We must address the issue of racial essentialism in medicine. Cerdena et. al define race-based medicine as “the system by which research characterizing race as an essential, biological variable, translates into clinical practice, leading to inequitable care” [1]. The belief that people of different races have distinct biological characteristics is a manifestation of racial essentialism. This leads to a phenomenon known as race-based medicine, where doctors make medical decisions based on their patients’ self-reported race.

However, whether race exists as a biological phenomenon itself is highly debated. As Cerdena et. al. note, “race was developed as a tool to divide and control populations worldwide. Race is thus a social and power construct with meanings that have shifted over time to suit political goals, including to assert biological inferiority of dark-skinned populations” [1].

A justification for the biological reality of races is based on the assumption that different races have distinct genetics from one another, and can be fit into genetic groups. However, Maglo et. al. note that humans are not distinct by evolutionary criteria and genetic similarities between “human races, understood as continental clusters, have no taxonomic meaning”, with there being “tremendous diversity within groups” [2]. Whether race defines a genetic profile is unclear at best.

This is not to say that disease prevalence is equal amongst all populations. Maglo et. al. note that “Recent studies showed that ancestry mapping has been successfully applied for disease in which prevalence is significantly different between the ancestral populations to identify genomic regions harboring diseases susceptibility loci for cardiovascular disease (Tang et al., [2005](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4756148/#B105)), multiple sclerosis (Reich et al., [2005](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4756148/#B91)), prostate cancer (Freedman et al., [2006](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4756148/#B41)), obesity (Cheng et al., [2009](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4756148/#B24)), and asthma (Vergara et al., [2009](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4756148/#B113))” [2].

However, as stated above, race is not an accurate proxy for this mapping. Moreover, Cerdena et al. note that in medical practices, race is used as an inaccurate proxy: “Black patients are presumed to have greater muscle mass …On the basis of the understanding that Asian patients have higher visceral body fat than do people of other races, they are considered to be at risk for diabetes at lower body-mass indices” [1]. Not only can this lead to misdiagnosis, it also reinforces racist stereotypes.

Our model aims to accurately predict a patient’s race based on their chest X-ray. If this model succeeds, it may legitimize the idea that a person’s race determines their physiques: not just on-the-surface characteristics like skin color or hair texture, but bone structures. The fact that a machine can infer a person’s race from such a racially ambiguous picture as a chest X-ray will be unequivocal support of the idea that people of different races are inherently different. This may lead to an argument that people of different races should be treated differently.

To refute this argument, however, recent studies suggest that there is actually more variation within racial groups than between them [3]. Studies that find racial differences often reflect the effects of racism such as stress and its physiological consequences [4, 5]. This means that the physiological differences that we can observe in black people in America, for example, reflect the experience of being black in America rather than being black itself.

Regardless, that a deep learning model can determine a patient’s race from their medical images means that other models used in medicine could also have this capability. Since race-based medical practices are still common and even built into these models, it could lead to race-specific errors that clinical radiologists without access to demographic information would not be able to tell [6], and thus resulting in flawed medical decision-making.

Another concern that our model can bring about is improved surveillance methods. Adleberg et al. [7] created a model that can extract from chest X-rays information such as race, gender, age and insurance status. If such information can be obtained from a chest X-ray with high accuracy, it means that anything can become a source of data to be harvested. Even though it is unlikely that this model will be used for this purpose, it gives us a glimpse into how well current surveillance methods are working.

Furthermore, we do not know for sure what our model is looking at in order to make its decision. Earlier in the course, we learned about an image classification model whose task was to identify criminality in a person based on their picture. The model was trained on pictures of convicted people who did not smile and non-convicted people who did, and the model turned out to classify non-smiling people as criminals. This may be the case for our model, and we need more time and computing power to actually test this theory.

It is also dangerous if this model is tested, and we find that the model is accurately predicting people’s races based purely on physiological differences picked up from the chest radiographs. During World War II, several people of certain ethnicities were incarcerated in several countries because of their affiliation with the ‘enemy.’ There were those who avoided incarceration by denying their origins. If another race-based mass incarceration is to happen again, and our model is completely accurate in revealing a person’s race, it means that no one can avoid incarceration by denying their ethnic background. With this in mind, we believe that such models should not be attempted in the future, because the dangers they pose far outweigh the benefits.

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