may rely on log-in credentials (e.g., username and password) to confirm a cardholder's identity. However, if the log-in credentials are compromised, another person could have access to the user's account.

[0006] These and other deficiencies exist. Accordingly, there is a need to provide users with an appropriate solution that overcomes these deficiencies to provide data security, authentication, and verification for contactless cards. Further, there is a need for both an improved method of activating a card and an improved authentication for account access.

SUMMARY

[0007] Aspects of the disclosed technology include systems and methods for cryptographic authentication of contactless cards. Various embodiments describe systems and methods for implementing and managing cryptographic authentication of contactless cards.

[0007a] In a first aspect, the present disclosure provides data transmission system, comprising: a receiving application comprising instructions for execution on a receiving device having a processor, a memory, a communication interface configured to create a communication field, and one or more proximity sensors for determining a distance and an orientation of a contactless card within the communication field, wherein the receiving application is configured to: receive, via the one or more proximity sensors, information corresponding to one or more types of signal strengths detected during a movement of the contactless card within the communication field of the receiving device, determine, based on one or more types of signal strength, a position of the contactless card within the communication field of the receiving device, the position of the contactless card being associated with a distance and an orientation of the contactless card with respect to a surface of the receiving device, and present one or more instructions regarding a placement of the contactless card relative to the surface of the receiving device.

[0007b] In a second aspect, the present disclosure provides a method for establishing data transmission between a contactless card and a receiving device, the method comprising: generating, by the receiving application comprising instructions for execution on a receiving device, a communication field for data communication with the contactless card; detecting, by one or more proximity sensors on the receiving device, one or more types of signal strength from the contactless card within the communication field of the receiving device; receiving, from the one or more proximity sensors, by a receiving application, information associated with the one or more types of signal strength; determining, based on information received from the one or more proximity sensors, a position of the contactless card within the communication field of the receiving device, the position of the contactless card being associated with a distance and an orientation of the contactless card with respect to a surface of the receiving device; presenting, by the receiving application, one or more guidance instructions on the receiving device regarding the position of the contactless card relative to a surface of the receiving device ; and adjusting the position of the contactless card based on the one or more instructions presented on the receiving device.

[0007c] In a third aspect, the present disclosure provides non-transitory computer accessible medium containing computer executable instructions that, when executed by a processor, perform procedures comprising: generating a communication field; utilizing one or more proximity sensors to detect one or more types of signal strength from a contactless card within the communication field; utilizing the one or more types of signal strength detected by the one or more proximity sensors to track a position of the contactless card relative to a receiving device associated with the communication field, the position of the contactless card being associated with a distance and orientation of the contactless card relative to the receiving device; and generating one or more guidance instructions regarding the position of the contactless card relative to the receiving device.

[0008] Embodiments of the present disclosure provide a data transmission system comprising: a transmitting device having a processor, a memory, and a communication interface; a receiving application comprising instructions for execution on a receiving device having a processor, a memory, a communication interface configured to create a communication field for data communication with the transmitting device, and one or more sensors; wherein, upon movement of the transmitting device, the receiving application is configured to: receive, via one or more sensors, feedback information associated with the transmitting device, display one or more instructions regarding the position of the transmitting device relative to the receiving device until the transmitting device enters the communication field; and wherein, upon entry into the communication field, the transmitting device is configured to transmit data to the receiving device.

[0009] Embodiments of the present disclosure provide method of guiding a transmitting device

CLAIMS

1. A data transmission system, comprising:

a receiving application comprising instructions for execution on a receiving device having a processor, a memory, a communication interface configured to create a communication field, and one or more proximity sensors for determining a distance and an orientation of a contactless card within the communication field,

wherein the receiving application is configured to:

receive, via the one or more proximity sensors, information corresponding to one or more types of signal strengths detected during a movement of the contactless card within the communication field of the receiving device,

determine, based on one or more types of signal strength, a position of the contactless card within the communication field of the receiving device, the position of the contactless card being associated with a distance and an orientation of the contactless card with respect to a surface of the receiving device, and

present one or more instructions regarding a placement of the contactless card relative to the surface of the receiving device.

