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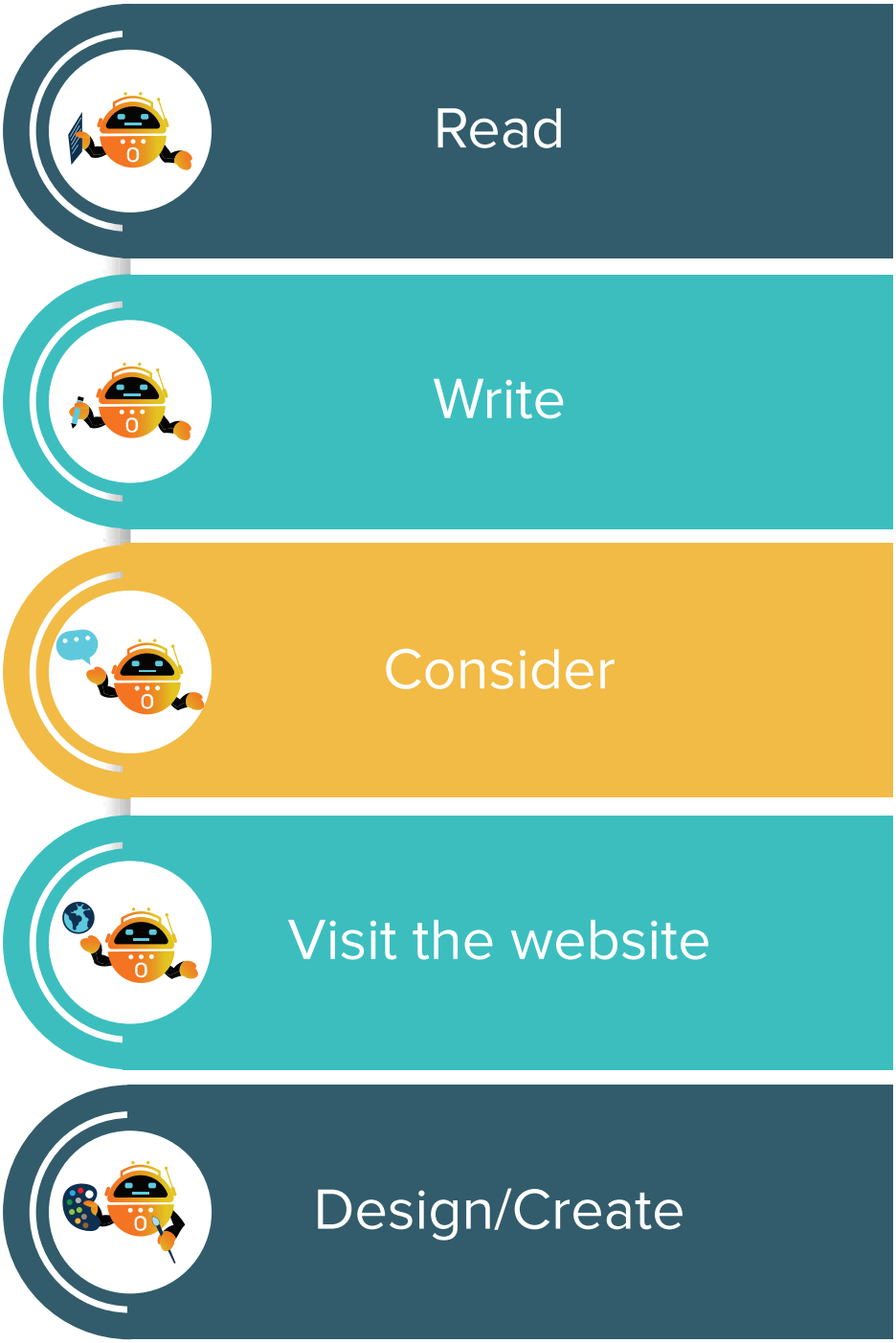
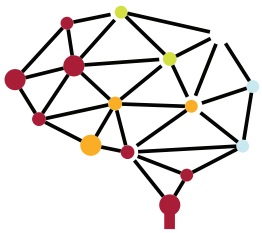
Designing and Building AI Products and Services Workbook

Your AI Mascot will guide you through this week, so watch out for these icons:



Workbook 7: The Sustainability, Feasibility, and Responsibility of GANs



Week 7

Using GANs for Good

As you've seen throughout this module, AI has raised the stakes in the realm of images, video processing, and video alterations. You've explored how GANs can enhance as well as mislead.

Undoubtedly, this technology has been phenomenal in many areas, including 3D medical imaging for better diagnosis. But when left to its own devices and without ethical guidelines, these very processes can be detrimental in areas such as social and mainstream media. Where do we go from here? How can we you use GANs for good?

