



Southbeach Modeller and ChatGPT

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This paper describes one way to use Southbeach Modeller with a large language model (LLM) such as ChatGPT (OpenAI).

Southbeach Modeller is a visual modelling tool that includes an embedded rules engine. Rules define patterns in a graphical model based on the Southbeach Notation. As the user explores the visual model, sentences that point to directions for further analysis, design or problem-solving are generated. Southbeach is a sophisticated workbench for lateral thinking, design tasks and systematic problem-solving in any domain.

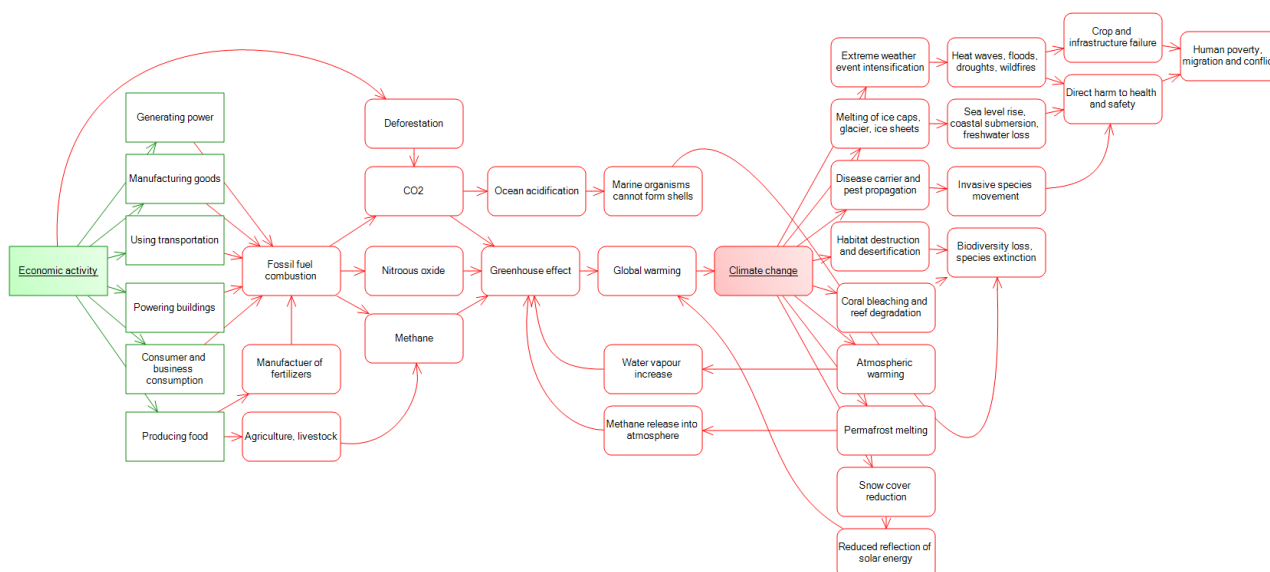
For this paper, a standard model of the causes of climate change was used to illustrate.

Prompt:

I will provide you with a problem. I want you to solve the problem as if you were a scientist.

GPT:

Sure, please provide me with the problem and I will do my best to solve it as a scientist.



A Southbeach model

Problem statement generated by the Southbeach 'report'

[*(,) "{this}"]

Economic activity produces Generating power
Economic activity produces Manufacturing goods
Economic activity produces Using transportation
Economic activity produces Producing food
Economic activity produces Powering buildings
Economic activity produces Consumer and business consumption
Generating power produces Fossil fuel combustion
Producing food produces Agriculture, livestock
Producing food produces Manufactuer of fertilizers
Manufacturing goods produces Fossil fuel combustion
Using transportation produces Fossil fuel combustion
Powering buildings produces Fossil fuel combustion
Consumer and business consumption produces Fossil fuel combustion
Fossil fuel combustion produces Methane
Fossil fuel combustion produces CO2
Methane produces Greenhouse effect
CO2 produces Greenhouse effect
Nitroous oxide produces Greenhouse effect
Greenhouse effect produces Global warming
Global warming produces Climate change
Fossil fuel combustion produces Nitroous oxide
CO2 produces Ocean acidification
Ocean acidification produces Marine organisms cannot form shells
Climate change produces Extreme weather event intensification
Climate change produces Melting of ice caps, glacier, ice sheets
Climate change produces Disease carrier and pest propagation
Climate change produces Habitat destruction and desertification
Climate change produces Coral bleaching and reef degradation
Climate change produces Atmospheric warming
Climate change produces Permafrost melting
Climate change produces Snow cover reduction
Atmospheric warming produces Water vapour increase
Permafrost melting produces Methane release into atmosphere
Snow cover reduction produces Reduced reflection of solar energy
Extreme weather event intensification produces Heat waves, floods, droughts, wildfires
Heat waves, floods, droughts, wildfires produces Direct harm to health and safety
Melting of ice caps, glacier, ice sheets produces Sea level rise, coastal submersion, freshwater loss
Sea level rise, coastal submersion, freshwater loss produces Direct harm to health and safety
Heat waves, floods, droughts, wildfires produces Crop and infrastructure failure
Crop and infrastructure failure produces Human poverty, migration and conflict
Direct harm to health and safety produces Human poverty, migration and conflict
Disease carrier and pest propagation produces Invasive species movement
Invasive species movement produces Direct harm to health and safety
Habitat destruction and desertification produces Biodiversity loss, species extinction

