

# Open AI Products Report

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OpenAI is an AI research and deployment company. The main mission is to ensure that artificial general intelligence benefits all of humanity.

The open AI works Artificial intelligence is the creation of human-like intelligence in machines, and it is the idea that robots can think, act, and feel like humans.

OpenAI has been working to create an AI system that can do anything a human can. And they have succeeded. They have developed a deep learning algorithm that uses neural networks with vast amounts of data to understand what it is seeing or hearing.

The company's deep learning algorithms use neural networks with vast amounts of data to understand what they are seeing or hearing. The data they use are from games like Atari breakout and Pac-Man to teach the AI how to play games.

Their goal is to create an AI system that can do anything a human can, which means it can write, speak, listen, read images and video, be creative, and learn independently.

AGI, short for Artificial General Intelligence, is the next step in artificial intelligence after Narrow AI-on that comes close to matching or exceeding human intelligence in most general cognitive tasks.

OpenAI has received \$1 billion in funding from companies like Microsoft. It has repeatedly stated that it's focusing on creating AI safely for humanity.

A recent investor presentation revealed they expected to bring in \$200 million in revenue in 2023 and \$1 billion annually by 2024. OpenAI was recently valued at \$20 billion. They currently generate revenue by charging developers licensing fees for the technology.

## Chat GPT

Chat GPT is launched on 30 November 2022. Chat GPT is a state-of-the-art Natural Language Processing (NLP) model developed by open AI. It is a variant of the popular GPT-3 (Generative Pretrained Transformer 3) model.

New Application of GAN's (Generative Adversarial Network) that has been generating a lot of buzz in the AI Community.

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Chat GPT isn't limited to English. Not only can it handle other spoken languages, Which as been trained on a massive amount of text data to generate human-like responses to a given input. Chat GPT uses a neural network architecture and unsupervised learning to generate responses, without needing to be explicitly told what that correct response is, which makes it a powerful tool for handling a wide range of conversational takes.

The algorithm were used in chatGPT is PPO (Proximal Policy Optimization).

Step1: collecting demonstration data and train a supervised policy and train a supervised policy.

Step 2: collect comparison data train a reward model.

Step 3: optimize a policy against the reward model using the PPO reinforcement learning algorithm.

Neural network that uses two competing network a generator and a discriminator- to create realistic- looking outputs.

- A new prompt is sampled from the data set.
- The PPO model is initialized from the supervised policy.
- The policy generates an output.
- The reward model calculates a reward for the output.
- The reward is used to update the policy using PPO (Proximal Policy Optimization).
- A new class of reinforcement learning algorithms, PPO (Proximal Policy Optimization). Which perform comparably or better than state-of-the-art approaches while being much simpler to implement and tune, PPO has become a default reinforcement learning algorithm at open AI because of its ease of use and good performance.

## PPO algorithm

With supervised learning, we can easily implement the cost function, run gradient descent on it, and be very confident that we'll get excellent results with relatively little hyper parameter tuning. The route to success in reinforcement learning isn't as obvious-the algorithms have many moving parts that are hardtop debug, and they require substantial effort in tuning in order to get good results. PPO strikes a balance between ease of implementation, sample complexity, and ease of tuning, trying to compute an update at each step that minimizes the cost function while ensuring the deviation from the previous policy is relatively small.

We've previously detailed a variant of PPO that uses an adaptive KL penalty to control the cha change of the policy at each iteration. The new variant uses a novel object function not typically found in other algorithms.

$$L^{CLIP}(\theta) = \hat{E}_t[\min(r_t(\theta)\hat{A}_t, \text{clip}(r_t(\theta), 1 - \epsilon, 1 + \epsilon)\hat{A}_t)]$$

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- $\theta$  is the policy parameter
- $E^{\pi_t}$  denotes the empirical expectation over time steps
- $r_t$  is the ratio of the probability under the new and old policies, respectively
- $A^{\pi_t}$  is the estimated advantage at time  $t$
- $\epsilon$  is a hyper parameter, usually 0.1 or 0.2

The PPO used to teach complicated simulated robots to walk, like the 'Atlas' Model from Boston Dynamics shown below the model had 30 distinct joints, versus 17 for the bipedal robot other researcher have used PPO train simulated robots to perform impressive feats of parkour while running over obstacles.

This objective implements a way to do a trust region update which is compatible with stochastic gradient descent, and simplifies the algorithm by removing the KL penalty and need to make adaptive updates. In tests, this algorithm has displayed the best performance on Atari, despite being far simpler to implement.

To generate responses, chatGPT uses a multi-layer transformer network which is a type of deep learning architecture that has proven to be effective at processing it using its internal knowledge, and then generates a response that is relevant to the input main features of chatGPT is ability to generate responses that are consistent with the context of the conversation.

The model able to understand the flow of conversation and generate responses that fit naturally with what has been said previously, this makes it use full for tasks such as customer service, where a able to handle a wide range of question and follow-up question without losing tasks of the context.

chatGPT is also capable of performing a range of other NLP tasks, such as language translation, text summarisation, and sentiment analysis, this makes it a versatile tool that can be used in a Varsity of application.

ChatGPT is a powerful NLP model that is capable of generating human-like responses to a given input. Its ability to understand the relevant response makes it a valuable tool for a wide range of conversational tasks.

### Drawbacks of Chat GPT

One of the limitations of chat GPT is that it is a large and complex model, which makes it resource-intensive to run. This can make it challenging to use in real-time application.

