



INVESTICE  
DO ROZVOJE  
VZDĚLÁVÁNÍ

## English for Biomedical Technicians

2013

TENTO PROJEKT JE SPOLUFINANCOVÁN EVROPSKÝM SOCIÁLNÍM FONDEM  
A STÁTNÍM ROZPOČTEM ČESKÉ REPUBLIKY.

The publication was released as part of the grant project CZ.1.07/2.2.00/15.0112 "Increasing the competitiveness of graduates in the fields of Biomedical Engineering at the Technical University of Ostrava."

### **Thanks:**

The team of authors would like to thank all my colleagues, students and PhD students, who participated in the preparation-Leli text. Many thanks also go to all domestic and foreign companies which are willing to provide information, documents and pictures to your products.

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## TEXT 1: Personalized Ambient Monitoring: Accelerometry for Activity Level Classification

### Vocabulary

aim	cíl
backbone	páteř, opora
Bipolar disorder (BD)	bipolární maniodepresivní psychóza
circadian rhythm	denní rytmus
diminished	snížený
disruptive	ničivý
distinct	odlišný
distinguish	rozeznat
draw conclusions	vyvodit závěry
intersperse	proložit, zpestřit
last	trvat
mounted	upevněný, uchycený
needs	potřeby
obtain	získat
participants	účastníci
prophylactic	profylaktický, preventivní
recurrent	opakující se
salient	nejdůležitější
subsequent	následný, další
treatment	léčba
undertake	vykonat, provést (činnost)

## Exercises

### 1. Read the definitions and write the correct word. The first letter is given for you to help. n – noun, adj – adjective, v – verb

- a) happening many times, or happening again: r..... (adj)
- b) to continue to exist: l..... (v)
- c) happening after something else: s..... (adj)
- d) to do or begin to do something, especially
- e) something that will take a long time or be difficult: u..... (v)
- f) to fix something on a wall, in a frame, etc.,
- g) so that it can be looked at or used: m..... (v)
- h) to be reduced in size or importance: d..... (adj)

### 2. Match the expressions on the left with the words on the right and make up semantic pairs. Use each word only once:

- |                 |             |
|-----------------|-------------|
| 1. patient's    | a) sufferer |
| 2. solid        | b) study    |
| 3. BD           | c) backbone |
| 4. bipolar      | d) episodes |
| 5. circadian    | e) mounted  |
| 6. wrist        | f) disorder |
| 7. recurrent    | g) needs    |
| 8. experimental | h) rhythm   |

### 3. Complete the sentences using the correct form of the words in brackets.

- a) Bipolar disorder is a mental disorder ..... (characterize) by recurrent episodes of mania and depression.
- b) A number of participants ..... (ask) to complete some basic activities whilst wearing the accelerometer.
- c) Manic episodes are typified by ..... (increase) energy and activity.
- d) ..... (depression) episodes often present with diminished activity.
- e) ..... (classify) of "Music" as "DVD" is understandable.
- f) The results obtained in the ..... (experiment) study are very encouraging.
- g) The classification accuracy is ..... (sufficient) high.

## Questions

**Answer the following questions. All answers can be found in the text:**

1. Could you characterize what bipolar disorder is?
2. How are manic/depressive episodes typified?
3. What kind of tool measures different activities and activity levels?
4. What is the aim of the PAM project?

## Additional questions

1. Why is the misclassification of 'Music' and 'DVD' understandable?
2. Why is the misclassification of 'Walk Slow' and 'Typing' harder to explain?

## TEXT 2: How can the rate-adaptive atrioventricular delay be programmed in atrioventricular block pacing?

### Vocabulary

apex	špička
atrioventricular (delay)	síňokomorový (atrioventrikulární zpoždění, zpoždění mezi síněmi a komorami)
atrium	srdeční síň
(be) aware (of sth.)	být si něčeho vědom
carry out	provést, uskutečnit
chronotropic incompetence	porucha chronotropní funkce srdce
cohort	skupina
consequence	následek
deflection	odchylka
disclose	odhalit
disorder	porucha (nemoc)
exclusion	vyloučení
failure	selhání
haemodynamics	hemodynamika, dynamika krevního oběhu
heart rate	tepová frekvence
inclusion	začlenění, zařazení
insufficient	nedostačující
interatrial (conduction time)	čas mezisíňového převodu
latency (left ventricular)	zde: zpoždění (levé komory)
left-atrial oesophageal electrogram	jícnový elektrogram levé srdeční síně
left ventricular ejection fraction	ejekční frakce levé srdeční komory
malfunction	porucha, závada
mean	průměrný
oesophagus	jícen
pacemaker	kardiostimulátor
rate-adaptive	zde: přizpůsobivý vlastní srdeční činnosti pacienta
slope	sklon
superimpose	přenést na
supine	v poloze na zádech
transmitral flow	průtok přes mitrální chlopeň
truncated	zkrácený
ventricle	srdeční komora



## Exercises

### 1. Read the text and match the definitions with the correct word/words from the box.

atrium	failure	heart rate	pacemaker	supine	ventricle
--------	---------	------------	-----------	--------	-----------

- a) a chamber of the heart that receives blood from the upper chamber and pumps it to the arteries .....
- b) loss of ability to function normally .....
- c) a measure of cardiac activity usually expressed as number of beats per minute .....
- d) an artificial device for stimulating the heart muscle and regulating its contractions .....
- e) one of the two upper chambers of the heart .....
- f) lying on the back or having the face upward .....

