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Analysis of the Impact of Artificial Intelligence on Our Lives

Boris Hu

Bishop Amat High School, US

Abstract: *Artificial Intelligence (AI) is a computer system that is developed by certain algorithms to perform different types of tasks. In recent years, the implementation of AI in different fields has made a tremendous impact on our lives and has changed the way we think and work. The host of benefits and efficiencies AI affords human society are willing to be accepted by people, but the analysis on the potential threat is inevitable to address. To find the benefits and threats of AI, I first search through online tools and come out with five questions that most people are interested in, and then find papers utilizing academic databases to summarize concepts in each paper and add additional analysis and solutions I think that answer the questions. In this poster, I introduce the applications of AI including the stages of human-robot interaction, brain-computer interface (BCI), and the purpose of smart cities with its operating components. I also analyze the threat of AI on democracy by massive surveillance and social polarization and its contribution to further inequality and creating discrimination among ethnicities and gender by biased training data. In conclusion, AI developing process should be transparent and should be restricted by certain regulations.*

Keywords: *Artificial intelligence, Human-robot interaction, Brain-computer interface, Smart cities, Machine learning*

1. Introduction

Artificial Intelligence (AI) is a computer system that is developed by certain algorithms to perform different types of tasks. In recent years, the implementation of AI in different fields has made a tremendous impact on our lives and has changed the way we think and work.

Research statement: Even though people are optimistic about the implementation of AI in different industries that create a better life, certain regulations are essential to ensure AI would follow basic democratic rules that protect our human rights of privacy and eliminate discrimination among gender and races rather than exaggerating it. What positive impact AI brings to our life, and what potential threats we need to be aware of ?

2. Benefits

2.1. Human robot interaction

●Human robot interaction is the ability of interaction between human and robot. It often involves robot responses to do certain jobs after receiving orders from humans.

○Hand sign, pointing gesture, sound, etc.

○Robots priorly obtain the ability to recognize the meanings behind these orders.

●Stage 1 Tracking: track a person's head and hand to gain the information of the position by analysing color pixels (Figure 1).

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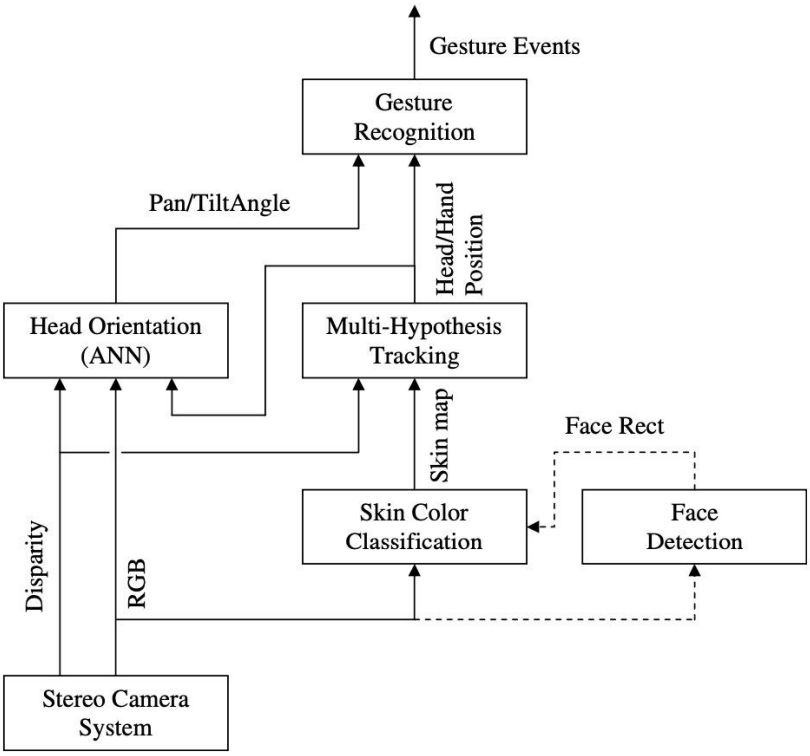

Figure 1: Overview process about the gesture recognition and tracking system

●Stage 2 Recognition of Gesture: decompose the pointing gesture and estimate the direction using the line of sight between head and hand, the orientation of the forearm, and head orientation (Figure 2).

