

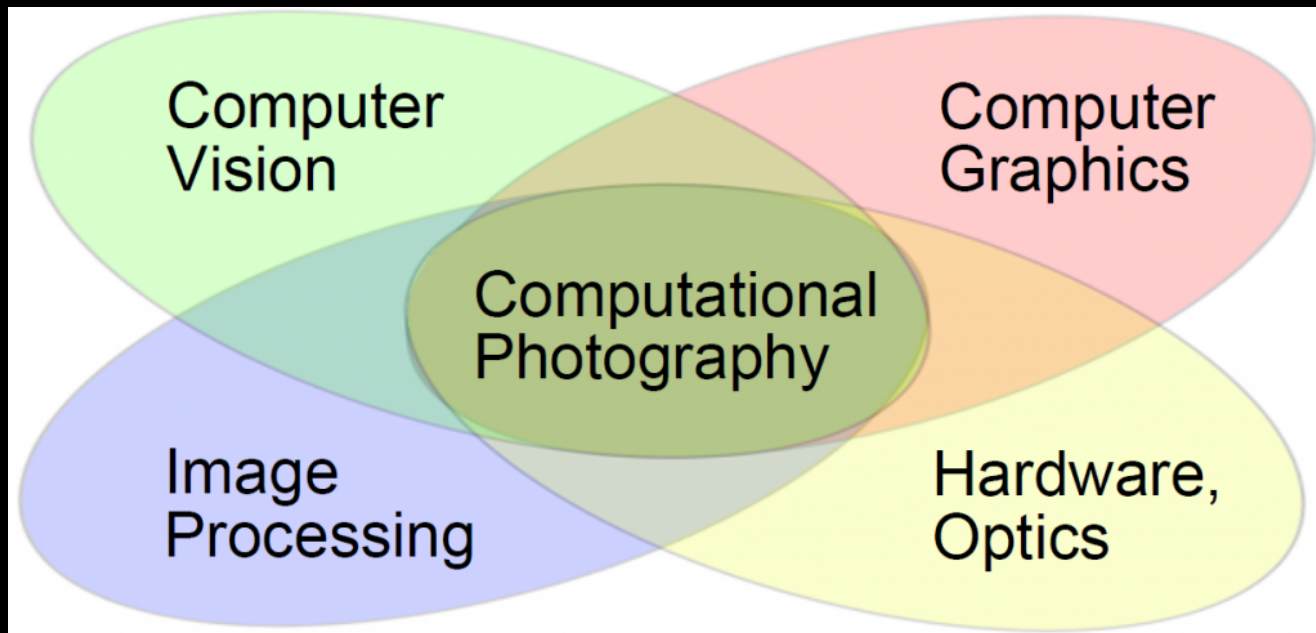
THE FUTURE OF PHOTOGRAPHY

HOW COMPUTATIONAL PHOTOGRAPHY WILL REDFINE
THE CAMERA INDUSTRY

BY LEAH ARMER

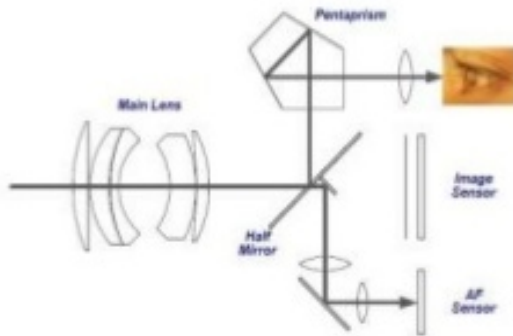
WHAT IS COMPUTATIONAL PHOTOGRAPHY?

“Computational Photography captures a machine-readable representation of our world to synthesize the essence of our visual experience.”

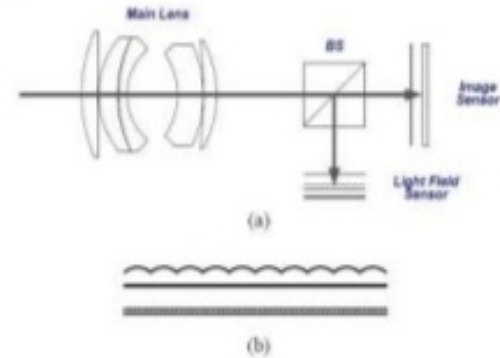


TRADITIONAL VS COMPUTATIONAL

* Traditional Method of recording light



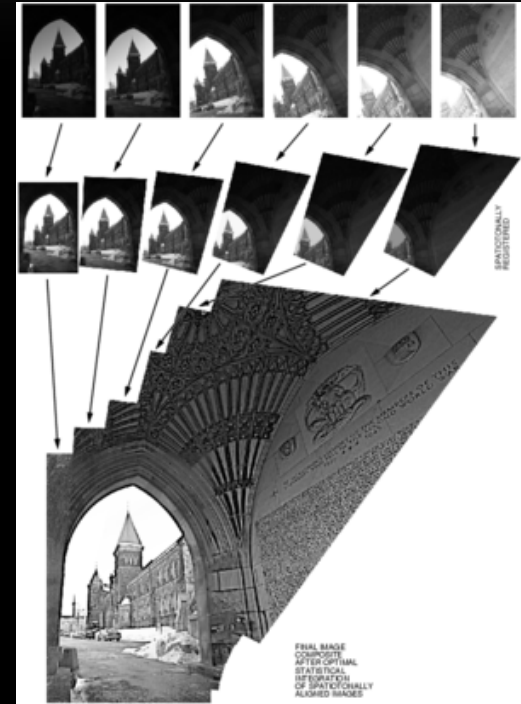
* New Method of recording Light



- Picture-making device → data-collecting device
- Pixels vs. Rays

APPLICATIONS

- High-dynamic-range (HDR) imaging
- Flash/no-flash imaging
- Coded-aperture and coded-exposure imaging
- Digital photomontage
- Multi-perspective and panoramic stitching
- All-focus imaging
- Light-field imaging
- HDR and Panoramic stitching in Iphones/Smartphones



COMMERCIAL CAMERAS

- Mark Levoy's Frankencamera prototypes: open-sourced programmable cameras (2011)
 - F2 Frankencamera
 - API program/Nokia N900
 - SynthCam app



F2 Frankencamera



Nokia N900

COMMERCIAL CAMERAS

- Lytro's Light Field Cameras
 - Recreates the light field using an array of microlenses
 - Can alter focus depth of field
 - Slide the point of view of the camera, similar to 3D imaging



PROBLEMS WITH LYTRO

- Lytro Illum: The Camera of the Future
- Expensive- \$1600
- Low resolution
- Refocusable images, only within limits



COMPUTATIONAL PHOTOGRAPHY TODAY

- Shift toward smartphones
- HDR, panoramic stitching
- Updated software, smaller lenses, two camera system, wide angle and telephoto pair
- Iphone 7's depth of field



iPhone photo #1
Harvard Square church



iPhone photo #2
Harvard Square church



TrueHDR app output
Harvard Square church

ON THE HORIZON

- New ideas for smartphone hardware
- 3D object capture, video capture
- Analysis for virtual reality and augmented reality,
- Better real-time AR interaction
- Selfies that resemble you more closely
- Lytro Immerse: Cinematic Virtual Reality



ON THE HORIZON

- Light's L16



REFERENCES

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