인공지능과 비즈니스

2020. 7. 4

윤 종 영

교수 및 학생 소개

과목 소개

- 인공지능과의 융합으로 만들어지는 사회를 디자인해보는 과목입니다.

- 인공지능을 실제로 활용하는 프로젝트를 진행하면서 인공지능 비즈니스의 기획 및 실현 과정을 익히게 됩니다.

- 인공지능을 활용한 서비스 및 제품을 기획하고 시제품을 제작하는 과정을 통하여 인공지능 기술을 실제 산업에 적용할 수 있게 됩니다.

구성

- 강의
- 사례연구
- 프로젝트 진행

+ 초대강사 (네이버, 구글…)

학기일정 (안)

W1 (7/4)	강좌소개 및 개요
W2 (7/11)	비즈니스 아이디어 구상과 발굴을 위한 문제 정리 및 분석
W3 (7/18)	사업 아이디어 타당성 검토 및 구체적 실행방안과 계획 수립
W4 (7/25)	User Feedback 분석 및 Prototyping 계획 수립
W5 (8/1)	프로젝트 중간발표

W6 ( )	시제품 제작 아이디어에 대한 피드백 및 수정
W7 ( )	Prototyping (시제품 제작 및 멘토링)
W8 (8/8)	Prototyping (시제품 제작 및 멘토링)
W9 ( )	시제품 제작 완료
W10 (8/22)	프로젝트 최종발표

평가방법

프로젝트	과제물	발표	출석	합 계
50%	20%	10%	20%	100%

Reference Material

- Alan Pelz-Sharpe;Kashyap Kompella, Practical Artificial Intelligence: An Enterprise Playbook (New Hampshire:Deep Publishing, 2019)

- Maurice Bigmo Flynn;Chris Flynn;Killian Flynn, Today's AI Artificial Intelligence: It's Not As Difficult As Its Sounds! (The FF Foundation & Open Doors Ltd., 2019)

Practical Artificial Intelligence

An Enterprise Playbook

Alan Pelz-Sharpe & Kashyap Kompella

Deep Publishing

Table of Contents

1. AI is Everywhere

Types of AI

- **Areas that AI can be applied**
    - Everything from self-driving cars to robotics, from medical diagnosis to drug discovery.
    - Digital assistants and chatbots.
    - Make recommendations or analyze sentiment.

- **This book focuses on the more mundane (but no less critical) use cases that are common in every organization**
    - Back and front office content and process operations.
    - Predict demand, identify patterns and draw insights from documents, deliver dynamic pricing, segment our customers, and cross-or up-sell to them.

- **Exploratory AI**
  - Determine the underlying patterns or groups in data.
  - Example: Understand how customers are segmented. Explore what specific factors contribute to loan defaults.
  - Sort and categorize documents more quickly and more accurately than was ever possible before.
  - The focus here is to find patterns, classifications, and groups, to sort and categorize using AI to automate that work.

- **Predictive AI**

    - Predict a business metric or predict what action a customer might take.
    - In retail, we may want to predict what product a customer might buy.
    - In an insurance claim processing office, we may want to predict when an insurance claim might occur.
    - Web content management and online digital marketing
    - Improve the quality of search results and result ranking.
    - Predict the best times and locations to automatically place adverts online.

- Predictive AI is something we encounter every day.
- That also means that we are all aware of its limitations: spam is not always correctly identified, search results can be frustrating, and adverts can be distracting and way off the mark.
- Impressive though the technology is, it is an early indication that AI is not magic.

- **Prescriptive AI**
  - Extension of predictive AI.
  - Tells us what we should do if certain things happen in the future.
  - Uses simulation algorithms to advise on potential outcomes and to answer the basic question: "What should we do?"

- **In Summary**
  - Exploratory gives us insights into the past. We can look at what has gone before, spot patterns and associations to sort and manage.
  - Predictive AI forecasts and tells us what could or likely will happen in the future.
  - Prescriptive AI simulates possible future outcomes and gives us answers and advises us on what actions we should take.
  - Knowing where your AI project best fits is an important starting point.
  - Defining this will help you to choose the right AI options and set realistic expectations regarding future outcomes and the value your project can bring.

