Prof. Dr.-Ing. A. Zoubir | FG Signalverarbeitung | Merckstr. 25 | 64283 Darmstadt

TECHNISCHE UNIVERSITÄT DARMSTADT

Experiment „Radar for Gait Analysis"
Information sheet and declaration on data protection

Institut für Nachrichtentechnik
Fachgebiet Signalverarbeitung

SIGNAL PROCESSING GROUP

Prof. Dr.-Ing. Abdelhak Zoubir

Merckstr. 25
64283 Darmstadt

Tel.: +49 6151 16-21340
Fax.: +49 6151 16-21342
zoubir@spg.tu-darmstadt.de

Datum
30. Oktober 2018

Sekretariat
Tel.: +49 6151 16-21341
Fax.: +49 6151 16-21342
koschella@spg.tu-darmstadt.de

Information sheet

The guidelines of the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) require that participants in empirical studies explicitly and comprehensibly agree to participate in our research on a voluntary basis. For this reason, we would like to ask you to read the following information on the content of the study and to sign the declaration of consent below if you agree.

Objective of the study

In this study, the human gait is to be recorded by radar as well as by the so-called motion capture (mocap) method. The recorded data will then be analysed with respect to various gait parameters, such as the duration of the swing phase of the legs. The aim is to be able to detect gait abnormalities using the radar signals. The mocap data are used to verify the data measured by the radar.

Procedure of the study

First, the objectives of our project will be explained to you and any open questions you may have will be answered. You will then be familiarized with the experimental setup and the measurement technology used. After the test protocol has been introduced to you, you will be asked to wear a knee orthosis on both legs. Finally, the markers necessary for the mocap measurement are glued to your skin and/or your tight-fitting clothing. The sticky surface of the marker dots is about 2 cm^2 and the markers can be removed without leaving any traces after the experiments.

After a short walk on the treadmill, two experiments follow, in which the position of the radar device is changed between the experiments. Five measurements are taken per experiment, with one measurement comprising two different speeds of the treadmill. This will require slow walking and fast walking (no running). Each measurement can take up to 5 minutes. The following measurements will be conducted per experiment:

- Measurement 1: no restriction of the knee angle
- Measurement 2: maximal knee angle of 45 °
- Measurement 3: maximal knee angle of 30 °
- Measurement 4: maximal knee angle of 20 °
- Measurement 5: maximal knee angle of 10 °

If necessary, you will be given time to regenerate between measurements, whereby a 2-minute pause for storing the data will automatically occur.

Duration and compensation

Participation in the experiment is expected to take about 2 hours. About 30 minutes are planned for preparations and introduction to the experiments and 90 minutes for carrying out the two experiments, including the breaks. The participants will not receive an compensation.

Possible use of the experiment

Many neuronal diseases and disorders of the musculoskeletal system can first be diagnosed by observing a change in gait. The earlier a change in gait is detected, the earlier diagnoses can be made and appropriate therapy methods initiated. The experiment therefore examines normal walking and a pathological gait, which is simulated here with the help of a knee orthosis.

Radar devices should be used as (additional) sensors for gait analysis. They can unobtrusively observe the gait over a longer period of time (at home, if necessary), while preserving the privacy of the observed person. In addition, the radar sensors used are small and inexpensive, which makes it possible to equip entire rooms (e.g. in nursing homes) with the technology to make the examination as convenient as possible for the patient. The radar devices have the advantage of being able to measure from a distance, i.e. the person to be observed does not have to wear any sensors on his body, which is particularly advantageous for use in nursing care for the elderly. Wearable sensors are often forgotten to put on and wearing them can potentially influence walking to an extent that no natural or everyday gait can be observed.

Experience/risks associated with participation

Participants in this study are not exposed to any risk beyond the risks of everyday life. Since you are moving on a treadmill, there is a risk of injury from falling or tripping. For this reason, the test person is secured with a belt system. If necessary, the treadmill can be switched off by the experimenter as well as by the test person via an emergency stop button.

TECHNISCHE UNIVERSITÄT DARMSTADT

Declaration on data protection

The data processing of this study is carried out in accordance with the Datenschutzgrundverordnung (DSGVO) and the Hessischen Datenschutz- und Informationsfreiheitsgesetzes (HDSIG). The data will be used exclusively for the purposes described in the information sheet.

The following data will be collected within the context of this study:

- by radar: speed of individual parts of the body (mainly the lower limb) while walking on the treadmill
- by means of force plates in the treadmill: forces acting on the treadmill while walking through the feet
- using the Mocap system: position of individual body parts in space to which markers were previously attached

Personal data is collected:

- gender
- height
- length of the lower limb
- weight
- age

Privacy

All data collected within the course of this study are of course confidential and will only be used anonymously. Demographic data such as age or gender do not allow a clear conclusion to be drawn about your person. We will never ask you to give your name or any other unambiguous information at any time during the respective study.

Storage of data

The data collected with this study are stored at the Signal Processign Group, Technische Universität Darmstadt, and deleted after 10 years. The data is stored in a form that does not allow any inference about your person, i.e., the data is anonymised or pseudonymised (e.g. the first two letters of the first names of both parents and your own month of birth in numbers: HeGe08). This declaration of consent will be kept separate from the other experimental data and documents and will be destroyed after this period.

Voluntariness and rights of trial subjects

Your participation in this study is voluntary. You are free to cancel your participation at any time in this study and thus withdraw your consent (revocation), without resulting in any disadvantages for you. If you cancel your participation, no data from you will be stored and all existing personal data will be destroyed. You have the right to obtain information about the personal data concerning you and, if necessary, to demand its correction or deletion. In the event of a dispute, you have the right to complain to the Hessian data protection officer (see address below).

TECHNISCHE UNIVERSITÄT DARMSTADT

Consent

I have read the explanations to the experiment ”Radar for gait analysis” and agree to participate in the experiment mentioned.

I agree that the data collected during the experiment may be evaluated for scientific purposes and stored in a pseudonymised form. I am aware that my participation is voluntary and that I can revoke the declaration of readiness at any time and without giving reasons. I can also arrange for my data to be deleted at any time.

Date	Name (in block letters)	Signature

If you have any **questions**, **suggestions** or **complaints**, please do not hesitate to contact:

Prof. Dr.-Ing. Abdelhak M. Zoubir
Fachgebiet Signalverarbeitung
Tel.: 06151-16 21341
E-Mail: zoubir@spg.tu-darmstadt.de

Person responsible for the data processing of this study:

Ann-Kathrin Seifert
Fachgebiet Signalverarbeitung
Tel.: 06151-16 21354
E-Mail: aseifert@spg.tu-darmstadt.de

If you have any questions regarding data protection, please contact the data protection officer of the TU Darmstadt:

Gerhard Schmitt
E-Mail: datenschutz@tu-darmstadt.de

Contact address of the Hessian data protection officer:

E-Mail: poststelle@datenschutz.hessen.de