

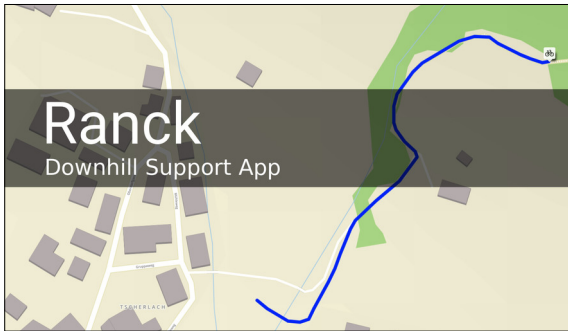


Samuel Kurath

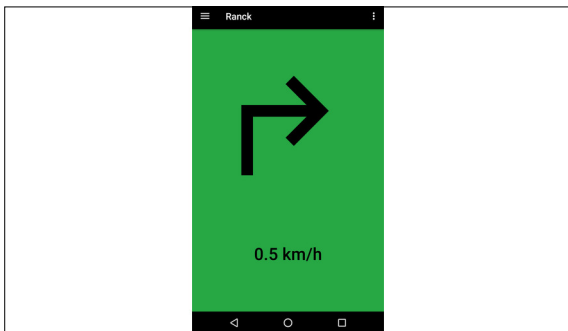
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Ranck

Downhill Support App



Title



Android App

Problemstellung: Sport without technical support is unthinkable anymore. The current unbelievable achievements of athletes are often related to improved analysis, measurement methods and the usage of technical gadgets. All top athletes use devices to track their training and performances. Even the amateur athletes wear multiple devices like a sports watch or smartphone during their sportive activities. For example, ski jumping professionals use a differential global positioning system (DGPS) to get highly accurate measurements of their trajectories and the amateur sportsman uses the bikecomputer to monitor his pedalling rate and average speed over the past five kilometers.

Ziel der Arbeit: The Ranck application aims to use a smartphone to help downhill bikers avoid crashes, by providing them information about the track, their current speed and a computed maximum speed for the next curve. This goal should be reached through the use of the built-in sensors in the smartphone and tracks previously stored on the device. If external sensors are needed, the barrier to use the application rises. Only when the results of the built-in sensors aren't accurate enough, will the external sensors be considered.

Fazit: The project Ranck aims to support downhill bikers during their risky rides along trails. For this purpose, the cyclist needs to be informed if he is too fast for the next curve or his speed is appropriate. Hence Ranck tries to realize this goal with the help of an application for smartphones and their built-in sensors. If the built-in sensors aren't accurate enough external ones would be considered. As a first approach, the GPS sensor and the accelerometer were fused with a Kalman filter. Unfortunately, this didn't lead to accurate enough measuring data, since the application didn't recognize speed changes within a reasonable time. To counteract this problem an external bike speed sensor from Garmin was considered and tested. The external sensor improved the measurement and provided the ability to detect fast speed changes. However, the determination of the exact position on the track is still missing. Consequently, an application that is able to handle the requirements of a downhill biker was not achieved.