2020학년도 2학기 일반대학원 박사
IT 융합학과 종합고사 시험문제지

1. 최근 인공지능의 딥러닝(deep learning)기술 소개로 전반적인 산업의 패러다임이 전환기를 맞이하고 있다. 이에 대해 미래의 사회는 어떤 방향으로 갈 것인지 자신의 견해를 기술하시오.

2. ICT 융합 응용기술에 관해서 기술하시오.

3. 심층 신경망(Deep Neural Network, DNN)에 대해 구체적으로 기술하시오.

4. 뇌 임플란트 응용기술에 관해서 기술하시오.

5. PKI(Public Key Infrastructure) 대해 서술하시오.

6. 최근 Big Data의 동향을 기술하시오.

7. Big Data Platform이란 무엇인가?

8. 다양한 Big Data 기술 중에서 관계형과 비관계형에 대해서 서술하시오.

9. 사이버테러 방지를 위한 실용분석을 통한 아키텍처 기반의 ICT 전략을 기술하시오.

10. Cloud 컴퓨팅기술의 특성에 대해서 기술 하시오.

11. 모바일 Platform의 분류에 대해서 아는 데로 서술하시오.

12. AI Platform Service에 대해서 아는 대로 설명하시오.

13. 해킹의 세대별 해킹기법을 서술하시오.

14. 4차 산업의 비즈니스 플랫폼에 관해서 설명하시오.

15. Bitcoin을 설명하시오.

16. 핀테크(FinTec)서비스에 대해서 종류별로 기술하시오.

17. BlockChain의 개념을 작성하시고, 기술요소에 대해서 작성하시오.

18. 클라우드 서비스의 문제점에 대해서 아는데로 기술하시오.

19. 크리스퍼 유전자 가위에 대해 미래의 바이오 시장을 고려하여 기술하시오

20. 자율주행의 핵심기술을 서술하시오.

(이상. 끝.)

2020학년도 2학기 일반대학원 박사
IT 융합학과 외국어 시험문제지

1. A self-drivig car (also known as an autonomous car or a driverless car) is a vehicle that is capable of sensing its environment and navigating without much human input. Autonomous cars combine a variety of techniques to perceive their surroundings, including radar, laser light, GPS, odometry, and computer vision. Advanced control systems interpret sensory information to identify appropriate navigation paths, as well as obstacles and relevant signage. The potential benefits of autonomous cars include reduced mobility and infrastructure costs, increased safety, increased mobility, increased customer satisfaction, and reduced crime. These benefits also include a potentially significant reduction in traffic collisions; resulting injuries; and related costs, including less need for insurance. Automated cars are predicted to increase traffic flow; provide enhanced mobility for children, the elderly, disabled, and the poor; relieve travelers from driving and navigation chores; lower fuel consumption; significantly reduce needs for parking space; reduce crime; and facilitate business models for transportation as a service, especially via the sharing economy. This shows the vast disruptive potential of the emerging technology.

2. An electric vehicle (EV), also referred to as an electric drive vehicle, uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery or generator to convert fuel to electricity. EVs include road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.

EVs first came into existence in the mid-19th century, when electricity was among the preferred methods for motor vehicle propulsion, providing a level of comfort and ease of operation that could not be achieved by the gasoline cars of the time. The internal combustion engine (ICE) has been the dominant propulsion method for motor vehicles for almost 100 years, but electric power has remained commonplace in other vehicle types, such as trains and smaller vehicles of all types.

3. Electric motive power started in 1827, when Slovak-Hungarian priest Ányos Jedlik built the first crude but viable electric motor, provided with stator, rotor and commutator, and the year after he used it to power a tiny car. A few years later, in 1835, professor Sibrandus Stratingh of University of Groningen, the Netherlands, built a small scale electric car and a Robert Anderson of Scotland is reported to have made a crude electric carriage sometime between the years of 1832 and 1839. Around the same period, early experimental electrical cars were moving on rails, too. American blacksmith and inventor Thomas Davenport built a toy electric locomotive, powered by a primitive electric motor, in 1835. In 1838, a Scotsman named Robert Davidson built an electric locomotive that attained a speed of four miles per hour (6 km/h). In England a patent was granted in 1840 for the use of rails as conductors of electric current, and similar American patents were issued to Lilley and Colten in 1847.

