

Idea: Chronic pain changes behaviour, and by measuring this change we can quantitate pain. If your right knee is sore, you limp. If your back hurts, you stoop. Using sensors, similar to those currently used for motion capture, would allow us to exactly capture the patient's behaviour. Analyzing the data created over long periods of time (using machine learning) would allow doctors to diagnose chronic pain with unprecedented accuracy.

Implementation: A number of small sensors (I imagine roughly marble sized) would be worn by the patient over a period of time to collect data. The number of sensors required and where they would be located would vary from patient to patient (why measure your legs if you only have shoulder pain). The sensors could clip onto clothing or could use velcro to attach underneath, what matters is that they don't move too much relative to the patient. With enough miniaturization, they could even stick on similar to nicotine patches.

Benefits: (Referring to the specific headings from the challenge)

Validation: The data created would show that the pain definitely exists. The doctor could even create a personalized heat map showing where exactly the pain is most intense, for the patient to show his/her family and/or caregivers.

Seeking Escape: With the extremely accurate diagnosis, patients could do the exact exercises they need to get better.

Confusion: There would be no communication required! The doctor would simply take the data, crunch the numbers, ask if the results are accurate (they should be), and then either write a prescription or assign some exercises.

Inconsistency: By using a large data set, we could analyze months of behaviour to find trends, and not just hope that a two hour snippet is representative.

Example Setup: A patient comes in with elbow pain. Three sensors are used in the following configuration.

