

TYPE OF SURFACE WE SHOULD USE TO SAVE THE WORLD?

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Abstract

- Context of research: In recent years there has been global warming that causes climate changes and severe natural phenomena. Inside the cities the warming is increasing and this is how the phenomenon of urban heat island was created. In our research, we check which surface should be used to mitigate these phenomenons, and to result in a lower temperature being emitted from the ground.
- Research question: What is the connection between the type of ground cover and the temperature of the infrared radiation reflected from it?
- Objectives set: We will measure different surfaces inside our urban school and examine which surface is better to use in terms of heat emission.
- Brief methods description: We measured three surfaces across the school: concrete, soil and astroturf (synthetic grass). The data was gathered using an Infrared Thermometer (IRT). In each surface we took 9 measurements randomly, where all the surfaces were exposed to the sun.
- Results: synthetic grass (astroturf) reflects the most infrared radiation, concrete which reflects less, and soil reflects the least radiation.
- Conclusions: synthetic grass (astroturf) causes environmental warming, compared to concrete which reflects less radiation, and soil which reflects the least radiation meaning it protects better against environmental warming.
- Recommendations for a way forward: check where it is possible to replace surfaces within the city, and plant more trees that will provide shade, to lower the returned temperatures.
- Keywords that emphasize key ideas in the paper: Temperature, surface, urban heat.

Research Question

What is the connection between the type of ground cover and the temperature of the infrared radiation reflected from it?

Introduction

In recent years there has been global warming that causes climate changes and severe natural phenomena. Inside the cities the warming is increasing and this is how the phenomenon of urban heat island was created. In our research, we check which surface should be used to mitigate these phenomena, and to result in a lower temperature being emitted from the ground. According to the results of our research, we can know what type of surface should be used, in order to get a lower temperature above the ground. We will measure different surfaces inside our urban school and examine which surface is better in terms of heat emission.



Research Methods

- We've done our researches in three surfaces across the school: concrete, soil and astroturf (synthetic grass).
- We measured each surface in the same way, the only thing we changed was the surface type.
- The data was gathered using an Infrared Thermometer (IRT). In each surface we took 9 measurements randomly, where all the surfaces were exposed to the sun. In addition to the globe measurements, we also typed in the same measurements in a google sheet that we will use as our backup data.
- In order to analyze the results we used our class google sheet where we saved the measurements to do an average calculation. That average was then used to create a chart for our result.



GLOBE Badges



I make an impact because our research can lead to a change in our neighborhoods. Initially, the synthetic grass can be replaced with soil in almost every house, gardens and schools, and thus the temperature inside the city will drop.