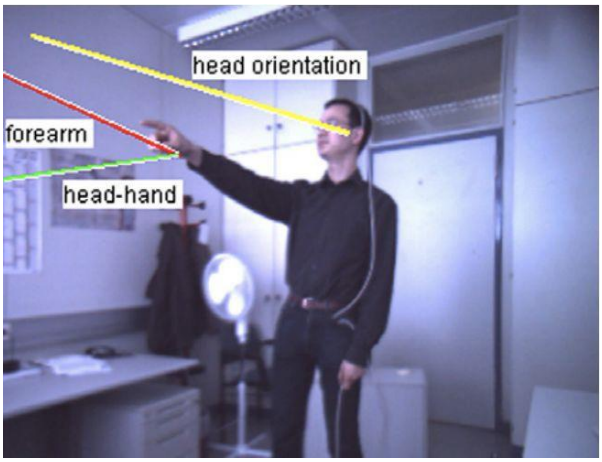

Figure 2: Different approaches for estimating the pointing direction

2.2. Brain Computer Interface (BCI)

●Vallabhaneni. et. al (2005) define BCI as "a method of communication-based on neural activity generated by the brain and is independent of its normal output pathways of peripheral nerves and muscles" [1].

●It is helpful for handicapped people even though BCI requires some sort of reliable muscular control. (Figure 3).

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Figure 3: PhD student Michele Tavella from MIT operates a wheelchair that uses "shared control" to navigate (Brain signals are translated into simple commands like "forward" or "left"; the chair then steers itself around any obstacles)

2.3. Smart cities

●To deal with the rapid growth of urban population, manage the resources and optimize energy consumption, many countries have started to introduce the concept of smart cities. (Figure 4).

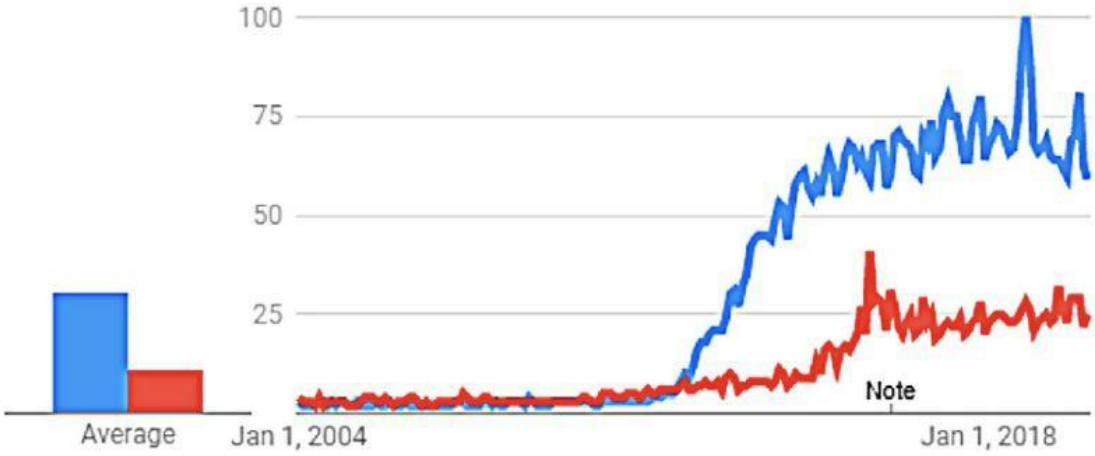

Figure 4: The popularity of smart city concept and big data over the given period of time

●Ullah, et. al describe that "advanced techniques like Artificial Intelligence (AI), Machine learning (ML), and Deep Reinforcement Learning (DRL)" can be used to make the operation of city facilities more efficient [2].

○Intelligent transportation system: precisely monitor and estimate the real-time traffic flow data in an urban environment [2].

○Cyber-security: a smart city must ensure that data processing and transmission should be safe.

○Smart grids: Big data is playing a significant role in revolutionizing the operational structure of SGs and efficient energy utilization [3].

○5G communication: The increasing demands of high data rates, high-reliability, and low latency have led the existing mobile wireless communication system towards 5G and B5G communications [2].

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3. Threats

3.1. Democracy

●Massive Surveillance: At least seventy-five out of 176 countries globally are actively using AI technologies for surveillance purposes (Figure 5) [4].

●Social Polarization: People are used to receiving information that serves their own interest.

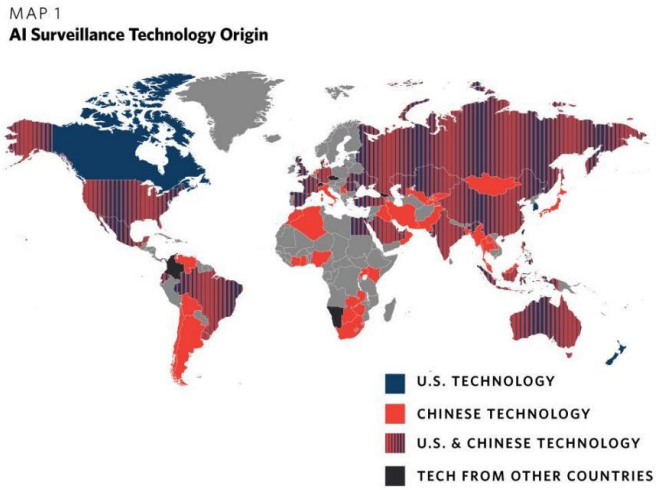

Figure 5: The origin of AI surveillance technology

3.2. Inequality

●The restriction in AI technology development cause gender inequality, racial bias, and discrimination toward certain group of people.