Coral bleaching and reef degradation produces Biodiversity loss, species extinction
Water vapour increase produces Greenhouse effect
Methane release into atmosphere produces Greenhouse effect
Reduced reflection of solar energy produces Global warming
Agriculture, livestock produces Methane
Manufacture of fertilizers produces Fossil fuel combustion
Deforestation produces CO₂
Economic activity produces Deforestation
Marine organisms cannot form shells produces Biodiversity loss, species extinction

GPT generated the following answer:

GPT:

Based on the information provided, it seems like the problem is related to the negative impacts of human economic activity on the environment and climate, and the resulting consequences for biodiversity, human health, and safety. As a scientist, I would approach this problem by analyzing the causal relationships between the different factors and identifying potential solutions to mitigate their harmful effects.

One potential approach would be to focus on reducing the reliance on fossil fuels for energy production, transportation, and manufacturing. This could involve investing in renewable energy sources such as solar, wind, and hydroelectric power, as well as promoting energy efficiency and conservation measures.

Another important area to address would be agriculture and livestock production, which contributes significantly to greenhouse gas emissions through the production of methane. Strategies to reduce these emissions could include promoting plant-based diets and reducing food waste, as well as improving livestock management practices and developing alternative protein sources.

Deforestation, which is driven in part by economic activity, is another major contributor to carbon emissions and loss of biodiversity. Solutions to this problem could include implementing sustainable forest management practices, promoting reforestation and afforestation, and reducing demand for products that drive deforestation such as palm oil and soy.

Finally, it will be important to address the impacts of climate change on human health and safety, as well as on biodiversity and ecosystems. This could involve developing adaptation strategies to protect vulnerable populations from extreme weather events and sea level rise, as well as promoting conservation efforts to protect endangered species and ecosystems.

In order to implement these solutions effectively, it will be important to engage stakeholders across different sectors and to foster international cooperation and coordination. Additionally, it will be important to develop policies and incentives that encourage businesses and individuals to adopt more sustainable practices, while also recognizing the role of social and economic factors in driving unsustainable behavior. Overall, addressing the negative impacts of economic activity on the environment and climate will require a multifaceted approach that integrates scientific knowledge, policy, and societal change.

We then asked GPT to identify the problem's root cause and find a solution.

Prompt:

Identify the root cause of the problem.

GPT:

The root cause of the problem is the negative impact of human economic activity on the environment and climate. Specifically, the primary driver of this problem is the widespread use of fossil fuels for energy production, transportation, and manufacturing. This results in the release of greenhouse gases such as carbon dioxide and methane, which contribute to global warming and climate change. Additionally, economic activity such as agriculture and deforestation also contribute to the problem by releasing greenhouse gases and driving biodiversity loss. The root cause of this problem is therefore deeply tied to human society's dependence on fossil fuels and the systems that drive economic growth at the expense of environmental sustainability.

Prompt:

Find a solution that solves the root cause.

GPT

A solution to address the root cause of the problem would involve transitioning away from fossil fuels and adopting sustainable and renewable energy sources. This would require a comprehensive approach that involves investment in renewable energy technologies such as solar, wind, and hydropower.

Governments and businesses could incentivize the adoption of renewable energy technologies by providing tax incentives, grants, and other financial support. Additionally, policies such as carbon pricing, regulations on greenhouse gas emissions, and energy efficiency standards could be implemented to encourage the adoption of sustainable practices.

Another critical area to address is reducing demand for energy and resources by adopting circular economy principles. This could involve designing products for reuse and recycling, reducing waste and resource consumption, and promoting sustainable consumption patterns.

In addition to reducing reliance on fossil fuels, it will also be important to address the impact of economic activity such as agriculture and deforestation. This could involve promoting sustainable farming practices, reducing food waste, and reforestation efforts.

Finally, education and awareness campaigns could be implemented to promote public understanding of the need for sustainable practices and the impact of individual actions on the environment.