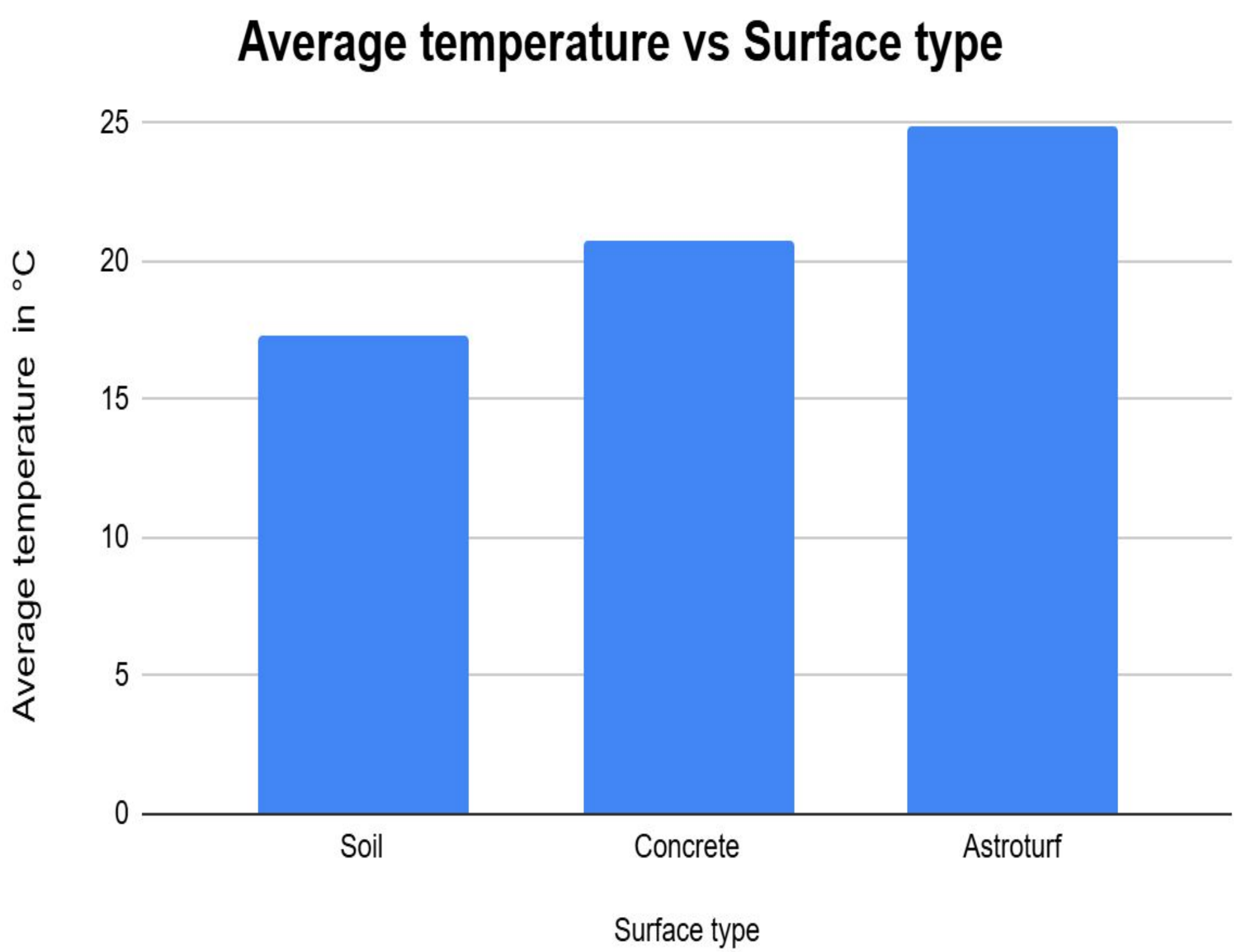


I am a data scientist in that we measured temperatures on different surfaces, put them in tables, calculated the data, created graphs and drew conclusions.

Results

To summarize the results, the summary table and graph are presented which clearly show that synthetic grass (astroturf) reflects the most infrared radiation, meaning it causes environmental warming, compared to concrete which reflects less, and soil which reflects the least radiation meaning it protects better against environmental warming.

Land cover types	Hagefen astroturf 2025 Synthetic grass	Hagefen concrete 2025	Hagefen soil 2025
The average temperature of the emitted radiation	25.15	20.19	17.653



Discussion

Our results show that the soil is the coldest surface and the Synthetic grass is the hottest.

In our research the possible errors are: Inaccurate measurements, bad weather, changing cloud cover, lack of sun and unsaved data.

Our hypothesis was that the synthetic grass will return the most heat compared to the soil which will return the least heat.

After the research, our hypothesis was verified (synthetic grass is the warmest, soil is the coldest).

Conclusions

We measured the surfaces for 3 weeks in a row, 27 measurements every day and 9 measurements on every surface. After calculating the average, we came to a conclusion that the astroturf is the hottest material, and the soil is the coldest when exposed to the sun. This research is important because that's how you know which material is best for the surface when exposed to the sun. The importance of this research is knowing how to prevent global warming in general, and the increase in temperature inside the city in particular.

Bibliography

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