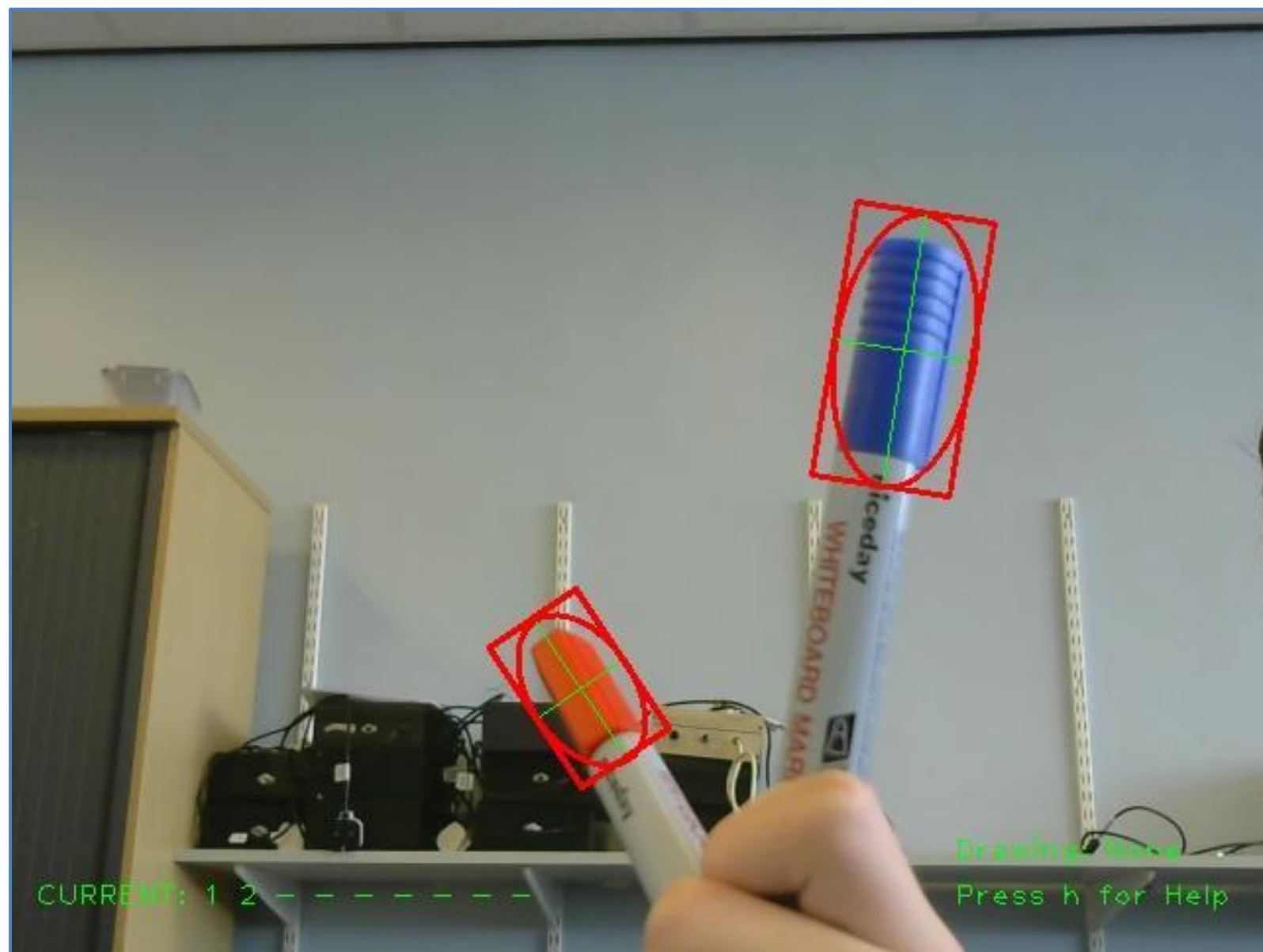


## CAMSHIFT FAST, EFFICIENT COLOUR-BASED TRACKING



### WHAT IS IT?

CAMSHIFT is a fast, efficient colour-based tracking algorithm that uses image moments to track an object. It uses three unique tracking selection methods: Point, Selection and Histogram; each method is best suited to a different shapes of objects.

Our improvements include the ability to track multiple objects of varying colour at the same time as well as the ability to draw the path the object has followed. Also developed was an intuitive and easy-to-learn User Interface for interacting with the system when tracking, selecting and drawing.