2. The data transmission system of claim 1, wherein the receiving application is configured to present the one or more instructions until a communication with the contactless card is established.

3. The data transmission system of claim 1, wherein the receiving application is configured to continuously detect the position of the contactless card relative to the receiving device.

4. The data transmission system of claim 1, wherein the one or more instructions comprises at least one selected from the group of textual guidance, audible guidance, and haptic guidance.

5. The data transmission system of claim 1, wherein the receiving application is configured to display a targeting box for positioning of the contactless card.

6. The data transmission system of claim 5, wherein:

the receiving device includes a screen, and

the targeting box comprises a portion of a display region of the screen indicating a placement of the contactless card.

7. The data transmission system of claim 5, wherein the one or more instructions are continuously updated based on the position of the contactless card relative to the targeting box.

8. The data transmission system of claim 1, wherein:

the receiving device comprises at least one selected from the group of a smartphone, a tablet, and a wearable mobile device.

9. The data transmission system of claim 1, wherein the receiving application is configured to determine a type of the contactless card based on a configuration of one or more antennas associated with the contactless card and the one or more signal strengths detected from the one or more antennas of the contactless card.

10. The data transmission system of claim 1, wherein

the receiving device comprises a front facing camera and a rear facing camera,

the front facing camera and the rear facing camera are used to determine the orientation of the contactless card, and

the orientation comprising whether a front or a back of the contactless card is facing the receiving device and a degree of rotation associated with the contactless card.

11. A method for establishing data transmission between a contactless card and a receiving device, the method comprising:

generating, by the receiving application comprising instructions for execution on the receiving device, a communication field for data communication with the contactless card;

detecting, by one or more proximity sensors on the receiving device, one or more types of signal strength from the contactless card within the communication field of the receiving device;

receiving, from the one or more proximity sensors, by a receiving application, information associated with the one or more types of signal strength;

determining, based on information received from the one or more proximity sensors, a position of the contactless card within the communication field of the receiving device, the position of the contactless card being associated with a distance and an orientation of the contactless card with respect to a surface of the receiving device;

presenting, by the receiving application, one or more guidance instructions on the receiving device regarding the position of the contactless card relative to a surface of the receiving device; and

adjusting the position of the contactless card based on the one or more instructions presented on the receiving device.

12. The method of claim 11, wherein the receiving application generates the one or more guidance instructions until near-field communication (NFC) is established with the contactless card.

13. The method of claim 11, wherein:

the receiving application ceases presenting the one or more guidance instructions when the communication with the contactless card is established.

14. The method of claim 13, wherein the receiving application resumes presenting the one or more guidance instructions after the contactless card exits the communication field.

15. The method of claim 11, wherein presenting the one or more guidance instructions comprises the display of an animation tracking the position of the contactless card relative to the receiving device.

16. The method of claim 11, wherein the receiving application dynamically generates the one or more guidance instructions in response to the feedback information.

17. The method of claim 11, wherein:

the receiving application is configured to display one or more types of signal strength between the contactless card and the receiving device, wherein the one or more types of signal strength is associated with a position of the contactless card with respect to one or more surfaces of the receiving device, and

the one or more types of signal strength corresponds to at least one selected from the group of a no signal, a weak signal, and a strong signal.

18. The method of claim 11, further comprising:

displaying, by the receiving application, a targeting box for positioning the transmitting device,

wherein the targeting box visually indicates a boundary for placement of an edge of the contactless card relative to the surface of the receiving device.

19. The method of claim 18, wherein the boundary corresponds to a placement of two parallel edges of the contactless card relative to the surface of the receiving device.

20. A non-transitory computer accessible medium containing computer executable instructions that, when executed by a processor, perform procedures comprising:

generating a communication field;

utilizing one or more proximity sensors to detect one or more types of signal strength from a contactless card within the communication field;

utilizing the one or more types of signal strength detected by the one or more proximity sensors to track a position of the contactless card relative to a receiving device associated with the communication field, the position of the contactless card being associated with a distance and orientation of the contactless card relative to the receiving device; and

generating one or more guidance instructions regarding the position of the contactless card relative to the receiving device.