Next Classes and Conclusion

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USC CSCI 467, Spring 2023

April 27, 2023

Announcements/Reminders

- HW4 due today at 11:59pm
- Final exam Thursday May 4, 2-4pm
  - Last name A-K: CPA 201 (this room)
  - Last name L-Z: CPA 102 (downstairs)
- No TA/CP office hours next week, my OH Tuesday 11am-12pm
- Final project instructions updated—submit code (and data if you created your own dataset) via GitHub/Google Drive/etc.
- Will share spreadsheet with all lecture recording links tonight

Next classes to take

- Natural Language Processing
- Computer Vision
- Theory of Machine Learning
- Robotics & Cyber-Physical Systems
- Sustainability
- Deep Learning

Natural Language Processing

- **CSCI 499: Language Models in NLP (Swabha Swayamdipta)**
  - New class on modern NLP, focusing on language models
- **CSCI 544: Applied NLP (TBD)**
  - Generally a more “traditional” NLP class, will go in depth about NLP tasks (sequence tagging, machine translation, dialogue systems) as well as modern approaches
- **CSCI 626: Text as Data (Morteza Dehghani)**
  - Applications of natural language processing to psychology research
- **CSCI 662: Advanced NLP (TBD)**
  - Research-focused class, covering machine translation, dialogue, question answering, information extraction, etc.

Computer Vision

- **CSCI 677: Advanced Computer Vision (Yue Wang)**
  - Foundational computer vision topics (geometry)
  - Deep learning for computer vision
  - Standard tasks (object detection, semantic segmentation, motion analysis, activity recognition, visual question answering)
  - From Yue: Will be more like a “normal class” rather than research-focused, would be appropriate for advanced undergraduates who’ve taken ML

Theory of Machine Learning

- **CSCI 567: Machine Learning (Dani Yogatama)**
  - Not exactly a “theory” class, but main difference compared to 467 will be greater emphasis on theory and mathematical rigor
  - Conceptually will have high degree of overlap
- **CSCI 699: Theory of Machine Learning (Vatsal Sharan)**
  - How to prove that a model will achieve good test accuracy?
  - What types of problems are theoretically learnable?
  - When can we prove that gradient descent will converge?
  - New algorithms/settings like AdaBoost, online learning
  - Focus on current research
- **Math 447: Mathematics of Machine Learning**
  - Some similar topics as the CSCI 699 class