For this task, you'll use a GAN to solve a business problem for the good of society. Follow the steps below to complete this workbook entry.

1 Step One: Select A Problem

GANs are an extraordinary class of models that generate output from random inputs. Select a problem that can be solved using GANs and also keep in mind the nature of these models when deciding upon your problem that needs to be solved.

Type your response here

My GAN:
UI/UX Web Helper.

Description:
As discussed in the training videos, customers can easily get frustrated and lose interest in an application (web or mobile) if the UI interface is hard to interpret or navigate. So, I would like to create a GAN that evaluates a product's successful user experience based on various Key Performance Indicator metrics and automatically renders a website based on customer specs.

Though different variations of web application designs could easily misguide these models, few human interactive-ness metrics measure the features of a web or mobile application and create benchmarks for these features.

Thus, defining a clear and concise representation of Business Scope, Performance Metrics, and Operational Metrics marks the successful delivery of this product.

2 Step Two: Decide The GAN Development Process

After deciding on the problem, you have made in Step One, decide the GAN development process that will include: data collection to train GAN for your problem, processing the collected data, and training the GAN on the processed data. Describe this process in detail.

Type your response here

GAN Development Process:

As this product involves creating websites by Generator Network and evaluating various KPI metrics by Discriminator Network, the main process involves collecting various interesting web design templates for Generator to create and various successful web application pages for Discriminator to create the metrics.

As data collection for the Generator is more than a random number, we need to analyse the feasibility of the Generator to read those templates and embed product specifications for creating user-friendly websites.

Discriminator should be able to produce the processed data by reading successful web pages and interpreting the website's effectiveness (more details about the break-up of that effectiveness in the next section).

3 Step Three: GAN User Interaction

One of the challenges of developing these models is how the user will interact with the model. To achieve this, describe the process of collecting inputs from the user, how this data will be processed and fed as inputs to the GAN, and how the result from the GAN will reach the user.

Keep in mind just how powerful GANs are. GANs have been described as robot artists that can learn to mimic any data distribution.

Type your response here

Generator

———————

Inputs:
Various Website Design Templates are categorically defined for every domain use case (e.g., financial, e-commerce, retail, etc.).
Customised requirements for specific application use cases.
Dimensional data about product specifications, such as the list of its category values, associated images, pricing if appropriate, various user interaction data, etc.

Functionality:
The above inputs will enable the generator to create a web application and create the required objects according to their placement. Though this network might not be able to produce the complete website, it builds a base website layer that is then enhanced by the application developer.

Discriminator

———————

Inputs:
Set of successful web applications for every domain-specific use case.

Functionality:
Develop its KPI metrics such as Conciseness, basic feature-ness (login, signup, header, footer, brand, etc.), easy navigation, use case Association, user-friendliness, etc.

4 Step Four: Assess The Target Market (Sustainability)

Based on the choice you've made in Step One, conduct some research and determine your target market.

The following questions.

- Will your product or service serve a relevant need?
- How will you address the needs of your target market?
- How will your product or process compare to the competition?
- How will you measure progress?
- Can you maintain this product or process over time?

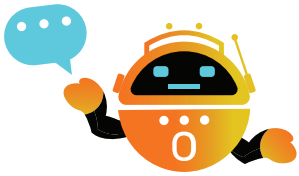
Type your response here

My target audience would be small businesses, local business experts, and individuals who need a stronger or more dedicated online presence (instead of using existing social media platforms alone).

Though this product won ' t be as intuitive for business users to use directly, as a data professional, I will use it to quickly roll over the website with minimal cost.

Compared to the existing website designers, this leverages the Discriminator network to correctly assess the quality of my product based on industry-standard successful web applications, which will increase my success ratio.

This model(both generator and discriminator) needs constant maintenance. This model aims to integrate as many generation capabilities as possible as website features.



5 Step Five: Assess The Finances (Feasibility)

Now, consider the following questions.

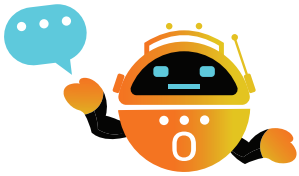
- What are the current market trends for your product or process?
- Do you have a unique value proposition?
- Which distribution channels will you use?
- What are the technology investment costs?
- How much will it cost to train your AI process?
- What kind of data do you need?
- Is the data publicly or readily available?
- How much will it cost to maintain the AI technology?
- Does your organization have the technology talent to develop the resource?
- How much will it cost to outsource the project?

5 Step Five: Assess The Finances (Feasibility) (Cont.)

In this step, sketch out a cost analysis for the project.

