

# Errata and Corrections to "Device-Free Localization via Dictionary Learning With Difference of Convex Programming"

Xiang Li, *Member, IEEE*, Shuxue Ding, *Member, IEEE*, Zhenni Li, Benying Tan

Regretfully, in the Page 5603 of [1], the equations (13), (15), (16) and (21) are incorrect due to the mistake in checking LaTeX.

The incorrect Eq.(13) is

$$\mathbf{x}^{(k+1)} = \text{Prox}_{\phi^{(k)}, \lambda}(\mathbf{x}^{(k)} - \phi^{(k)} \nabla \mathcal{L}(\mathbf{x}^{(k)}) + \mathbf{z}^{(k)})$$

The correct Eq.(13) is

$$\mathbf{x}^{(k+1)} = \text{Prox}_{\phi^{(k)}, \lambda}(\mathbf{x}^{(k)} - \frac{1}{\phi^{(k)}} \nabla \mathcal{L}(\mathbf{x}^{(k)}) + \frac{\lambda}{\phi^{(k)}} \mathbf{z}^{(k)})$$

The incorrect Eq.(15) is

$$\mathbf{u}^{(k)} = \mathbf{x}^{(k)} - \phi^{(k)} \nabla \mathcal{L}(\mathbf{x}^{(k)})$$

The correct Eq.(15) is

$$\mathbf{u}^{(k)} = \mathbf{x}^{(k)} - \frac{1}{\phi^{(k)}} \nabla \mathcal{L}(\mathbf{x}^{(k)})$$

The incorrect Eq.(16) is

$$\begin{aligned} \mathbf{x}^{(k+1)} &= \text{ST}(\mathbf{u}^{(k)} + \mathbf{z}^{(k)}, \frac{\lambda}{\phi^{(k)}}) \\ &= \text{sign}(\mathbf{u}^{(k)}) \circ \max(|\mathbf{u}^{(k)} + \mathbf{z}^{(k)}| - \frac{\lambda}{\phi^{(k)}}, 0) \end{aligned}$$

The correct Eq.(16) is

$$\begin{aligned} \mathbf{x}^{(k+1)} &= \text{ST}(\mathbf{u}^{(k)} + \frac{\lambda}{\phi^{(k)}} \mathbf{z}^{(k)}, \frac{\lambda}{\phi^{(k)}}) \\ &= \text{sign}(\mathbf{u}^{(k)}) \circ \max(|\mathbf{u}^{(k)} + \frac{\lambda}{\phi^{(k)}} \mathbf{z}^{(k)}| - \frac{\lambda}{\phi^{(k)}}, 0) \end{aligned}$$

The incorrect Eq.(21) is

$$\begin{aligned} \mathbf{D}^{(k+1)} &= \underset{\mathbf{D}}{\text{argmin}} \left\{ g(\mathbf{D}) - \text{trace}(\mathbf{Q}^{(k)T} \mathbf{D}^{(k)}) \right\} \\ \Leftrightarrow \mathbf{D}^{(k+1)} &= \underset{\mathbf{D}}{\text{argmin}} \sum_{j=1}^n \left( \frac{1}{2} \omega_j \|\mathbf{d}_j\|^2 - \langle \mathbf{q}_j^{(k)}, \mathbf{d}_j \rangle \right) \end{aligned}$$

The correct Eq.(21) is

$$\begin{aligned} \mathbf{D}^{(k+1)} &= \underset{\mathbf{D}}{\text{argmin}} \left\{ g(\mathbf{D}) - \text{trace}(\mathbf{Q}^{(k)T} \mathbf{D}^{(k)}) \right\} \\ \Leftrightarrow \mathbf{D}^{(k+1)} &= \underset{\mathbf{D}}{\text{argmin}} \sum_{j=1}^n \left( \frac{1}{2} \omega_j \|\mathbf{d}_j\|^2 - \langle \mathbf{q}_j^{(k)}, \mathbf{d}_j \rangle \right) \end{aligned}$$

In Algorithm 2, in line 6 and line 7, the corrections are

$$\mathbf{u}_j^{(k)} = \mathbf{x}_j^{(k)} - \frac{1}{\phi^{(k)}} \nabla \mathcal{L}(\mathbf{x}_j^{(k)})$$

$$\mathbf{x}_j^{(k+1)} = \text{sign}(\mathbf{u}_j^{(k)}) \circ \max(|\mathbf{u}_j^{(k)} + \frac{\lambda}{\phi^{(k)}} \mathbf{z}_j^{(k)}| - \frac{\lambda}{\phi^{(k)}}, 0)$$

And  $\gamma$  in Algorithm 2 should be a positive number and greater than 1 according to Eq.(6).

## REFERENCES

- [1] X. Li, S. Ding, Z. Li and B. Tan, "Device-Free Localization via Dictionary Learning with Difference of Convex Programming", *IEEE Sensors Journal*, vol. 17, no. 17, pp. 5599-5608, Sep. 2017.

X. Li is with the School of Computer Science and Engineering, University of Aizu, Aizu-Wakamatsu, Fukushima, Japan, e-mail: xiangli@u-aizu.ac.jp

S. Ding is with the school of Computer Science and Engineering, University of Aizu, Aizu-Wakamatsu, Fukushima, Japan, e-mail: sdng@u-aizu.ac.jp

Z. Li is with the School of Computer Science and Engineering, University of Aizu, Aizu-Wakamatsu, Fukushima, Japan, e-mail: lizhenni2012@gmail.com

B. Tan is with the School of Computer Science and Engineering, University of Aizu, Aizu-Wakamatsu, Fukushima, Japan, e-mail: m5201105@u-aizu.ac.jp