Between 1832 and 1839 (the exact year is uncertain), Robert Anderson of Scotland invented the first crude electric carriage, powered by non-rechargeable

primary cells.

4. By the 20th century, electric cars and rail transport were commonplace, with commercial electric automobiles having the majority of the market. Over time their general-purpose commercial use reduced to specialist roles, as platform trucks, forklift trucks, ambulances, tow tractors and urban delivery vehicles, such as the iconic British milk float; for most of the 20th century, the UK was the world's largest user of electric road vehicles.

Electrified trains were used for coal transport, as the motors did not use precious oxygen in the mines. Switzerland's lack of natural fossil resources forced the rapid electrification of their rail network. One of the earliest rechargeable batteries – the nickel-iron battery – was favored by Edison for use in electric cars.

5. EVs were among the earliest automobiles, and before the preeminence of light, powerful internal combustion engines, electric automobiles held many vehicle land speed and distance records in the early 1900s. They were produced by Baker Electric, Columbia Electric, Detroit Electric, and others, and at one point in history out-sold gasoline-powered vehicles. In fact, in 1900, 28 percent of the cars on the road in the USA were electric. EVs were so popular that even President Woodrow Wilson and his secret service agents toured Washington DC in their Milburn Electrics, which covered 60–70 mi (100–110 km) per charge.

6. A number of developments contributed to decline of electric cars. Improved road infrastructure required a greater range than that offered by electric cars, and the discovery of large reserves of petroleum in Texas, Oklahoma, and California led to the wide availability of affordable gasoline/petrol, making internal combustion powered cars cheaper to operate over long distances. Also internal combustion powered cars became ever easier to operate thanks to the invention of the electric starter by Charles Kettering in 1912, which eliminated the need of a hand crank for starting a gasoline engine, and the noise emitted by ICE cars became more bearable thanks to the use of the muffler, which Hiram Percy Maxim had invented in 1897. As roads were improved outside urban areas electric vehicle range could not compete with the ICE. Finally, the initiation of mass production of gasoline-powered vehicles by Henry Ford in 1913 reduced significantly the cost of gasoline cars as compared to electric cars.

7. In the 1930s, National City Lines, which was a partnership of General Motors, Firestone, and Standard Oil of California purchased many electric tram networks across the country to dismantle them and replace them with GM buses. The partnership was convicted of conspiring to monopolize the sale of equipment and supplies to their subsidiary companies, but were acquitted of conspiring to monopolize the provision of transportation services.

8. In October 2015, a computer Go program called AlphaGo, powered by DeepMind, beat the European Go champion Fan Hui, a 2 dan (out of 9 dan possible) professional, five to zero. This is the first time an artificial intelligence (AI) defeated a professional player. Previously, computers were only known to have played Go at "amateur" level. Go is considered much more difficult for computers to win compared to other games like chess, due to the much larger number of possibilities, making it prohibitively difficult for traditional AI methods such as brute-force. The announcement of the news was delayed until 27 January 2016 to coincide with the publication of a paper in the journal Nature describing the algorithms used. In March 2016 it is playing a professional 9-dan player, Lee Sedol, in Korea and has so far beaten him three times. Lee Sedol eventually beat AlphaGo in the fourth game on 13 March 2016.

9. If I had never dropped in on that single course in college, the Mac would have never had multiple typefaces or proportionally spaced fonts. And since Windows just copied the Mac, its likely that no personal computer would have them.
If I had never dropped out, I would have never dropped in on this calligraphy class, and personal computers might not have the wonderful typography that they do. Of course it was impossible to connect the dots looking forward when I was in college.
But it was very, very clear looking backwards ten years later. Again, you can't connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future.
You have to trust in something – your gut, destiny, life, karma, whatever. This approach has never let me down, and it has made all the difference in my life.