In order to address the root cause of the problem, a comprehensive and coordinated effort will be necessary involving governments, businesses, and individuals. By investing in sustainable practices and transitioning to renewable energy sources, we can reduce our reliance on fossil fuels and mitigate the harmful impacts of economic activity on the environment and climate.

GPT was then presented with a more specific set of questions. The questions were generated using the Southbeach rules engine. The user selected from a library of rules and turned on a short set of rules called 'reduce.harmful'. The rules used in this example were:

#reduce.harmful

increases(*,harmful) "How can you prevent the {source} from producing the {destination}."

increases(*,harmful) "Put measures in place to deal with the {destination}."

increases(*,harmful) "Isolate the part of the {source} that is producing the {destination} and remove it."

increases(useful,harmful) "How else could the {source} be accomplished that would not result in the {destination}?"

increases(useful,harmful) "What else could give the benefits of the {source} that would not result in the {destination}?"

decreases+potential(&a=*,&b=useful) "How can the proportion of the {&a} impacting the {&b} be reduced?"

We selected one object in the visual model: marine organisms cannot form shells and set the extent of pattern matching to 'extended' allowing the rules engine to iterate over the effects of this model element. As a result, the following sentences were generated:

1. How can you prevent the Ocean acidification from producing the Marine organisms cannot form shells.
2. Put measures in place to deal with the Marine organisms cannot form shells.
3. Isolate the part of the Ocean acidification that is producing the Marine organisms cannot form shells and remove it.
4. How can you prevent the Marine organisms cannot form shells from producing the Biodiversity loss, species extinction.
5. Put measures in place to deal with the Biodiversity loss, species extinction.
6. Isolate the part of the Marine organisms cannot form shells that is producing the Biodiversity loss, species extinction and remove it.

These questions were then put to GPT:

Prompt:

Think like a marine biologist. I am going to present you with a set of questions. Please suggest how to solve the problem.

GPT:

Certainly! As a marine biologist, I can suggest the following solutions for each of the problems you've outlined:

1. How can you prevent the Ocean acidification from producing the Marine organisms cannot form shells?

Reduce carbon dioxide emissions from human activities to slow down the rate of ocean acidification.

Promote the use of renewable energy sources to reduce dependence on fossil fuels and reduce carbon dioxide emissions.

Encourage the implementation of policies and regulations to limit greenhouse gas emissions.

2. Put measures in place to deal with the Marine organisms cannot form shells.

Develop and implement artificial shell-forming materials to help these organisms adapt to the changing ocean chemistry.

Investigate alternative food sources for the affected organisms to ensure they still have sufficient nutrition.

Establish protected areas to conserve the habitats of these organisms.

3. Isolate the part of the Ocean acidification that is producing the Marine organisms cannot form shells and remove it.

Unfortunately, there is no single part of ocean acidification that can be isolated and removed. Ocean acidification is caused by the absorption of carbon dioxide from the atmosphere, so reducing carbon dioxide emissions is the most effective way to combat this problem.

4. How can you prevent the Marine organisms cannot form shells from producing the Biodiversity loss, species extinction?

Establish and enforce protected areas to preserve the habitats of these organisms.

Implement sustainable fishing practices to prevent overfishing and protect the food chain.

Develop and implement plans to restore damaged or destroyed habitats.

5. Put measures in place to deal with the Biodiversity loss, species extinction.

Promote public awareness and education on the importance of biodiversity and the impacts of human activities on marine ecosystems.

Develop and implement policies and regulations to protect marine species and their habitats.

Support research to better understand the impacts of human activities on marine biodiversity and identify effective conservation strategies.

6. Isolate the part of the Marine organisms cannot form shells that is producing the Biodiversity loss, species extinction and remove it.

Unfortunately, there is no single part of the inability of marine organisms to form shells that can be isolated and removed. However, the solutions outlined in points 4 and 5 above can help address the broader issue of biodiversity loss and species extinction.

We then used the Southbeach Cues function to generate combinations of prompts for ChatGPT. We called this ThinkGPT. The definition of the Cue set is:

-AI

--ThinkGPT

---Please think like a

---@people:profession

---\.

---I need you to

---@actions:think

---the

---@innovation:situation

---\.