### 2. Complete the sentences using the correct form of the words in brackets.

- a) Several techniques enable ..... (determine) of the individual optimal AV delay under resting conditions in DDD pacemaker patients.
- b) Most current pacemaker models offer the ..... (possible) of programming a rate-adaptive AV delay.
- c) According to one non-invasive study, there was evidence that ..... (nature) AV delay decreases with increasing heart rate.
- d) The aim of our study was to record ..... (separate) the components of the optimal AV delay during rate-increasing exercise.
- e) Patients were ..... (include) if they were able to perform exercise with at least a 20bpm rate increase.
- f) Patients were excluded with any type of disorder of the oesophagus, because in such cases an oesophageal electrode could be .....(harm) to the patient.

### 3. Fill in the gaps with the correct expression from the brackets.

- a) Various authors have failed to ..... (prove / proof / proved) an effect of AV delay programming in overall haemodynamics.
- b) Various studies for DDD pacemaker patients with a third degree AVB have demonstrated that rate-adaptive AV delay can .....(cause / lead / result) to an improvement in haemodynamics.
- c) Daubert et al., confirmed a shortening of AV delay under psychological conditions in an ..... (non-invasive / invasive / optimal) study on healthy subjects.
- d) The cause for the change in optimal AV delay under exercise conditions could be linked to ..... (other / another / the other) components of the AV delay.
- e) This approach required the (place / placed / placement) of a bipolar oesophageal electrode to provide a filtered left-atrial electrogram.

### Questions

**Answer the following questions. All answers can be found in the text:**

1. What is the difference between fixed and rate-adaptive AV delay, according to various studies?
2. Could you name at least four exclusion criteria?

### Additional questions

1. Why wasn't the study carried out under maximal exercise conditions?
2. What could be said about the findings of the study?

## TEXT 3: Accelerometers in Rehabilitation Medicine for Older Adults

### Vocabulary

ascending and descending stairs	jít po schodech nahoru/dolů
assess	měřit
be suspended	být zavěšen
bulky	rozměrný, objemný
carer	pečovatel
cautious	opatrný
comprehensive	komplexní
congestive heart failure	městnavé srdeční selhání
consequence	následek
deficiency	nedostatek
deflection	výchylka
dependence	závislost
device	zařízení
gait	chůze
high-volume	ve velkém
hospital admission	hospitalizace
impairment	porucha, vada
loss	ztráta
portable	přenosný
recurrence	recidiva, opakování
requirement	požadavek, podmínka
restricting	omezení
spring	pružina
stride	kráčet, krok
stringent	přísný
subject to	podléhat
subtle	nepatrný
trunk	trup

## Exercises

### 1. Read the definitions and write the correct word. The first letter is given for you to help. n – noun, adj - adjective

- a) the main part of a person's body, not including the head, legs, or arms: (n) t.....
- b) a piece of curved or bent metal that can be pressed into a smaller space but then returns to its usual shape: (n) s.....
- c) a particular way of walking: (n) g.....
- d) too big and taking up too much space: (adj) b.....
- e) having a very severe effect, or being extremely limiting: (adj) s.....
- f) a change of direction: (n) d.....
- g) physical/mental defect: (n) i.....
- h) happening many times or happening again: (n) r.....

### 2. Complete the sentences using the words in the box.

<b>balance</b>	<b>validated</b>	<b>distinguished</b>	<b>device</b>	<b>stride</b>	<b>gait</b>
<b>pattern</b>					

- a) It was found that older subjects exhibit a more conservative ..... when compared with younger subjects, which was most noticeable when walking on an irregular surface.
- b) A single ..... on the trunk comprising an accelerometer and a gyroscope is capable of accurately detecting posture change and walking in older adults.
- c) This monitor has been .....on normal subjects, amputees, failed back surgery patients, etc.
- d) Falls have been .....from activities of daily living with 100% accuracy using a single tri-axial accelerometer device on the trunk.
- e) Accelerometers are now available as miniature, inexpensive, low-power devices providing the capability for quantitative, portable measurement of ..... and gait changes in the elderly.
- f) In normal older subjects walking speed was slower compared with younger subjects, with a decrease in ..... length and a resultant reduction in trunk movement.