●Underrepresentation training dataset leads further bias in system.

○The popular Labeled Faces in the Wild (LFW) dataset contains over 15,000 images of faces, only 7% are images of black people [5].

●Ads are delivered in a manner that aligns with gender and racial stereotypes [6].

●An analysis of over 6,000 companies found that women hold only 9% of startup equity value [7].

●Technophobes: CSAF shows that various technological concerns prove to be some of the greatest fears Americans have (Figure 6). Technophobia is prominent among females (Figure 7) [8].

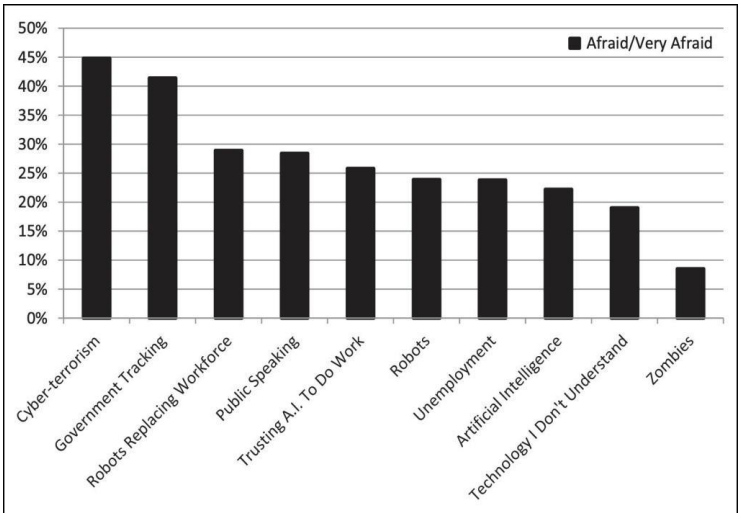

Figure 6: Select fears of the American population Chapman Survey of American Fears (2015)

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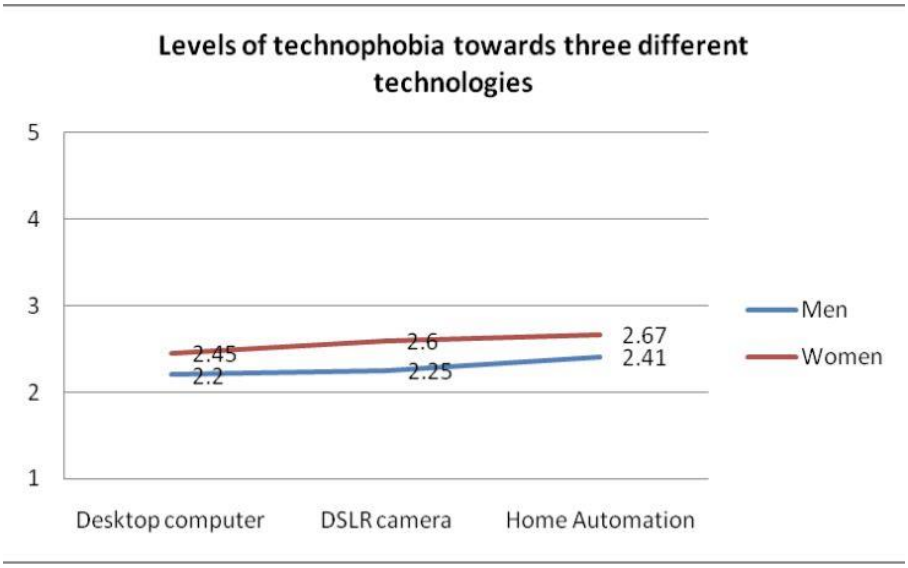

Figure 7: Mean scores of men's and women's levels of technophobia towards three different technology products

4. Methods

(1) Search AI-related articles though online platform (i.e. Google News) to see trends;

(2) Think 5 research questions that most people interest in or concern about;

(3) Literature search using academic databases (i.e. Google Scholar);

(4) Summarize and combine key points addressed in each paper;

5. Discussion

The government or the companies should ensure that fair opportunities of tech-related education for everyone, especially for women, low-income families, and minorities so that the demographic pattern holding AI-related jobs could be more diverse, and eventually release technophobe among population.

Certain regulation on AI should be implemented; stored data, tracking information, and purpose of surveillance practice should be transparent for the users so it ensure our basic human right would not be violated and democratic principles would preserved. The future of AI seem optimistic, but its threats should not be ignored

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