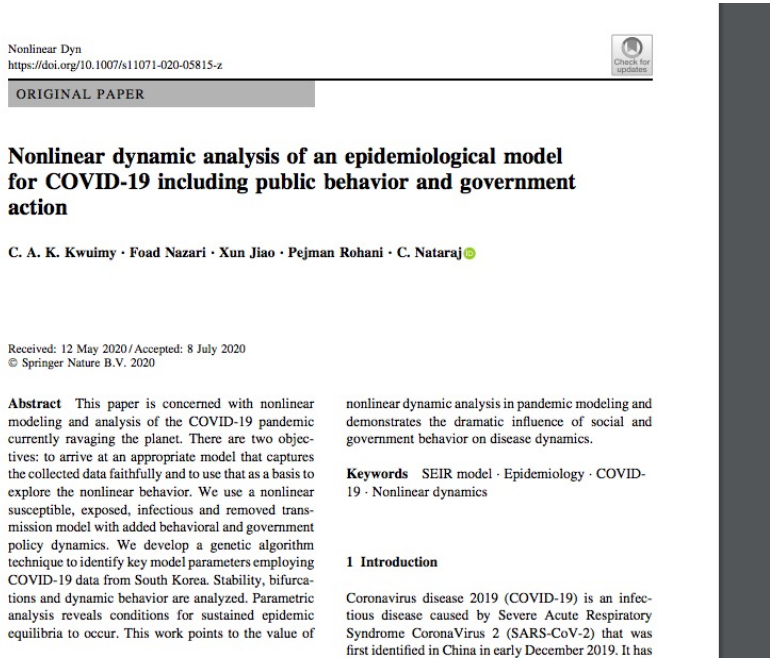
Xun Jiao
Personal webpage: http://www.ece.villanova.edu/~xjiao/
DETAIL Group webpage: https://vu-detail.github.io/

Assistant Professor of ECE@VU	• Department of Electrical and Computer Engineering
Director of DETAIL Lab@VU	• Dependable, Efficient, and Intelligent Computing Lab (DETAIL)
I teach courses	• C Programming, embedded system, computer architecture, machine learning, and microcontroller application
I do research	• Machine learning (AI), and embedded system
I work with students	• Ph.D. + MS + undergrad

A few examples of AI/ML Applications/Research

- https://vu-detail.github.io/publication





AI for COVID-19

Outline

- Background Survey: https://docs.google.com/forms/d/e/1FAIpQLSd7SsSkHXPxvuny6TXQzRCqWDQLVa7z27LwBgey5pd8H4Jfnw/viewform?usp=sf_link
- Course Logistics
- Introduction to machine learning
- Overview of the course

Course Logistics

Office Hour

- Office Location: Tolentine Hall Rm 415
- Office Hour: Monday 1pm-3pm or by appointment; most problems can be resolved by emails or just come to my office to talk.