The Foundations of AI

- **The first myth to bust is that most AI is not really AI at all.**
  - Artificial Intelligence sounds more impressive than Machine Learning, but almost every AI-labelled product you will encounter is really a Machine Learning product at heart.
  - Most organizations that believe they are using AI are actually using Machine Learning.

- So, what is the difference between the two?

- **What is Machine Learning?**
  - Machine Learning is an approach that allows computer programs to automatically improve through experience.
  - The more they learn, the better they get.
  - In essence, Machine Learning tools will look at a large set of documents (for example), spot patterns in those documents, and label them.

- **What is Artificial Intelligence?**
  - Technology that behaves in ways that previously required human intelligence.
  - True AI tools can sense, reason, act, and adapt to situations.
  - AI is beyond Machine Learning, yet it needs Machine Learning to understand and optimize the decisions it makes.
  - AI uses the learnings of Machine Learning to simulate actual intelligence.

- **You should**
  - Understand that what you are being sold is often overhyped and not quite as smart as the sellers would lead you to believe.
  - That being said, the right tool in the right situation can make dramatic changes to your business.
  - Asking "How is this really AI?" can tell sellers that they shouldn't mess with you.
  - It's a smart question to ask, and they will likely have to answer "Well no, it's really just ML."

- **Traditional Programming versus ML**
  - In traditional programming, things are logical and pretty simple. You define some rules, you input some data, and you get an output in the form of a decision.
  - Machine learning takes past data and outcomes as its starting point. It then automatically infers rules and conditions based on its analysis of the past data and outcomes.
  - Those rules are applied to any new input data to drive outcomes and decisions.
  - In simple terms, machine learning learns from the past and applies its analysis to new data to drive future outcomes.

Types of Machine Learning

- **Supervised Learning**
  - Uses a predictive algorithm that uses training data and feedback from humans to learn the relationship between given inputs to a given output.
  - For example, is this a duck?
  - Used in areas such as sales to understand marketing spend, sales channels, and prices that are charged by our competitors.
  - Predict customer churn, how long a customer is likely to stay with us, predicting that from analysis of past customer loyalty patterns.
  - The bottom line here is that we know what we are looking for and we can supervise the system to learn to look for the same things.

- **Unsupervised Learning**
  - We want to discover hidden patterns to identify groups or clusters in the data.
  - We allow the algorithm to analyze all the input data by itself.
  - We don't give it a specific output variable (eg. this is a duck). We allow it to create its own classifications.
  - For example, it may identify things that are similar to one another (birds), and automatically recognize that rabbits and hedgehogs look different to birds.
  - We give the algorithm unlabeled data.
  - We allow it to infer structures itself from the data we provide it, and in turn, we allow it to group data into categories that display similarities.

- We use unsupervised methods when we ourselves don't know how to classify data.
- We want the algorithm to identify hidden patterns and do the classification of these groups for us.
- We use this approach for situations such as segmenting customers or providing recommendations to customers based on the past preferences of similar customers.

- **Semi-Supervised Learning**
  - Uses a small amount of labeled data (we know what we are looking for) along with a typically much larger amount of unlabeled data.
  - By using some labeled data, we basically give the system a head start, a cheat sheet of sorts, that hopefully guides the algorithm to provide more meaningful and relevant models and outcomes.
  - Typically, we would use semi-supervised learning in situations where it's not feasible to label all the data.
  - Oftentimes, fully labeling an entire training set is too costly and time consuming.
  - Even if we can afford the time and money, there is simply too much data to label, to make the process a practical one.

- **Reinforcement Learning**
  - The algorithm learns to perform a task by trying to increase the rewards it receives for its actions–doing more of the actions that get rewarded and doing fewer actions that do not get rewarded.
  - With reinforcement learning, the method is more open ended, we allow the algorithm to explore many possible options and outcomes.
  - When it comes up with something we deem to be good, we reward it.
  - Rather than a passive learning exercise, it is an active one.
  - It's a three-step process: it takes an action, it receives a reward if the action is deemed good, and over time, the algorithm optimizes itself through self-correction.

