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| **VR Project Design Document** | |  | | --- | | 10/04/2025  **Kevin Wu & Rida Chaarani** | |

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| **1**  **App Info** |  | |  |  | | --- | --- | | Tentative Title: | VR Exoskeleton Simulation | | |
|  | |  |  | | --- | --- | |  | Education & Training | | |  |  | | --- | --- | |  | Mental Health & Fitness | |
| |  |  | | --- | --- | |  | Travel & Discovery | | |  |  | | --- | --- | |  | Media & Entertainment | |
| |  |  | | --- | --- | |  | Productivity & Collaboration | | |  |  | | --- | --- | |  | Gaming | |
| |  |  | | --- | --- | |  | Art & Creativity | | |  |  | | --- | --- | | **✓** | Other: Data collection | |

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| **2**  **Pitch** |  | To goal is for users to [learn | experience | practice | review | design | play | other]:   |  | | --- | | have a standard testing platform to evaluate the efficacy of various exoskeleton designs for construction workers. | |
|  | This will be especially [impactful | educational | memorable | effective | fun | other] in VR b/c:   |  | | --- | | the simulation test will be consistent across different test sites, as the simulation will always be the same regardless of the real-life test location. | |
|  | At a high level, during the app, users will:   |  | | --- | | be capable of selecting different test cases, such as evaluating arm support or back support exoskeletons. Additionally, an augmented reality (AR) version of the simulation may be developed to enhance flexibility and real-world applicability. | |
|  | This experience will be targeted at devices with:   |  |  |  |  | | --- | --- | --- | --- | | 6 | degrees of freedom,  giving users control over the | movement & rotation | of their head & controllers. | |

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| **3**  **Basics** |  | The app will take place in:   |  | | --- | | A virtual construction site environment | | and the user will get around the scene with:   |  |  | | --- | --- | | continuous | movement. | |

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| **4**  **Events & Interactions** |  | There will be haptic / audio feedback when:   |  | | --- | | * A task is completed * The simulation is completed | | | There will also be 3D sound from:   |  | | --- | | * Random ambiance noise to mimic construction site (talking, birds, drills, etc.) | |
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|  | If the user is holding:   |  |  |  | | --- | --- | --- | | TBD | and presses the trigger, | TBD | | TBD | and presses the trigger, | TBD | | TBD | and presses the trigger, | TBD | | | |
|  |  | | |
|  | By default, the left hand will have a:   |  |  | | --- | --- | | Direct | interactor. | | and the right hand will have a:   |  |  | | --- | --- | | Direct | interactor. | | |
|  | And you will not be able to toggle on a Ray interactor using the thumb stick. | | |
|  |  | | |
|  | The main menu will be located:   |  | | --- | | At the start, in front of the user | | | and from the main menu, the user will be able to:   |  | | --- | | * Select a specific test | |
|  | [Optional] There will be additional UI elements for:   |  | | --- | | * TBD | | | |

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| **5**  **Optimization & Publishing** |  | To make the user experience more accessible / comfortable:   |  | | --- | | * Clear visual cues to highlight interactable objects * Intuitive controls for simple and clear interactions * Progress indicator to show task completion status | | | |
|  | Given that this app is targeting the wireless Oculus Meta Quest, target metrics are:   |  |  |  | | --- | --- | --- | | Frames per second: | >= 60 | FPS | | Milliseconds per frame: | < 16.67 | ms | | Triangles per frame: | 50k – 100k | tris | | Draw calls per frame: | 50 - 200 | batches | | | |
|  |  | Lighting strategy: | | |
|  |  | |  |  | | --- | --- | |  | All baked | | |  |  | | --- | --- | | **✓** | Mostly baked with some mixed | | |  |  | | --- | --- | |  | All real-time | |
|  |  | Light probes [will | will not] also be used for more realistic mixed lighting. | | |

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| **6**  **Other features** |  | |  | | --- | | * TBD | |

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| **7**  **Sketch** |  | To be made |