# Research: Empower Visions.TV

**An effort to uncover methods to teach predictive modeling and machine learning to students in high schools with a significant percentage of disadvantaged students.**

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# Motivation

My goal is to create Empower Visions TV, which is a program to teach students in the Oakland Unified School District with a high rate of disadvantaged students about machine learning and predictive modeling using R and Python. I'm not sure anyone at the math department of top universities such as UC Berkeley or Stanford would be inclined to act, but there is a generation of young disadvantaged students in high school that are hungry to learn how predictive modeling powers Facebook, SnapChat, Youtube, Amazon and Google Search. My presumption is that many of the disadvantaged students are doubtful that they are smart enough to learn the basic concepts. They view topics such as regression or recommendation engines beyond their grasp. However, I endeavor to show them that learning these concepts can empower their minds and even prevent tragedies in their communities before they happen.

Another motivation for this program came from my experience as a student within the Data Science Certificate Program at UC Berkeley Extension. Within the program I had two excellent instructors, Chris and Yushu, who opened my eyes to the applications of machine learning using programming languages called *R, Python,* and *Scala*. As the only black person in the courses, one who grew up in a lower socioeconomic community, I often pondered if disadvantaged students are learning predictive modeling.  The concepts can be difficult, but then again, they can be powerful if applied to communities considered to be destitute by the students from those communities. A second fact is that Data Science, a field that uses predictive modeling, is a popular industry, and will continue to be for many years. So if my basic logic is correct, if disadvantaged high school students are not learning how to make predictions based on data, then these students will be in an even worse position after high school. This is because predictive modeling and machine learning will be a key technological trend based on the Gartner Hype Cycle. Let me explain…

The 2016 Gartner Hype Cycle of Emerging Technologies is one of the most thorough reports that analyzes trends in over 2000 technologies. The report indicates that machine learning will be the most disruptive technology over the next 10 years.  This is due to 3 factors - 1) powerful computers that have radical computational power, 2) an imperceptible amount of data stored in databases, and 3) neural networks, which were built upon hypotheses and models of how the human brain works.
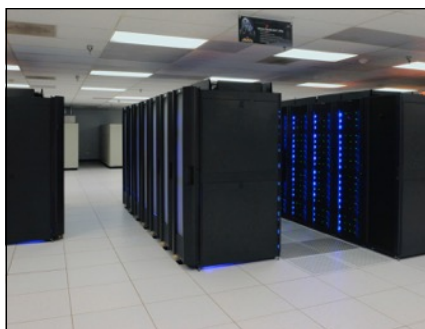
**Computational Power**     **Data Collected**     **Neural Networks**

The question then becomes, who will learn and apply these concepts to solve problems? The most obvious group is young students. Why? Because the concepts of predictive modeling are so tortuous, complex, and time consuming to understand that a collaborative classroom environment is the most effective way to grasp the material. This is not surprising since Larry Page created the PageRank algorithm that powers Google when he was a young PhD student. Mark Zuckerberg learned programming in high school and created Facebook when he was a young college student. So students will be a main driver to apply the concepts of predictive modeling to solve new problems that help humanity advice forward in the future. However one must ask, how do we prepare high school students for this trend, and which socioeconomic communities will these students come from? Will it only be students from the upper and mid-level socioeconomic classes that have the resources available to learn predictive modeling? Or will students from lower socioeconomic communities and high schools also be given the opportunity to learn and contribute?

Based on my interviews with high school teachers in the Bay Area, only the former group has the resources, and there are no plans to include the later group. More over, current incumbents of machine learning, whether students, teachers or industry professionals, tend *not* to come from lower socioeconomic communities. This may suggest why a program that targets disadvantaged students learning predictive modeling using R or Python doesn't exist today in the Bay Area, based on my research.

The *Empower Visions TV* research project will be a powerful force to ensure that disadvantaged students aren't marginalized when it comes to learning predictive modeling. If this is continues, then significant consequences will continue to affect disadvantage students and their communities. This includes unpreparedness for future jobs that involve intelligent devices, lack of innovation within the communities from which the disadvantaged live, and worst of all, lack of preparedness or motivation to pursue college courses that build upon the basic concepts of predictive modeling. I don't yet have the silver bullet to solve this problem, but I do believe that through Empower Visions TV, through the teachers of disadvantaged students, and through the determination of the students, a multifarious program can be created to make these students profound predictive modelers.

**Why use R and Python?**

**(To be added)**

**Notes from  High School Teachers Interviewed**

**(To be added)**

**Important Concepts High School Students Must Learn**

**(To be added)**

**Overview of Streaming Video Technology**

**(To be added)**

**Advisors and Mentors**

**(To be added)**