Type your response here

Please refer to the attached powerpoint slide for high level steps that helps to dig deeper on performing cost analysis.



6 Step Six: Assess Societal Matters (Responsibility)

Microsoft's Office of Responsible AI along with the AI, Ethics, and Effects in Engineering and Research Committee have developed the six principles of responsible AI. They include:

Fairness: Our society is unfair and biased in many different ways. The whole point of focusing on fairness in AI systems is to make sure that the system that we develop and deploy reduces unfairness in our society rather than keeping it at the same level or making it worse. AI systems can be used to allocate and withhold opportunities and resources in different areas, such as criminal justice, employment, and finance. Another example would be cultural denigration or over- and under-representation. The problem is that there isn't a single definition that we can easily quantify and integrate into our systems. Fairness relates not only to the technical context of the system but also to the societal context in which the system is deployed. Therefore, fairness is a socio-technical challenge that can be overcome by having a team with a greater diversity of people developing AI systems.

Reliability and safety: Reliability and safety is a concern for any system. You need to make sure that the systems you are developing are consistent with the design ideas you have and that they work in a way that is consistent with your values and principles. To achieve this, the models must not create any harm in the world. In situations where products may make mistakes, their deployment should be preceded by sharing the risks and harms clearly with the users. This is the principle of ensuring the reliability and safety of any AI product. For example, risks of self-driving cars are not limited to physical systems but are also about human lives, as wrong systems can create harmful situations for humans.

Privacy and security: Privacy is a fundamental right. We add complexity to AI and ML systems and increase reliance on using data to develop and train them. This increasing reliability on data adds new requirements for keeping the system secure. For example, you need to ensure the protection of that

data so that it doesn't get leaked or disclosed. One approach could be not to remove data from a user's device by running the models locally on the device. You need to think about where the data is coming from, if it's a user-submitted data or publicly outsourced. Finally, you need to check if the data is corrupted.

Inclusiveness: When developing an AI product, you must make sure that the product can engage with every community in the world. You must be intentionally inclusive and diverse with the approaches taken towards AI. Moreover, you need to make sure that designing a product is done with an inclusive perspective towards the future of AI – this can be achieved by ensuring that people from minority communities are involved with the process of both designing and testing an AI product.

Transparency: Transparency and intelligibility can help achieve a really diverse range of goals: from mitigating machine unfairness in machine learning systems to helping developers debug their AI systems and gaining more trust from the users.
There are two sides to transparency: The first one is that the people developing AI systems should be open about how and why they decided to use AI and the limitations of their systems. Transparency also means that people should be able to understand the behavior of AI systems in terms of interpretability or intelligibility.

Accountability: Despite all the complexities with these new models and with new technology that can be unpredictable and difficult to interpret, you are still accountable for how a technology impacts the world. Accountability is also the structure that you put in place to make sure that you are consistently embedding the principles in everything you design and deploy. Accountability also means helping users be accountable. For example, you must develop, sell, and advocate for any technology, such as facial recognition or any other product you develop.

6 Step Six: Assess Societal Matters (Responsibility) (Cont.)

Consider the following questions (based on Microsoft AI principles)

- Does your AI process treat people fairly?
- Is your AI process reliable?
- Is your AI process safe?
- Does your AI process guard the privacy and security of your target population?
- Is your AI process inclusive?
- Is your AI process transparent?
- Are you willing to be accountable for the actions of your AI process?

6 Step Six: Assess Societal Matters (Responsibility) (Cont.)

Now, create general guidelines for addressing ethical and social issues related to your AI process.

Type your response here

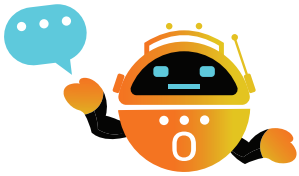
Some of the ethical issues that are required to be addressed:

Reliability of AI process:
As this is the first attempt to create a website from scratch based on specs provided by the User, the model could be easily misguided by the User ' s input. Clearly articulating a set of guidelines and principles that Users must follow while using this Product is mandatory. For example, the User is supposed to select layouts or specifications based on a pre-defined set of rules instead of free-form text as much as possible.

Data & User Security:
This Product will clearly define the Terms and Conditions regarding what data the User will provide and what data will be visible to the outside world. So, all layers of data will be utilised and encrypted as per user requirements and under user agreement.

Transparency:
As mentioned above, explaining the model might be challenging. However, the results are interpretable directly (either as images, documents, web pages, etc.), so the end results do not slip away from the customer ' s eyes.

AI Inclusive and Accountability:
As the product success measures are based on customer participation at every stage of the solution, the rules about any customer input will be considered only after they agreed. As a product owner, I will be accountable for any misalignments created solely by this Product.



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