### WHAT'S UP WITH TRACKING RIGHT NOW?

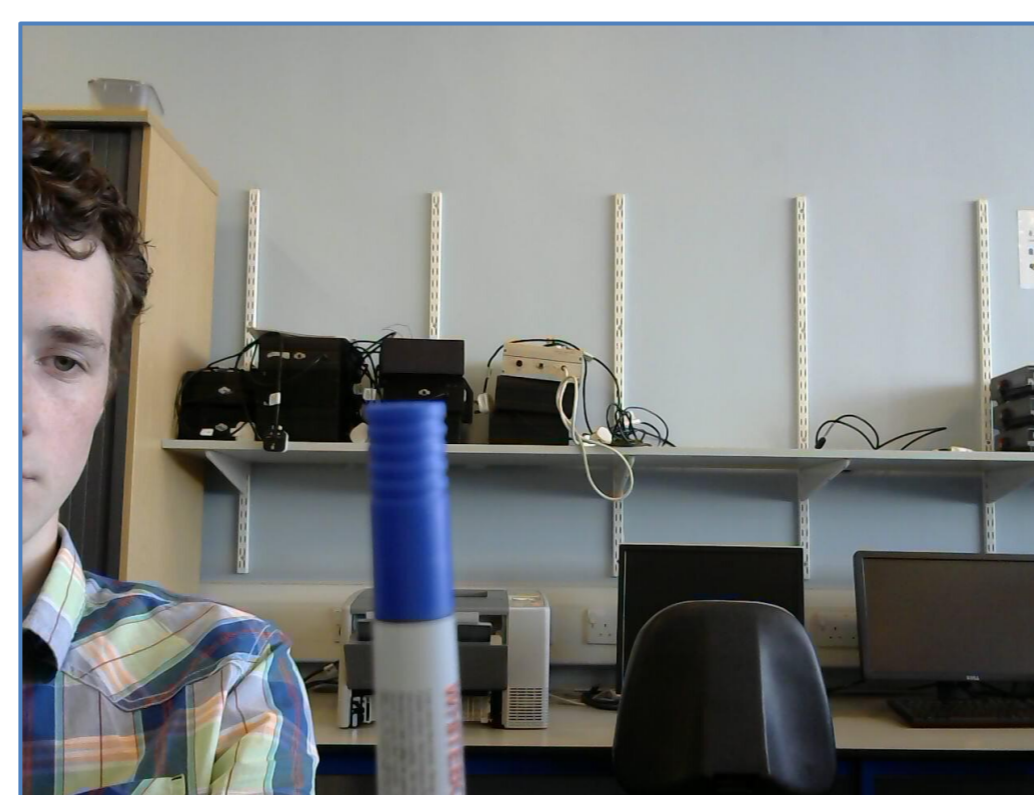
Many tracking algorithms exist, but often elaborate methods use various hypotheses or feature detectors which are far too computationally expensive.

CAMSHIFT, which can track a given colour in the presence of noise, other colours and movement while still remaining fast and efficient.

However, many colour based tracking algorithms are far too computationally expensive (and therefore slower at any given CPU speed), especially for use on embedded hardware.

### WHAT DID WE HAVE?

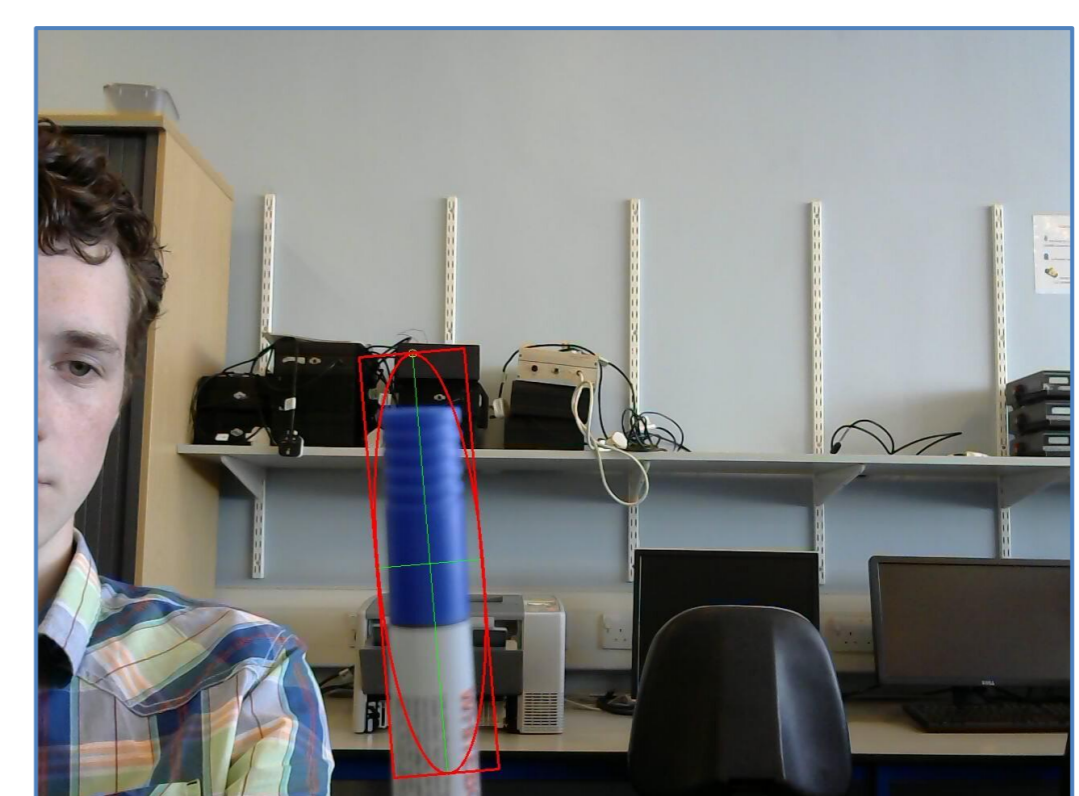
Originally the system only supported tracking a single colour at any given time, it also didn't support full 360° rotation of the object.



### HOW DOES IT WORK?

The image above shows how the source image is transformed, first being thresholded to remove all but the colour we want to track (blue in this case).

Then, using morphological erosion, gaussian blurring and morphological dilation, we filter out small artifacts. Finally, using moments we can calculate angles, widths and lengths to draw overlays on the video feed.



## I ALSO WORKED ON... NON-PHOTOREALISTIC RENDERING

