Theory of Knowledge: Exhibition

In this exhibition, I will explore the question: **is bias inevitable in the production of knowledge** through the tools we humans use to produce knowledge, and how bias impacts these tools.

There are many ways by which we attempt to remove bias when producing knowledge, one of those ways is by using precision tools like a pair of digital calipers. Calipers allow us to get extremely precise measurements of length. By placing an object in between the jaws and closing them around the object, calipers can measure accurate to plus or minus 0.001 inches.

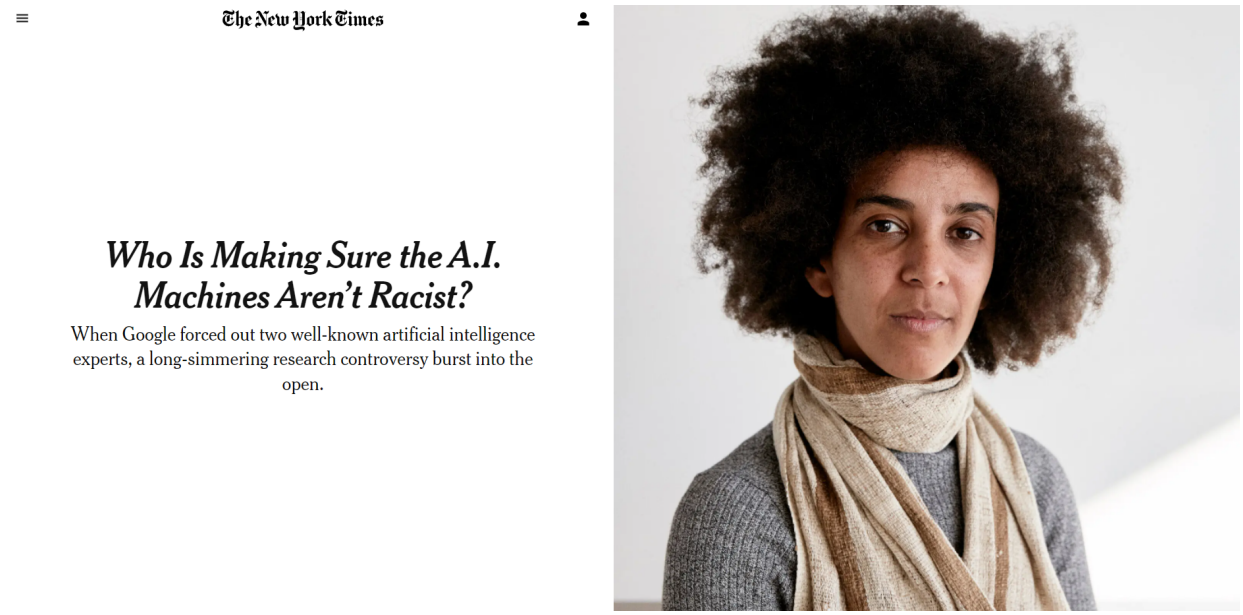
Credit: Fisher Scientific

This object is relevant to this exhibition as it serves as an example of the relationship between bias and knowledge, as calipers attempt to remove bias from the production of the knowledge when measuring objects. When using a tool like a ruler, biases like the estimation of the human eye and small inconsistencies in markings are inevitable. With a tool like calipers, however, these sources of bias are removed.

This object enriches this exhibition because it presents the idea that it is possible to produce knowledge without bias. No matter who is using a pair of calipers, or in what situation, they will always produce the same measurement when measuring the same object.

However, this object is also important in this exhibition as there are still sources of bias present in calipers. Someone had to design the calipers, and someone had to construct them as well. Whenever there are humans involved, bias will be introduced. Small inconsistencies in production or specific design choices made act as sources of bias.

From this angle, there is no way to remove these biases, and so the inevitability of bias presents itself even in situations where attempt to remove it.



Credit: The New York Times

While there are many areas of knowledge where we attempt to remove bias from its production, there are many more where bias is very prevalent. One of these areas is AI, specifically, facial recognition algorithms. This is a screen capture from an article published in the New York Times discussing bias that exists in many major facial recognition algorithms.

Facial recognition software is used everywhere from hobbyist projects and viral YouTube videos to police systems. Its main goal is to, from an image of someone's face, extract information about them. For applications in police work, it usually attempts to extract demographic information and aid in matching pictures or videos recorded from crime scenes to databases of faces. Hence, these algorithms attempt to produce knowledge about people by matching photos to known faces.

These algorithms are relevant to this exhibition because, while many perceive them as impartial and unbiased sources of knowledge, as the article discusses, the way they are written and trained often ingrains human bias in how they match faces. The main source of these biases is in the datasets that are used to train these algorithms. Because of this, the algorithms are only able to produce reliable knowledge from images that reflect those in the training dataset. Many of these datasets, however, underrepresent minority

groups and people of color. This leads to misidentification of these minority groups, which makes these sources of knowledge biased.

Not only that, this object is important to this exhibition because these algorithms speak to the idea that bias may be inevitable in all computer systems that produce knowledge. As mentioned above, computers are often seen as unbiased sources of knowledge. But what people tend to forget is that humans build and program these computers, and inherit biases held by those humans will translate to bias within these algorithms.

Credit: Carolina Biological

So far, this exhibition has explored bias as a negative concept in the production of knowledge. However, this does not always have to be the case. This last object, the microscope, is an example of a source of bias that is beneficial in the production of knowledge.

A microscope focuses light through a series of lenses to greatly magnify a sample placed on its base. Microscopes are used widely in fields like biology to make the study of small structures like cells easier. There are many different types and styles of microscopes, but this exhibition will focus on a standard, three magnification microscope like the one shown in the image.

We humans perceive the world mainly through our eyes. While our other senses like hearing, taste, touch, and smell give us some information, the vast majority of the information we gather about the world around us is through our eyes.

Microscopes, however, allow us to see the world in a way in which we could not before. By distorting the light bouncing off of an object and magnifying it, they allow us to perceive the object we are producing knowledge about in a completely different way. In a certain sense, this change of perspective is a form of bias in the production of these kinds of knowledge.

But, this bias does not negatively impact our production of knowledge, in fact, it enhances it. This biased view of the world allows us to produce knowledge that we never could have before. Knowledge like the structure and functions of organelles inside of a cell, or the discovery of germs, was produced with the help of the microscope.

Hence, this object is relevant to this exhibition because it shows that bias may be inevitable in the production of knowledge. However, that does not mean that bias is detrimental to the production of knowledge.

In conclusion, we use many different types of tools in our production of knowledge, some of which attempt to remove bias, some of which do not, and some of which intentionally introduce bias in order to aid in the production of knowledge.