



# A Civic Developers Quest to Change Healthcare

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## Description

I am on a quest to change the way we approach solving the healthcare crisis in this world. In the past, we have focused on asking the experts to solve it and implemented a technocratic management style. I want to change that dynamic to be focused on the Civic Developer and empowering them. We will do this by using massive public data sets and minimal coding implementations of Artificial Intelligence. By using an open-source management style we can leverage the power of the crowd to solve these problems for the world.

### Audience

Who is this talk for?

The primary audience is developers who are interested in solving challenges in the healthcare space. I focus on developers versus physicians because our solutions will be based on using code to develop solutions. While having a team comprised of developers and physicians would be ideal it is not necessary

What background knowledge or experience the audience to have?

Developers to have a basic understanding of AI/ML and be comfortable with GIT and cloud services. No knowledge of the healthcare sector is needed.

What do you expect the audience to learn or do after watching the talk?

They will learn how to revolutionize healthcare using massive public data sets and easy to use AI/ML services hosted in the cloud. They will learn how to think through legal, business, ethical, technical obstacles in providing healthcare solutions. They will be able to launch a simple website that can deliver solutions to world patients.

## Goals

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2. Sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat.

## Specifications

The following requirements are needed to complete this training session.

1. Computer
2. Access to Google collab <https://colab.research.google.com/>
3. Helpful if you are familiar with fastai. <https://course.fast.ai/index.html>
4. Clone my conference repository. <https://github.com/lutherkhill/codemash2020>
5. Access to kaggle <https://www.kaggle.com/nih-chest-xrays/data>

## Lorem Ipsum

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## Hourly Breakdown

### I. 0900-0950 (Introductions & Setup)

#### A. Intro (10 minutes)

I was born into one of the worst healthcare systems in the world on the small island of Dominica in the Caribbean. One summer I broke my left forearm and stayed in the hospital for two months and endured 2 surgeries to fix my broken bone. Luckily my family held on to the x-rays from this incident. One day I brought this experience up at work and one of the doctors found this very odd for such a common condition. When he looked at my x-rays he immediately saw the problem. I had two fractures instead of one there were the obvious one and another hairline fracture further up. Due to a lack of trained radiologists and x-ray technicians on the island they missed it which resulted in my extended stay and multiple surgeries in the hospital. Back then I couldn't do anything about it or help the countless others who were in my position, but now I can and now so can you. With the advent of AI/ML and large public data sets, we are empowered to provide solutions to people all over the world.

#### B. Why it matters (10 minutes)

1. There is an urgent and growing need to deliver quality healthcare to developing parts of the world.

2. Billions of people could have their lives measurably improved with these simple applications you can build today.
3. We are exporting our diseases to developing countries but not our advanced treatments.

C. Problem (10 minutes)

1. The world lacks enough qualified physicians that are trained to read medical imaging.
2. Even though the x-ray is the most common medical image, there are not enough people who can quickly and accurately diagnose unfamiliar or complex problems.
3. Doctors based on their training and work experience are not always familiar with certain medical conditions.
4. This can put the patient at risk and slow down the delivery of care.
5. One of the biggest barriers in delivering a solution is limited connectivity in remote parts of the world.

D. Solution (10 minutes)

1. Using machine learning and large public data sets we can build a model that will detect an enlarged heart using an x-ray image.
2. By using the power of AI/ML we can leverage big data to deliver better results.
3. By using models that can be delivered over the internet at low bandwidth and high latency we can bring solutions to remote parts of the world.
4. We will be keeping the interface simple to minimize the need to speak any particular language.

E. The Future(10 minutes)

1. Make the solution mobile-first so that models are lightweight enough to be used in the browser on cheap hardware.
2. Develop models for other medical conditions. examples: broken bones, collapsed lungs, .....
3. Work on loading the labels with information about the condition and possible treatments.
4. Provide the ability to load the interface in the native language of the user.

## II. 0950-1000 BREAK

## III. 1000-1050 (Building the model pt1)

- A. Looking at the data (20 minutes)
  - 1. Source and background of data
  - 2. Metrics
  - 3. Medical image formats
- B. Training resnet50 (20 minutes)
  - 1. Model architecture
  - 2. Training metrics
  - 3. Improving the model
- C. Results (20 minutes)
  - 1. Have we solved the problem
  - 2. Metrics
  - 3. Saving file for future

## IV. 1100-1150: Building the model pt2 (50 minutes)

- A. Choosing a web server
- B. Make the UI easy to use

## V. 1150-1200 BREAK

## VI. 1200-1250 (Deploy and test)

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## VII. 1250-1300 Conclusion

## VIII. 1300 Presentation complete

