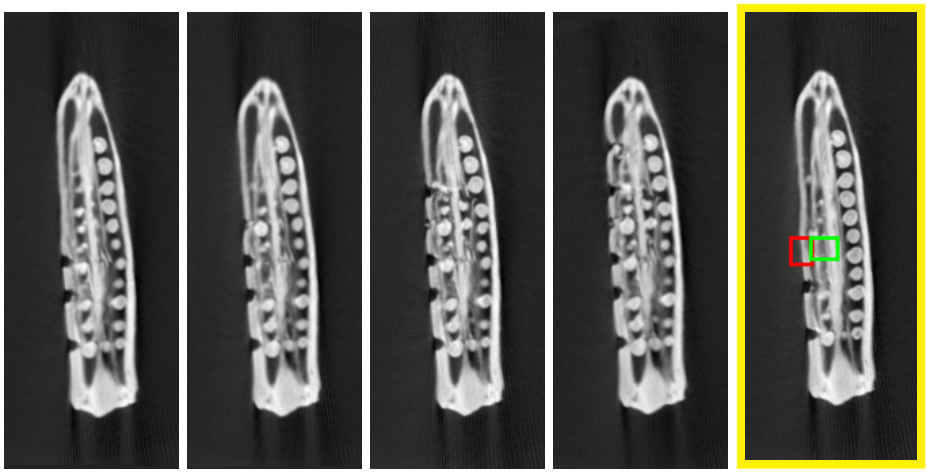


Figure 1: Okra 3D dataset: One slice each from the templates (the first four from the left), and one from the test volume (extreme right). In the regions marked in red and green, while all slices have deformities, the test has none.

With μ_x, μ_y and σ_x^2, σ_y^2 being the averages and variances of pixel values along dimensions x and y respectively, σ_{xy} being the covariance along x and y, L being the dynamic range, c_1 and c_2, and c_3 being defined to be $(k_1 L)^2$, $(K_2 L)^2$ and $c_2/2$ repectively, with $k_1 = 0.01$ and $k_2 = 0.03$, the three components of SSIM metric: luminance l, contrast c and structure s are defined as:

$$l(x,y) = \frac{2\mu_x\mu_y + c_1}{\mu_x^2 + \mu_y^2 + c_1} \tag{1}$$

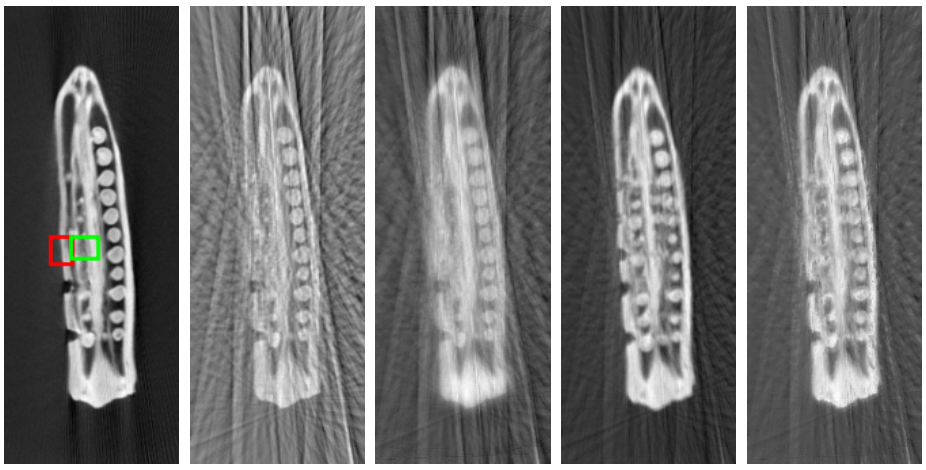
$$c(x,y) = \frac{2\sigma_x\sigma_y + c_2}{\sigma_x^2 + \sigma_y^2 + c_2} \tag{2}$$

$$s(x,y) = \frac{\sigma_{xy} + c_3}{\sigma_x\sigma_y + c_3} \tag{3}$$

Fianlly, SSIM is defined as

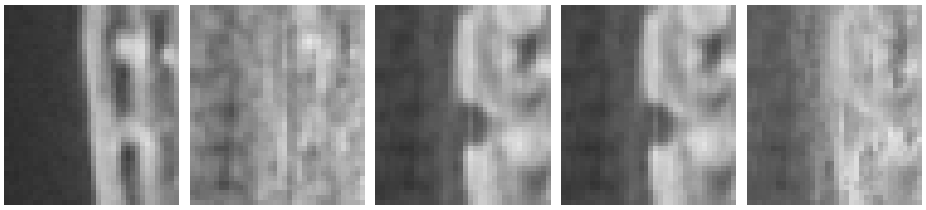
$$SSIM = \frac{1}{n}\sum_x\sum_y [l(x,y)^\alpha . c(x,y)^\beta . s(x,y)^\gamma], \tag{4}$$

where n denotes the total number of pixels. The coefficients α, β and γ are generally set to 1 but are adjustable to suit the application goal.



(a) Test (b) FDK (c) Sparsity prior (d) Sparsity and unweighted template priors (e) Sparsity and weighted template priors

Figure 2: 3D reconstruction of the okra from 10% projection views (b) has strong streak artefacts, (c) blurred, (d) no new information detected (prior dominates – the deformity from the prior shows up as a false positive) and (e) new information detected (no deformities corresponding to red and green regions) while simultaneously reducing streak artefacts.



(a) Test (b) FDK (c) Sparsity prior (d) Sparsity and unweighted template priors (e) Sparsity and weighted template priors

Figure 3: Zoomed in portion corresponding to the red RoI of Fig. 2 for various methods (b) has strong streak artefacts, (c) blurred, (d) no new information detected (prior dominates – the deformity from the prior shows up as a false positive) and (e) new information detected (no deformities).