Robotics & Cyber-Physical Systems

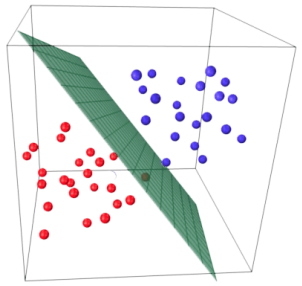
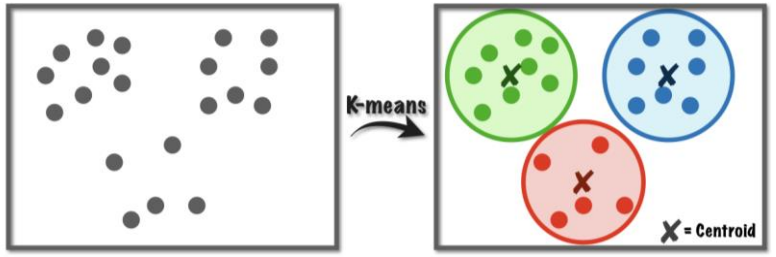
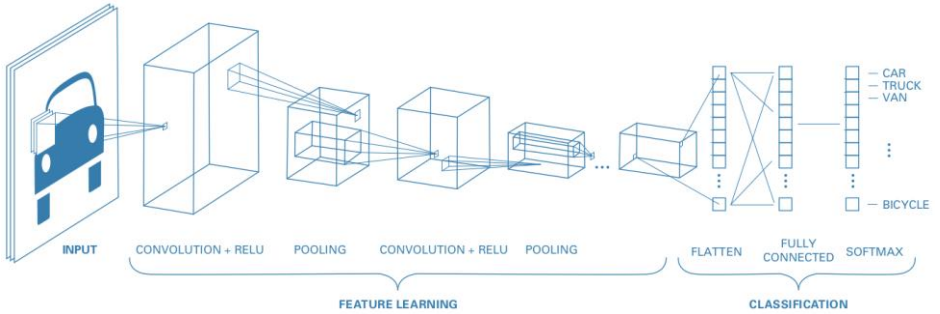
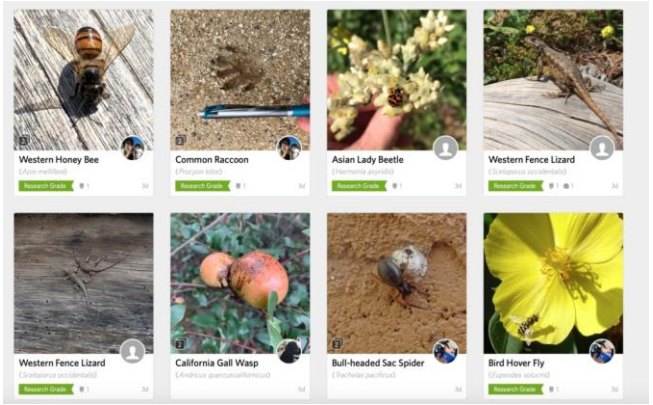
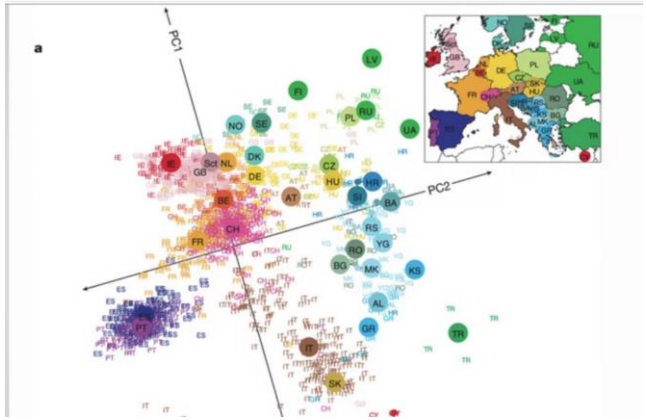
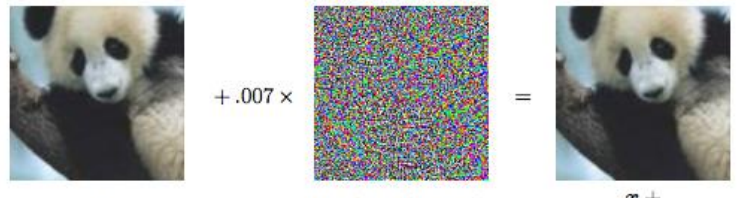
- Not exactly ML topics but highly related
  - Some of these will discuss RL, or other ideas that are related to topics from class (e.g., Kalman filters)
- **CSCI 445L: Introduction to Robotics (Heather Culbertson)**
  - Hands-on introduction to robotics, will work with real physical robots
- **CSCI 545: Robotics (Stefanos Nikolaidis)**
  - More advanced course covering control theory, kinematics, dynamics, sensor processing
  - Seems to get more into the math, which involves a lot of linear algebra
- **CSCI 513: Autonomous Cyber-Physical Systems (Jyo Deshmukh)**
  - “Cyber-physical systems” includes things like self-driving cars, drones, medical devices

Sustainability

- **CSCI 467 (AI for Sustainable Development; Bistra Dilkina)**
  - Project-based class focusing on AI for social good (e.g., sustainability, poverty, homelessness, health)
  - Includes discussions of research papers

Deep Learning

- Was CSCI 566 this semester
  - More detail about neural networks, how to train them, CNNs, RNNs, Transformers
  - Other topics like multimodality, transfer learning, etc.
  - Likely not offered next year…but if it is, worth considering
    - Don’t be surprised if you see a class that fits this description but under a different course number

That's it!

- Thank you for a wonderful semester!