The chair write up

In order to simulate the motions of a car journey within the study a VR gaming chair called Roto VR was used (cite Roto VR), it has 360 degree rotation and an API that allowed developer access to control the chair’s movements.

The unique advantage of using the RotoVr chair instead of a high fidelity car simulator is the reduced cost and ease of use. With a simulator the participants may get distracted by additional elements such as the steering wheel and foot pedals, using the RotoVr chair means that the participant can only sit in the chair and nothing else, it focuses solely on the chair’s movements. There was no need to purchase a high fidelity car simulator since the chair fulfills all the requirements needed for running this study.

The chair’s rotations were based on a representative route through the city centre of [redacted city and streets], a route that is likely to be used with VR travel in the future. The route was programmed by sequentially going through the Google Maps directions and writing down each right or left turn, what degree of turn it is, the speed of the movement and the duration of the wait time after the turn was made. The route programming was done by eye since the exact degrees of a turn was not provided by Maps, for a standard right turn, 90 degrees was used but for a slight bend or a sharper turn, approximations had to be made.

The chair speed was set at 40 or 50, for a 90 degree turn this is the equivalent to 17 deg/s in 5 seconds and 22 deg/s in 4 seconds with an average sized adult woman. These speeds were chosen since they were the middle ground for the chair speed settings and were fast enough to induce low to moderate motion sickness.

For the study, the thresholding session uses 1min snips of the original route and the experiment session uses one full iteration of the original route and then has 5 pseudo randomised variations. The variations are based on the original route but the order of the directions is randomly rearranged, this is to prevent the participant from predicting the chair’s behaviour and building a tolerance to the route.

When using the chair, the rotations and movements do not feel the same as being in a car, the chair’s software limitations meant that the ramp/movement profile of the turn was not adjustable (see MovementProfile in benchmarking excel for the standardRoute). Even though the chair does not move like a car, the type of motion sickness that it induces is the same as what someone would experience in a car and serves the purpose for this study.

Figure 1 -

Graph:



