

Transportation and Personal Mobility

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Purpose Many elderly people have problems with their walking. Falls are one of the most significant physical risk factors causing people ages 65 years of age or older to require long term care. Gait patterning can detect and illustrate leg and foot abnormalities that are directly related to fall and tripping risk. Foot plantar pressure measurement is sensitive to individual differences, based on high-resolution time and pressure information. The cost of the system is relatively low compared to other medical measurement systems. The F-scan system from Tekscan Inc. (South Boston, MA, USA) costs around 7,000 USD². Although the system measures and plays back plantar pressure using a 2D graph and animations, understanding individual differences is not easy. Additionally, transition patterning of plantar pressure during the gait cycle is more crucial than the patterning at each moment. **Methods** In this study, we developed visualization methods to detect abnormalities in foot pressure pattern transition. Pressure pattern frame (now,0) is set as Green. PPF(previous,-1) is Red. PPF(next,+1) is Blue. No transition of pressure is indicated by a White color where each of PPF(-1), PPF(0) and PPF(+1) have the same value of pressure. Red pixels show a reduction in pressure. Blue pixels illustrate an increase in pressure. Plantar pressures of both feet of 8 students were measured. Sampling rate was 100 sample/sec. **Results & Discussion** In *Figure 1*, each column shows each subject's right foot plantar pressure during the foot-flat phase (right leg is 90 degrees to the ground). Three rows correspond to 3 trials. The left-most subjects have the fastest transitions of pressure displayed by the red to blue figures. The fifth and sixth subject (from the left) have a large white part. These subjects have slower transition. The difference of pressure transition speed reflects ankle flexibility. Thus, we expect this color scheme presentation will help estimate tripping risk.

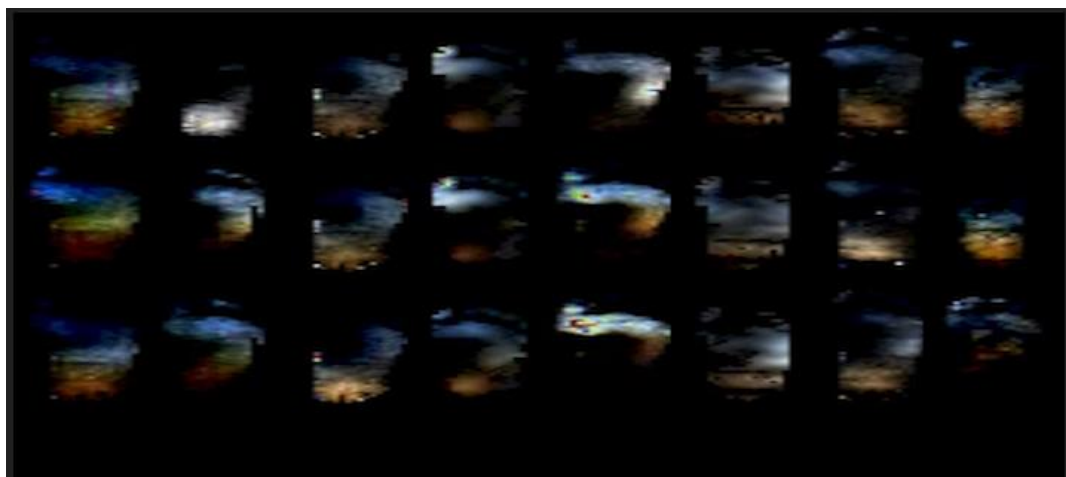


Figure 1. Pseudo color mapping of foot plantar pressure transitions (right foot). Column corresponds to subject. Row corresponds to trial

References

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