AI Applications Student Handout
January 2023

Below are 16 types of AI being developed. For each type, new AI applications are coming online every day. Find an application that falls under one of these headings, and make an argument for or against its use.

1 **AI in image generation:** New AI applications can generate images from words; you type in a prompt, and it creates a visual. Depending on the prompt, the images can be realistic, fantastical, or abstract. You can also upload images to manipulate.

2 **AI for cybersecurity:** Computer programs can use machine learning to automatically find unusual user behavior or unexpected network activity. These anomalies could indicate a security threat.

3 **AI for writing text:** Chatbots can use a field of machine learning known as natural language processing (NLP) to generate original text for any kind of writing. These types of chatbots are trained with massive amounts of data to accurately predict what word comes next in a sentence, thereby creating original text as it works. They can generate essays, stories, poems, recipes, computer code, or any other common type of writing.

4 **AI in genomics:** AI-based tools can extract and interpret information hidden inside the vast quantities of data generated from sequencing the human genome. AI programs can analyze a human face and identify genetic disorders, identify the primary kind of cancer in a biopsy, and predict how cancer will progress in a specific patient.

5 **AI in agriculture:** AI sensors detect weeds so that herbicides can be sprayed precisely. AI can predict the right time to sow seeds by analyzing the impact of weather conditions. It can forecast prices in the near term to help farmers make the most profit.

6 **AI in forestry:** AI gathers information about young forests and seedlings and combines this data with information on climate and weather to make accurate forest inventories. AI can tell foresters about signs of spruce bark beetle attacks on young forests and seedlings.

7 **AI in biodiversity detection:** AI provides information for scientists so they can predict which plants are threatened with extinction and which regions of the world are most in need of biodiversity protection. It helps policymakers use data to halt irreversible biodiversity loss.

DISCOVER ENGINEERING

8   **AI in cancer treatment:** AI uses genetic information and deep learning to predict whether cancer has spread and to determine the best treatment for a particular patient. It can recognize lung cancer on CT scans and distinguish it from lung tissue that might lead to false positives.

9   **AI in the military:** AI is used in autonomous vehicles for contemporary warfare. It is in combat robots that can fight alongside human soldiers. The military decodes intelligence, surveillance, and reconnaissance data using AI.

10   **AI in medicine:** AI is learning how to analyze clinical scenarios and apply clinical reasoning. It is in "intelligent prostheses" for handicapped people and in robots that help in surgery. Health trackers monitor heart rate, activity levels, and sleep.

11   **AI in search and rescue:** Robots can get into tight spaces and send back images. They can go where it's too dangerous for people or dogs. They combine a form of AI known as computer vision with logic and distance traveled; AI rescue robots can even communicate with each other and convey data back to operators.

12   **AI in deterring poaching:** AI cameras detect humans among motion-activated images and send alerts to park personnel so they can mobilize rangers to stop poaching. In a field test in East Africa, it helped arrest 30 poachers and seize 1,300 pounds of bushmeat.

13   **AI in social media:** AI analyzes user behavior and finds content the user might like. It can spot instances of abuse in a post or comment. It is used extensively in marketing; it scans trending posts, recommends topics for a business to post about, and can write posts as well.

14   **AI and politics:** AI analyzes social media data to target fundraising. It can predict which congressional bills are likely to pass. Its solutions are used to engage voters and keep them informed. The AI tools that power bots can be repurposed to support democracy and increase civic engagement.

15   **AI and music**: Musicians use AI to write music, and AI can write music that sounds as if it's from a particular artist. There's an AI song contest in which every song is created with AI help; AI can write song lyrics.

16   **AI and mental health:** AI can create a counselor training tool that allows for realistic practice conversations before undertaking actual ones. It allows training to occur at any time of day, anywhere. An AI-powered chatbot is designed to treat substance abuse disorders. It checks in with people and supplies tools for managing anxiety and cravings.