10. I was lucky I found what I loved to do early in life. Woz and I started Apple in my parents garage when I was 20. We worked hard, and in 10 years Apple had grown from just the two of us in a garage into a $2 billion company with over 4000 employees. We had just released our finest creation – the Macintosh – a year earlier, and I had just turned 30. And then I got fired.
How can you get fired from a company you started? Well, as Apple grew we hired someone who I thought was very talented to run the company with me, and for the first year or so things went well.
But then our visions of the future began to diverge and eventually we had a falling out. When we did, our Board of Directors sided with him. So at 30 I was out. And very publicly out.
What had been the focus of my entire adult life was gone, and it was devastating.
I really didn't know what to do for a few months. I felt that I had let the previous generation of entrepreneurs down – that I had dropped the baton as it was being passed to me. I met with David Packard and Bob Noyce and tried to apologize for screwing up so badly. I was a very public failure, and I even thought about running away from the valley.

11. When I was 17, I read a quote that went something like:
"If you live each day as if it was your last, someday you'll most certainly be right." It made an impression on me, and since then, for the past 33 years!, I have looked in the mirror every morning and asked myself:
"If today were the last day of my life, would I want to do what I am about to do today?" And whenever the answer has been "No" for too many days in a row, I know I need to change something. Remembering that I'll be dead soon is the most important tool I've ever encountered to help me make the big choices in life.
Because almost everything? all external expectations, all pride, all fear of embarrassment or failure – these things just fall away in the face of death, leaving only what is truly important.
Remembering that you are going to die is the best way I know to avoid the trap of thinking you have something to lose. You are already naked. There is no reason not to follow your heart.

12. Deep learning (deep structured learning, hierarchical learning or deep machine learning) is a branch of machine learning based on a set of algorithms that attempt to model high-level abstractions in data by using multiple processing layers, with complex structures or otherwise, composed of multiple non-linear transformations.
Deep learning is part of a broader family of machine learning methods based on learning representations of data. An observation (e.g., an image) can be represented in many ways such as a vector of intensity values per pixel, or in a more abstract way as a set of edges, regions of particular shape, etc. Some representations are better than others at simplifying the learning task (e.g., face recognition or facial expression recognition) from examples. One of the promises of deep learning is replacing handcrafted features with efficient algorithms for unsupervised or semi-supervised feature learning and hierarchical feature extraction.

13. Research in this area attempts to make better representations and create models to learn these representations from large-scale unlabeled data. Some of the representations are inspired by advances in neuroscience and are loosely based on interpretation of information processing and communication patterns in a nervous system, such as neural coding which attempts to define a relationship between various stimuli and associated neuronal responses in the brain.
Various deep learning architectures such as deep neural networks, convolutional deep neural networks, deep belief networks and recurrent neural networks have been applied to fields like computer vision, automatic speech recognition, natural language processing, audio recognition and bioinformatics where they have been shown to produce state-of-the-art results on various tasks.
Deep learning has been characterized as a buzzword, or a rebranding of neural networks.

14. Most optimistic predictions are made by people with financial interests in the industry, based on experience with electronic innovations such as digital cameras, smart phones and the Internet. Their analysis often overlooks significant obstacles and costs. Although vehicles can now operate autonomously under certain conditions, many technical problems must be solved before they can operate autonomously in all conditions, and those vehicles must be tested, approved for general commercial sale, affordable to most travelers, and attractive to consumers. Motor vehicles last much longer and cost much more than personal computers, cameras or telephones, so new technologies generally require many years to penetrate vehicle fleets. A failure by a camera, telephone or the Internet can be frustrating but are seldom fatal; system failures by motor vehicles can be frustrating *and* deadly to occupants and other road users. Autonomous driving can induce additional vehicle travel which can increase traffic problems. As a result, autonomous vehicles are likely take longer to saturate their markets and will provide smaller net benefits than optimists predict.