INFO5992 Introduction to IT Innovations

Week 4

Tutorial 3: Cognitive Services – A Disruptive Innovation?

In this week's Lecture, we studied the concept of 'Disruptive Innovation' defined by Christensen to mean an innovation that, i.e. *"they create new markets or change the value network in an existing market"* and discussed several examples, such as Canon, Cisco and Airbnb. In all these examples, it was possible to become disruptive through the emergence of a new technology.

In the tutorial, we will explore the state-of-the-art technology in ***Cognitive services*** from Microsoft. We will study the underlying technology in these services, with focus on Vision, Speech, and Language Application programming interface (APIs), which are available in the link below:

- Cognitive Services: https://www.microsoft.com/cognitive-services
- Vision (Emotion): https://www.microsoft.com/cognitive-services/en-us/emotion-api
- Speech (Recognition): https://www.microsoft.com/cognitive-services/en-us/speech-api
- Language (Understanding): https://www.microsoft.com/cognitive-services/en-us/language-understanding-intelligent-service-luis

Within the same group as in the previous weeks, try the different cognitive services and discuss the following questions:

1. Pick one of the above services. Can you describe the underlying technology and how it is used to provide the service? Can you identify how existing companies that are using the technology? There are some example companies in https://www.microsoft.com/cognitive-services/en-us/applications Do you think the technology already is, or can lead to, a disruptive innovation?

    - **UBER** – Use of Microsoft Face Detection API. This allows users to ensure that the person UBER have screened and approved is the person behind the wheel. It only took three 3 weeks to integrate with exisiting UBER system.
    - **Starship Commander VR Game**: Use of Microsoft Speech Recognition. The API allows to train the custom speech service on keywords and phrases in the game, which greatly contributed to speech recognition accuracy.
    - **Mimicker Alarm**: Use of emotion API. The Mimicker Alarm is a free morning alarm clock app. To dismiss your alarm, you must mimic the action given. (Snap a selfie with smile, sad emotion)

        - Many of core technologies used in these APIs are deep learning, image processing, artificial intelligence, big data, cloud computing, NLP, API, data mining, text analysis.
        - Many existing companies use it to improve the existing products or services (i.e. advanced features or functionalities, more accurate recognition rate)
        - Overall, the technologies have the potential to be disruptive but isn't disruptive yet.

2. Pick another service. Can you think of a new business model using the service (technology)? Does it have the attributes to be a disruptive innovation? Answer this in terms of

    - **Face & emotion recognition**
        - Customer Service (Robots can assist via video/audio with emotions being monitored of the customer)
        - Auto-driving (To switch to auto pilot or set an alarm when the driver seems sleepy)
        - Automated instant feedback generation to improve teaching quality (University or MOOCs).
        - Automated emotion detection for people with physical disability (e.g. expression of degree of pain).
        - More robust security systems – make use of any available cameras to detect person or objects and label them in real-time.
    - **Speech recognition – Translation (Travel & Guide Industry)**

    a. Does it gain a foothold in a low-end market that has been ignored in favour of more profitable customers?

        i. Yes, it is often more cost effective, do not have to build from scratch, requires low or no maintenance. Earlier customers had to outsource or hire expensive resources with necessary skill if it lies outside the firm boundary. But now they can use these available APIs. Developers with no knowledge in machine learning can use it too.

    b. Does it create an entirely new market, turning non-customers into customers?

        i. Yes, it does have the potential to create new market. There are so many firms that started over night with an idea that exploits APIs.
        ii. University students also can easily use of these APIs to create innovative businesses (start-up).
        iii. However, new features not always attract potential customers into customers.

    c. Does it begin with low-quality offerings, then eventually captures the mainstream market by improving quality?

        i. Yes, it begins with low quality. Machine learning & AI – more data the better. So as more customers embrace the technology, more data is captured that helps improve the algorithms (huger training sample, outliers can be identified).
        ii. A good example is the initial 3D movies with the red & blues glasses, which is a low-quality offering, then we now have IMAX and proper 3D glasses.

3. Pick another service. This time, consider the features and usability of the APIs. Microsoft is trying to produce an API that is easy to use to build your business. Do you think it will be easy to use the service and innovate with it for a new business? If you think the API of MS cognitive service is a Disruptive Innovation?
    i. Yes, overall, most of Microsoft API services are cost effective, easy to use, low time consumption, and provide another means to experiment new innovative business ideas with APIs.
    ii. Many of them are currently used for sustaining innovation but has a huge potential to be disruptive– for most of business models, they do not make use of Microsoft APIs yet. They are other vendors such as Google and IBM offering similar APIs. It is hard to tell which one is particularly better at this stage.
    iii. Samsung also have just released the new Galaxy S8 together with public APIs that can promote more advanced features.
    http://www.abc.net.au/news/2017-03-30/samsung-galaxy-s8-launch/8399636

4. Some other interesting examples are summarized below.

    1. **Real Time Advertising:**
    This Image Processing API can be used to effectively advertise to the customers (based on their gender and age. The billboard recognizes the face of the person (using the API), sends the data to the Google service, which sends it to the client server (here - Suncorp Server), the server then analyses the gender and age of the person and then sends back the appropriate ad for the person. Key Points:

        - Real time advertising
        - Capture age group
        - Find corresponding ad
        - Show tailored video ads

        Disruptive – Yes

        Create new market - yes

    2. **Text Analytics**
    Used to analyse the comments entered by the users based on feedback on online discussion forums, users then shown a scorecard of the feedback. Easy to use and simple to integrate.

        Disruptive - Yes

        Create new market - yes

    3. **Smart Homes/Smart Cars:**
    Computer language needs to understand human language e.g. commands. Eg - smart home, smart cars.

        Disruptive - Yes

Create new market - not entirely, already existing in the market. But companies still catching up with this trend.

4. **Employee Relationship Management:**
   Emotion API can be used to analyse customer and employee feedback and can also be used in lie detection systems

   Disruptive - Yes

   Create new market - yes

5. **Real time Language Convertor:**
   Speech API - can be used to do real time translation of languages, customers can utlilise this service to enhance the product or service.

6. **Speech Recognition Software**:
   Can be used to analyse costs, formulate costs and then google voice or text can be used to give a response back to the person. This service can be used by small businesses that cannot afford full-fledged call centres. It is disruptive, efficient and a lost cost solution., even though the product would need to grow over time and establish a niche market.

7. **Security Software for Schools:**
   Real time image detection to provide security for schools and universities.
   Reach a new market, hence disruptive.

8. **AI Security Services:**
   Using cognitive services to provide security mechanisms
   Disruptive - yes
   Create a new low-end market by cutting down the costs.