Chat GPT is that it is a generative model, which means that it is not always able to provide accurate answers to specific questions. In some cases, the generated responses may be irrelevant or nonsensical, which can make it difficult to use in certain applications.

Chat GPT, like all NPM models, is limited by the quality and quantity of the data it has been trained on. If the model has not been trained on a diverse and representative

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dataset, it may not be able generate accurate responses to inputs that are outside of its training data.

Chat GPT is a powerful and versatile NLP model, it is not without its limitations.

## Whisper Open AI

The openAI trained are open-sourcing a neural net called whisper that approaches human level robustness and accuracy on English speech recognition.

Whisper is an automatic recognition (ASR) system trained on 680,000 hours of multilingual and multitask supervised data collected from the web. It shows that the use of such a large and diverse dataset leads to improved robustness to accents, background noise and technical language. Moreover, it enables transcription in multiple languages, as well as translation from those languages into English. We are open-sourcing models and inference code to serve as a foundation for building useful applications and for further research on robust processing.

The whisper architecture is a simple end-to-end approach, implemented as an encoder-decoder Transformer. Input audio is split into 30-second chunks, converted into a log-Mel spectrogram, and then passed into an encoder. A decoder is trained to predict the corresponding text caption, intermixed with special tokens that direct the single model to perform tasks such as language identification, phrase-level timestamps, multilingual speech transcription, and to-English speech translation.

Whisper's high accuracy and ease of use will allow developers to add voice interfaces to a much wider set of applications. Check out the paper, model card, and code to learn more details and to try out whisper.

## OpenAI Codex

The openAI created an improved version of OpenAI Codex, our AI system that translates natural language to code, and we are releasing it through our API in private beta starting today. Codex is the model that powers GitHub Co-pilot, which we built and launched in partnership with GitHub a month ago. They are inviting business and developers to build on top of openAI Codex through our API.

OpenAI Codex is a descendant of GPT-3; its training data contains both natural language and billions of lines of source code from publicly available sources, including code in public GitHub repositories. OpenAI Codex is most capable in Python, but it is also proficient in over a dozen languages including JavaScript, Go, Perl, PHP, Ruby, Swift and TypeScript, and even shell. It has a memory of 14kb for Python code, compared to GPT-3 which has only 4KB- so it can take into account over 3X as much contextual information while performing any task.

OpenAI Codex is a general-purpose programming model, meaning that it can be applied to essentially any programming tasks. We've successfully used it for transpilation, explaining code, and refactoring code.

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They are making openAI Codex available in private beta via our API, and they are aiming to scale up as quickly as they can safely. OpenAI will continue building on the safety groundwork we laid with GPT-3 reviewing applications and incrementally scaling them up while working closely with developers to understand the effect of our technologies in the world.

## **CLIP: Connecting Text and Images**

A neural network called CLIP which efficiently learns visual concepts from natural language supervision. CLIP can be applied to any visual classification benchmark by simply providing the names of the visual categories to be recognized, similar to the “zero-shot” capabilities of GPT-2 and GPT-3.

Although deep learning has revolutionized computer vision, current approaches have several major problems: typically only a narrow set of visual concepts.

CLIP builds on a large body of work on zero-shot transfer, natural language supervision, and multimodal learning. The method uses an abundantly available source of supervision: the text paired with images found across the internet. This data is used to create the following proxy training tasks for CLIP: given an image, predict which out of a set of 32,768 randomly sampled text snippets, was actually paired with it in our dataset. They are two steps are there : 1. Contrastive pre-training 2. Create dataset classifier from label text.

CLIP was designed to mitigate a number of major problems in the standard deep learning approach to computer vision:

- Costly datasets.
- Narrow.
- Poor real-world performance.

## **Drawback of CLIP**

While CLIP usually performs well on recognizing common objects, it struggles on more abstract or systematic tasks such as counting the number of objects in an image and on more complex tasks such as predicting how close the nearest car is in a photo.

Zero-shot CLIP also struggles compared to task specific models on very fine-grained classification, such as telling the difference between car model, variants of aircraft, or flower species.

CLIP also still has poor generalisation to images not covered in its pre-training dataset. For instance, although CLIP learns a capable OCR system, when evaluated on handwritten digits from the MNIST dataset, zero-shot CLIP only achieves 88% accuracy, well below the 99.75% of humans on the dataset.

## **DALL-E**

DALL-E is a new AI system that can create realistic images and art from a description in natural language. In January 2021, OpenAI introduced DALL.E, generates more realistic and accurate images with 4X greater resolution. DALL-E can expand images beyond what's in the original canvas, creating expansive new compositions.

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DALL-E has learned the relationship between images and the text used to describe them. It uses a process called “diffusion,” which starts with a pattern of random dots and gradually alters that pattern of random dots and gradually alters that pattern towards an image when it recognizes specific aspects of that image.

The hope is that DALL-E will empower people to express themselves creatively. DALL-E also helps us understand how advanced AI systems see and understand our world, which is critical to our mission of creating AI that benefits humanity.

## Spam Detection AI

Spam detection in the physical world created the world’s first spam-detecting AI trained entirely in simulation and deployed robot. Deep learning-driven robotic systems are bottlenecked by data collection: it’s extremely costly to obtain the hundreds of thousands of images needed to train the perception system alone.

Their implementation is detector is a neural network based on the VGG16 architecture that predicts the precise 3-D location of Spam in simulated images. In Future they are planning to extend this work to detect phishing and to defend against adversarial Spam.