This rule generated a large number of suggestions. Clicking around the model led to the following randomized selection:

1. Please think like a analyst. I need you to invent the argument.
2. Please think like a manager. I need you to design the wicked problem.
3. Please think like a maker. I need you to analyze the opinion.
4. Please think like a manager. I need you to critique the law.
5. Please think like a investigator. I need you to design the plan.
6. Please think like a police. I need you to protect the system.
7. Please think like a inspector. I need you to streamline the idea.
8. Please think like a problem solver. I need you to create the design.
9. Please think like a economist. I need you to plan for the idea.
10. Please think like a politician. I need you to critique the wicked problem.
11. Please think like a expert. I need you to critique the law.
12. Please think like a businessperson. I need you to critique the argument.
13. Please think like a designer. I need you to plan for the moonshot.
14. Please think like a change agent. I need you to investigate the society.
15. Please think like a problem solver. I need you to optimise the system.
16. Please think like a leader. I need you to find cause the law.
17. Please think like a engineer. I need you to find cause the argument.
18. Please think like a CTO. I need you to invent the plan.
19. Please think like a artist. I need you to investigate the society.
20. Please think like a trouble shooter. I need you to find solution the technology.
21. Please think like a businessperson. I need you to streamline the opinion.
22. Please think like a leader. I need you to protect the contradiction.
23. Please think like a leader. I need you to understand the idea.
24. Please think like a consultant. I need you to simplify the plan.
25. Please think like a inspector. I need you to plan for the plan.

From the lists of suggestions, we selected two that might be interesting to throw at GPT:

- “Please think like a change agent. I need you to investigate the society.”
- “Please think like a economist. I need you to plan for the idea.”

GPT had the full context of the ‘chat’ available to the AI, based on the Southbeach Model. It was therefore able to suggest the following:

Prompt:

Please think like a change agent. I need you to investigate the society.

GPT:

As a change agent investigating society, I would first seek to understand the current attitudes and behaviors of individuals and institutions towards environmental sustainability. This would involve conducting surveys and focus groups to assess public awareness and understanding of environmental issues, as well as identifying barriers to behavior change.

Based on the insights gained from this research, I would develop targeted interventions aimed at promoting sustainable practices and encouraging behavior change. These interventions could

involve social marketing campaigns, educational programs, and community engagement initiatives.

One key strategy would be to engage businesses and industries in the transition to sustainable practices, by promoting the adoption of renewable energy technologies and circular economy principles. This could involve working with industry associations and professional organizations to provide training and resources on sustainable practices, as well as providing incentives and recognition for businesses that adopt sustainable practices.

Another important area to address would be public policy, by advocating for the adoption of regulations and policies that promote environmental sustainability. This could involve working with policymakers to develop and implement climate change policies, carbon pricing mechanisms, and regulations on greenhouse gas emissions.

Additionally, I would work to build public support for environmental sustainability by engaging and mobilizing communities around environmental issues. This could involve organizing grassroots campaigns, hosting community events, and working with local organizations and leaders to promote sustainable practices and behavior change.

Ultimately, as a change agent, my goal would be to build a movement for environmental sustainability, by empowering individuals and communities to take action and driving systemic change across society. By working together towards a shared vision of a sustainable future, we can create a more just and equitable society for all.

Prompt:

Please think like a economist. I need you to plan for the idea.

GPT:

As an economist, if the idea is to transition towards environmental sustainability, I would start by conducting a cost-benefit analysis to determine the economic impact of the proposed changes. This would involve estimating the costs associated with transitioning to sustainable practices, as well as the potential benefits to the economy, society, and the environment.

Based on the results of the cost-benefit analysis, I would develop a comprehensive plan for transitioning towards environmental sustainability, which would involve a mix of policy measures, market-based incentives, and public-private partnerships.

One key strategy would be to create a carbon pricing mechanism, such as a carbon tax or cap-and-trade system, which would incentivize businesses and individuals to reduce their greenhouse gas emissions. The revenue generated from the carbon pricing mechanism could be used to fund investments in renewable energy and other sustainable technologies, as well as to provide support for vulnerable populations and communities affected by the transition.

Another important area to focus on would be innovation and technological development, by investing in research and development for sustainable technologies and promoting the adoption of circular economy principles. This could involve providing tax incentives and funding for businesses and startups that develop sustainable technologies, as well as partnering with universities and research institutions to drive innovation in this area.

Additionally, I would work to promote sustainable production and consumption patterns, by encouraging businesses and individuals to adopt sustainable practices and reduce waste. This could involve implementing regulations and standards for sustainable production, as well as providing incentives and education to encourage sustainable consumption patterns.

Overall, the plan would need to be tailored to the specific economic and social context of the region, and would require a collaborative effort between government, businesses, civil society organizations, and individuals to achieve the transition towards environmental sustainability. By investing in sustainable development, we can create a more resilient and equitable economy that benefits both current and future generations.

Conclusion

This paper has only touched the surface of what's possible with the combination of the latest version of Southbeach Modeller (v4), the integrated MyCreativity rules engine and ChatGPT's generative AI.

A future version of Southbeach Modeller could provide tools for crafting persona-based GPT "prompts" directly from Southbeach visual models and provide integration with the GPT API (user credentials). The generative AI content could be incorporated into the dynamic creativity and reporting panels in Southbeach Modeller.