- In short, the system is built to collect rewards.
- We use the reinforcement approach in situations where the ideal end state cannot be clearly defined, potentially where only a small amount of training data is available and when you want to learn about the environment/situation by interacting with it.
- Used regularly in robotics and industrial automation, with the load balancing of electricity grids and self-driving cars.
- We also see it used in the financial sector such as options trading.
- In all these situations, we know we want an optimal outcome, but exactly how to get that is unclear. We leave it up to the reinforced learning algorithm to explore the possibilities and find the best route.

Two Types of AI Applications

- **Computer Vision**
  - AI plays a key role here in identifying and digitizing images.
  - Handwriting recognition, through still a tricky area depending on whose handwriting is analyzed, is greatly enhanced by machine learning.
  - Images, objects, and faces in images are now regularly detected and classified by AI.
  - Engineers are using AI to tag objects and structures in satellite images, doctors are doing the same in medical images, and lawyers are using AI to rapidly digitize handwritten statements and reports.
  - Until recently, images were poorly tagged (if at all) and were difficult to leverage as sources of content.
  - Automated image tagging and label generation has big implications for many use cases now and in the future.

- **Natural Language Processing**
  - Just like images, speech has been a format of content that has been difficult to leverage in the past, but AI is rapidly changing that.
  - For many (if not most) enterprises, speech files are hard to access and search. At best, they are tagged with a date and a basic title.
  - Text-to-speech conversion and speech-to-text conversion have digitized and made speech a form of content that can be analyzed and managed.
  - Moreover, AI goes further than simply digitizing speech; AI provides the tools to detect emotion or sentiment in speech, something that is of great interest to retailers, customer service, and law enforcement.
  - It also opens the door to more interactive digital assistants in the workplace.

- **Note**
  - The difference between success and failure with Machine Learning is less due to the underlying ML technology, and more down to whether you supervised it properly and whether you provided it with good data.
  - Machine Learning is reliant on your human intelligence, rather than true Artificial Intelligence.

- **Key Points from this chapter:**
  - AI can be applied almost anywhere from self-driving cars to drug discovery.
  - There are two main categories of AI use cases: exploratory and predictive.
  - Predictive AI predicts a business metric on what might happen next.
  - Exploratory AI use cases find patterns, categories, and groups.
  - Prescriptive AI is an extension of predictive AI, it advises on questions such as "What should we do next?"

- AI is a catch-all term for a lot of different technologies, approaches, and tools.
- Most AI systems are really Machine Learning systems. Machine Learning systems improve over time; they learn through experience.
- True Artificial Intelligence systems are rare. They behave like humans and can sense, reason, act, and adapt to situations.
- Supervised learning uses training data and feedback from humans to learn.
- In unsupervised learning, the algorithm in the system analyzes the data itself without human feedback and intervention.

Today's AI Artificial Intelligence

It's Not As Difficult As It Sounds!

By Maurice 'Big Mo', Chris & Killian Flynn

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TodaysSimpleAIForAll.eventbrite.com - TodaysSimpleAI.com

Any profits from this book will go to charity.
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Images: Courtesy of Pixabay.com

Case Study: Marketing & Biz Dev[17]

M&C Saatchi posters read the expression on viewers' faces. AI tells if the response is positive or negative (smile/frown) and responds e.g. change colours, fonts, images et al, to turn a consumer's frown upside down.

https://theconversation.com/now-advertising-billboards-can-read-your-emotions-and-thats-just-the-start-45519

Case Study: Retail & Marketing[26]

Starbucks launched a mobile app and rewards program that gives them enormous amounts of data from its 13 million users. It uses it to personalize the experience, so the customer can walk into a store

Case Study: Retail & Marketing[27]

anywhere and baristas will know what they drink at what time of day, what snacks they might enjoy, so they can suggest something new before the customer has even realized they were bored of their regular cup of joe.

https://bernardmarr.com/default.asp?contentID=1462

Case Study: IT & Social[36]

Wikipedia had such a problem with personal attacks that 40% of its volunteer editors had stopped contributing. Hard being a volunteer with feedback 'Your so rong & dum'. They used machine learning to teach a computer how to recognize abuse

Case Study: IT & Social[37]

and soon it could do so as well as human moderators. They then unleashed it upon 63 million comments to look for patterns. One discovery: 10% of abuse was coming from just 34 users.

https://bernardmarr.com/default.asp?contentID=1549

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