Dear Editors,

Enclosed is a manuscript entitled "*Motion-Based Challenge-Response Authentication using Depth Sensor*" written by *Jing Tian, Yu Cao, Wenyuan Xu,* and *Song Wang.* This a new paper, and we affirm that this manuscript has neither been published nor submitted to any other conferences, journals or magazines.

The manuscript has following major contributions:

1. We designed a motion-based challenge-response authentication that utilizes behavior biometrics to authenticate a user. In particular, our approach models users’ handwriting and thus is independent on what they write, e.g., English letters, math symbols, diagrams, or digits.
2. We proposed a new 3-level feature extraction method along with a co-occurrence matrix through which we can reduce the feature dimension and statistically represent writing styles.
3. We built a system that uses a hand motion sensor, a Leap Motion controller, to capture users’ writing movements in the air and performed verification using SVM. We evaluated the system on 24 subjects over 7 months, including 7 observing attackers and an emulated simple motion tracking robot arm.
4. We assume the attacker knows the response to the challenge (i.e., what they need to write), the system could achieve an equal error rate of 1.18% for random insider attacks and 2.26% for random impostors. In addition, we can reliably reject observing attackers and a simple robot arm that synthesizes writings.

We believe the manuscript be of particular interest to the readers of IEEE TDSC, because it describes an interesting topic of using 3D handwriting style for authentication.

Your consideration of helping us publish our research will be greatly appreciated.

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Sincerely yours,   
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