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Patent Pending

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An Algorithm to Estimate the Number of Dots On An Image
AzTE Case # M13-155P

Background
Counting the number of dots on an image has multiple applications. One such application is measuring the number of glomeruli (which appear as dots on images) in an intact kidney using non-destructive techniques to study renal and systemic failures. Some currently available techniques to count the glomeruli and measure their size require the destruction of the entire kidney. Other available techniques that do not require the destruction of the kidney, but do not perform direct measurements and cannot localize the identified glomeruli to specific parts of the kidney.

Invention Description
Researchers at Arizona State University have developed a novel computational algorithm that can automatically obtain the court of dots on an image, including for example the glomerular count from the kidney MRI images. The new technique adopts a patch-based processing approach and builds graphs that describe the relations between glomerular and non-glomerular regions in a set of ground-truth images. The robustness of these graphs to intensity variations and measurement noise is improved by building them using a non-local approach based on sparse representations. The final glomerular identification is performed using simple clustering procedures on the low-dimensional embedding of patches.

Potential Applications

- Counting objects on images
- Medical imaging
  - Medical resonance imaging (MRI)
  - Computed tomography (CT)

Benefits and Advantages
- **Robust** – Graphs are robust to intensity-variations across several images by adopting a non-local, subspace based approach.
- **Fast** – New technique can process 5 images per second.
- **Simple** – new technique provides for automatically determining the number of dots from images.