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Fast optimization methods for image registration in adaptive radiation therapy

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1. Constraints from physical space can be used as an optimal initial step size for optimization methods in image registration. (This thesis, Chapter 2)
2. There is a tradeoff between noisy information (random gradient) and smoothed information (averaged gradient) with respect to the convergence of higher order gradient methods. (This thesis, Chapter 3)
3. Prior knowledge can be efficiently exploited for real-time optimization of image registration. (This thesis, Chapter 4)
4. Fast image registration can facilitate real-time adaptive radiation therapy, and improve outcome while reducing side effects for cancer patients. (This thesis, Chapter 5)
5. Image registration is a basic procedure for many applications of medical image processing, and more efforts should be spent on this field.
6. Speed can relieve pain and save lives.
7. The qualities of different registration algorithms could be combined.
8. Image registration performance may be assessed directly by uncertainty measures.
9. A journey of a thousand miles begins with a single step. 千里之行始于足下。 Lao Tzu. *Tao Te Ching*, chapter 64.
10. Faster, Higher, Stronger. Pierre de Coubertin, *Olympic Motto*, 1894. *This spirit can push ourselves to move forward in our research.*
11. Everything should be made as simple as possible, but no simpler. Albert Einstein, paraphrase in *Philosophy of Science*, Vol. 1, No. 2 (April 1934), pp. 163-169., p. 165.
12. Stay hungry, stay foolish. Steve Jobs quoted the farewell message placed on the back cover of the 1971 edition of the *Whole Earth Catalog*, 2015.