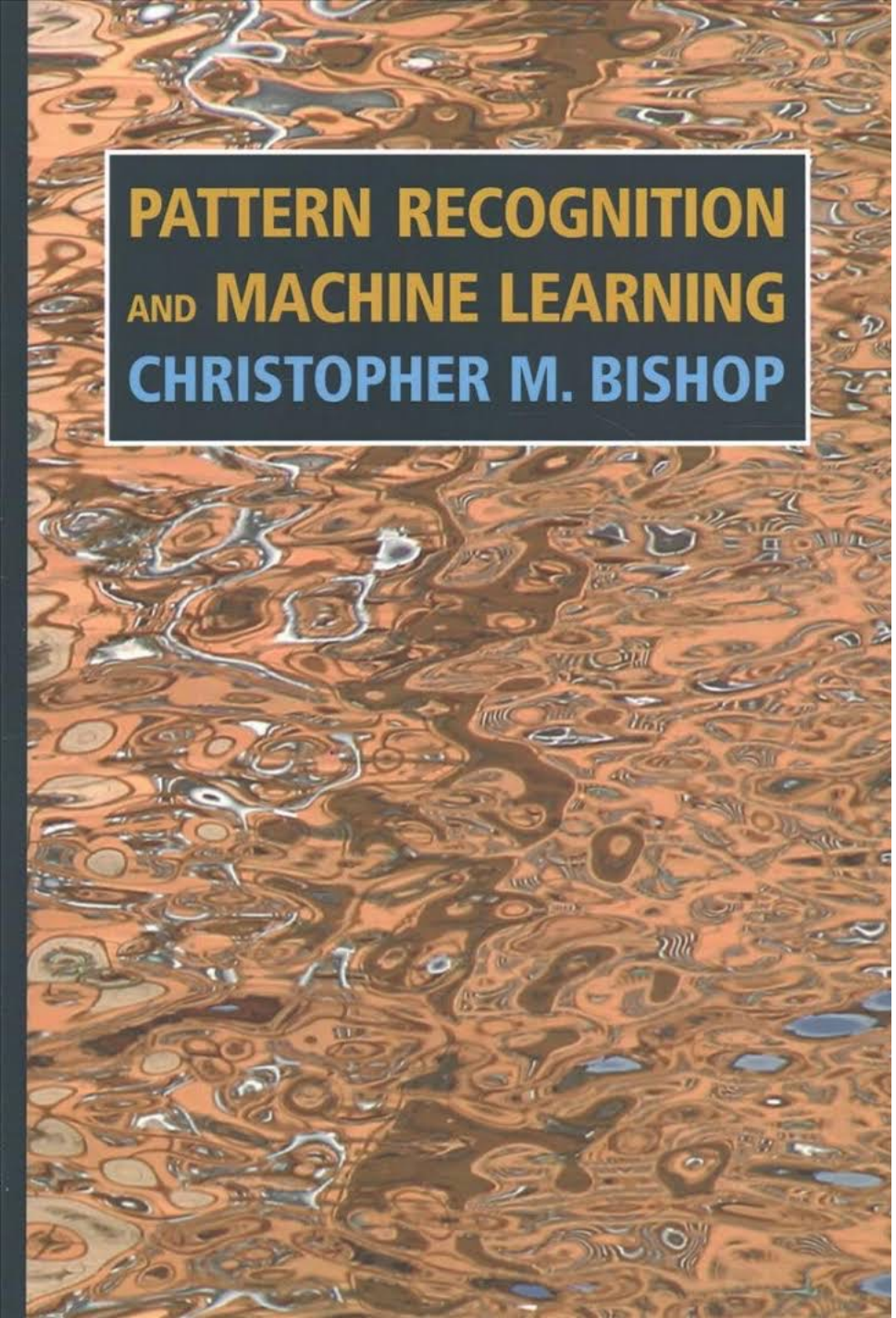
Grading

- Assignment (mix of HW, mini projects, paper reading, etc): 40%
- Midterm: 30%
- Final: 30%
- **Late submissions** will be assessed a 10% penalty per day.

Letter Grade	Numerical Grade	Letter Grade	Numerical Grade
A	94 to 100	C	73 to 76
A-	90 to 93	C-	70 to 72
B+	87 to 89	D+	67 to 69
B	83 to 86	D	63 to 66
B-	80 to 82	D-	60 to 62
C+	**77 to 79**	**F**	**Less than 60**

Attendance

- Where possible, students should inform their instructors if they plan to be late or absent from class. In all cases, students should be prepared to provide documentation to petition for *excused* absences to the Associate Dean for Student and Strategic Programs, Dr. Stephen Jones. Students should use the form for requesting an *excused* absence. Excused absences do not count toward a failure in the course for first year students. Absence from class does not release the student from work assigned. Students who miss an in-class obligation (exam, presentation, etc.) due to an excused absence will not be penalized - the instructor may offer a make-up test, arrange an alternative time for a presentation, exempt a student from the assignment, or provide another arrangement.
- The University's list of excused absences for all students includes the following:
  - participation in NCAA athletic competitions
  - participation in special academic events (e.g., conferences, field trips, project competitions)
  - participation in official university business (e.g., student representatives attending meetings related to university governance)
  - attendance at significant events involving the immediate family (e.g., funerals, weddings)
  - religious holidays - see the University's policy on Religious Holidays
  - college-approved participation in placement activities (e.g., job interviews, graduate school interviews, attending job fairs)
  - documented serious illness or disability



Course Materials

- Recommended but not required:
  - Pattern Recognition and Machine Learning (Bishop)

Academic Integrity

- The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work habits. Students violating the academic integrity policy will receive a zero on that assignment or exam and the violation will be reported to the Associate Dean for Academic Affairs.
- Students are encouraged to read the University's academic integrity policy.
- The College of Engineering has adopted the following exam guidelines:
  - Students must arrive before the start of the exam. Under exceptional circumstances a student may need to arrive late, but he/she can enter the exam no later than 5 minutes after the start of the exam.
  - All cell phones must be turned off and stored away until the student exits the exam room.
  - The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an exam.
  - Each student must write and sign the following statement, "*I have neither given nor received any unauthorized assistance in the completion of this exam.*"

Students with Disabilities

- It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability, please contact me after class or during office hours to make arrangements.
- If you have a non-physical disability you need to register with the Learning Support Office by contacting 610-519-5176 or at learning.support.services@villanova.edu as soon as possible. Registration is needed to receive accommodations.
- The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities @ 610-519-3209 or visit the office on the second floor of the Connelly Center.

What is Learning?

- “Learning is any process by which a system improves performance from experience.” - Herbert Simon

What is Machine Learning?

Kevin P. Murphy (Author of the textbook *Machine Learning: A Probabilistic Perspective*):

- “a set of methods that can automatically detect patterns in data, and then use the uncovered patterns to predict future data”

Tom Mitchell (Author of the textbook *Machine Learning*)

- Machine Learning is the study of computer algorithms that improve automatically through experience. Applications range from data mining programs that discover general rules in large data sets, to information filtering systems that automatically learn users' interests.