

Francis found they had a spare sensor. I had been trying to build my own low cost sensors or modify very cheap ten pound sensors. I thought I could start getting decent readings with this spare sensor.

I was also doing a project with Down Community Arts and I built this digital light painter and I had it on the desk the same day as Francis's sensor came in the post. The two things were just sat next to each other and I thought, 'you could plug *that* into *that* and do something visual rather than trying to make it around sound...'. Then I thought, in Delhi, if it is photography based you will have something that you can show *there and then*. I felt like I needed to show the scientists there what I was working with more quickly.

How is this type of data normally visualised?

Francis: In a scientific paper it would be graphs and tables. So time series graphs and then averages. Typically for air pollution we worry about the twenty-four hour average and the yearly average. Then, if we want to start thinking about where the actual pollution is coming from, going to shorter time averages is useful; so, if you look within the daily cycle you'll typically see peaks with rush hour. That's clear evidence that there's emissions from cars for example.

Robin, can you tell me about the equipment that you are using, what is the 'light stick' that we see in the photographs?

Robin: It uses LED strip left over from another work which was a light-up ping pong table. The visual element of that was rows of programmable LED strips. You can address each LED individually with a micro controller. The closer the LEDs are together the more resolution you can get in the drawing or whatever you like. The LED's come on a roll of tape.

I had done community art light paintings with the first light stick and I tried building the sensor around that but as soon as I moved



too far away from the camera it appeared too small in the image so I knew I needed to make it bigger. I had seen another project using a light painter to visualise wifi signal strength and I had also looked at Steve Mann's work around early digital light painting. They were quite big, two or three metre poles.

I didn't really have any budget so it was all sort of bits and bobs that I had lying around. I had the sensor from Francis, a micro controller and a raspberry pi computer to read the sensor and turn it into instructions for the LEDs. The whole thing was powered on a battery pack for recharging your phone.

I built a prototype, wasn't very happy, built the second one, was happier and then I worked on how I was going to visualise the data with that.

Talk us through how do you actually make one of the images.

Robin: It is a long exposure, so it only works in low light levels: dawn or dusk or at night time.

The light painter is a telescopic boompole for a film set microphone. It all has to pack away for taking on the plane. The LED strip attaches onto that with velcro pads. The sensor is hot glued and gaffer taped along with the micro controller onto a pack that was meant for when you go out running with your mobile phone. That goes on my arm.

Then I turn everything on. I take some readings so I can note down what the pollution level is. I take a series of readings either before or after the photo so I know what the pollution was. I use that in the titles.

Once I have got everything framed up, and I have set my exposure times, I ask the environmental scientist or driver, whoever I have been able to cadge into giving me a hand, to press the shutter release. Then I will start walking slowly with the light stick across the 'landscape' in front of the camera and I press a button and it starts the LEDs fading in. They are flickering off an on very quickly, the probability of any one of them

The artist on Mumbles Hill, Wales with a malfunctioning light painter.