US 20240214364A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2024/0214364 A1**

Orozco Cervantes et al. (43) **Pub. Date: Jun. 27, 2024**

(54) **MULTI-FACTOR AUTHENTICATION IN VIRTUAL REALITY ENVIRONMENTS**

(71) Applicant: **International Business Machines Corporation**, Armonk, NY (US)

(72) Inventors: **Humberto Orozco Cervantes**, Tonalá (MX); **Paul Llamas Virgen**, Guadalajara (MX); **Romelia H. Flores**, Keller, TX (US)

(73) Assignee: **International Business Machines Corporation**, Armonk, NY (US)

(21) Appl. No.: **18/086,532**

(22) Filed: **Dec. 21, 2022**

Publication Classification

(51) **Int. Cl.**
H04L 9/40 (2006.01)

(52) **U.S. Cl.**
CPC ***H04L 63/08*** (2013.01); ***H04L 63/102*** (2013.01); *H04L 2463/082* (2013.01)

(57) **ABSTRACT**

A method for authenticating a user to access a resource is disclosed. In one embodiment, such a method includes determining multiple devices on which to perform a multi-factor authentication sequence. The multiple devices include at least one virtual device and at least one physical device. As part of completing the multi-factor authentication sequence, the method requires a user to perform a first authentication action on a virtual device and a second authentication action on a physical device. In certain embodiments, the first authentication action and the second authentication action must be performed in a designated order and/or with a designated timing to successfully complete the multi-factor authentication sequence. In response to the user completing the multi-factor authorization sequence on both the virtual device and the physical device, the method grants authorization to the user to access a resource. A corresponding system and computer program product are also disclosed.