### 3. Match the halves of the sentences:

1. The cause of falling is multifactorial, ...
  2. Accelerometers are an ideal choice for evaluating variability of movement and balance...
  3. This would indicate a more cautious gait ...
  4. These ambulatory measures have many potential uses...
- 
- a) ...including objective assessment of mobility in a clinical or home-environment over a prolonged period.
  - b) ...providing a non-invasive, portable method of measurement.
  - c) ...however, impairments in gait and balance are often fundamental.
  - d) ...which may be an adaptation to reduce the risk of falling.

### Questions:

Answer the following questions. All answers can be found in the text:

1. When was the idea of using accelerometers first proposed?
2. Why were these devices unsuitable?
3. Which industry improved accelerometers?
4. What do accelerometers measure?
5. How do they work?
6. Can you explain what a tri-axial accelerometer is?
7. What are some current applications of accelerometers?
8. How would you characterize the gait of elderly people walking on an irregular surface?

### Additional questions:

1. What advantages do accelerometers have when compared with other quantitative methods?
2. What is the physical illness of elderly people associated with?
3. How many accelerometers are sufficient to distinguish between sitting, standing, lying and movement? Where are they placed?
4. How many accelerometers are used to distinguish up to 20 everyday postures?
5. Can you describe the fall-detection system? What does this system use and who does it inform about a patient current condition?

## TEXT 4: Analysis of Acoustic Noise in MRI

### Vocabulary

amenable	přístupný
apparent	zřejmý, jasný
asset	přínos, klad, výhoda
bone	kost
coil	cívka
computation	výpočet
conjunction	souvislost, spojení
cortex	mozková kůra
current	elektrický proud
disturbing	rušivý
ear plug	ušní ucpávka
endeavor	snaha, úsilí
equal (to)	stejný, rovný
devise	vynalézt, navrhnout
gradient	stoupavý / klesavý
noise	hluk, šum, rušení
obstacle	překážka
oxygenation	okysličení
rectangular	pravoúhlý, obdélníkový
retain	zapamatovat si, uchovat
skull	lebka
source	zdroj
subtle	nepatrný
suppress	potlačit, zadržet
tackle	pustit se do něčeho, dát se do něčeho
(pain) threshold	práh (bolesti)
vicinity	blízkost, okolí

## Exercises

**1. Read the definitions and write the correct word (a – e: a noun, f, g: a verb). The first letter is given to help you.**

- a) loud, confusing, and usually inharmonious sound: n.....
- b) a useful or valuable quality, advantage: a.....
- c) something that makes progress difficult and must be removed: o.....
- d) the case of bone that encloses the brain and supports the jaws of vertebrates: s.....
- e) a structure consisting of something wound in a continuous series of loops (usually a wire): c.....
- f) to form in the mind by new combinations or applications of ideas or principles: d.....
- g) to deal with something, to start doing something: t.....

**2. Decide whether the following statements are true (T) or false (F).**

- a) A number of ideas have been suggested about the possible elimination or reduction of sound noise.
- b) Acoustic noise due to gradient pulsing has been the only problem in MRI.
- c) Acoustic noise is produced by the basic gradient pulsing in conjunction with the magnetic field.
- d) The use of ear plugs protects only against sound or acoustic transmission to the brain either directly or indirectly through the body structures.
- e) High-frequency sound noise within the audible frequency band can be suppressed by ear plugs.

**3. Replace the word written *in italics* with a synonym. The first letter is given for you.**

- a) The progress in reduction of sound noise has been slow due to the *fundamental* role of gradient pulsing in MRI.  
b.....
- b) A systematic study of sound noise behaviour will provide important information for future *efforts* in this area of research.  
e.....
- c) We report on some *characteristic* behaviour of sound noise observed from MRI scanners.  
t.....
- d) Sound noise has been one of the most *disruptive* obstacles for MRI patient scanning. d.....
- e) It has become *obvious* that sound noise is one of the serious noise sources. a.....

## Questions

**Answer the following questions. All answers can be found in the text:**

1. Why is sound noise such a big problem in MRI?
2. What did P. C. Lauterbur do?
3. What do you know about the existing attempts to reduce sound noise? How successful were/are they?

## Additional questions

1. What are the acoustic noise profiles and their frequency distributions dependent on?
2. Could you explain the key solution to developing a "Silent MRI"?



## TEXT 5: Brain-computer interfaces for communication and control

### Vocabulary

achieve	dosáhnout, docílit
array	soubor, sada
assumption	předpoklad, domněnka
augment	rozšířit, zvýšit
brain	mozek
cerebral palsy	mozková obrna
confine (to sth.)	omezit (na něco)
confluence	souhra, souběh
convey	sdělit, přepravit
cortical surface	povrch mozkové kůry
cranial	lebeční
deteriorate	zhoršit se
disabled	handicapovaný, postižený
disease	onemocnění, choroba
disorder	porucha, potíže
endeavor	snaha, úsilí
essential	základní, nezbytný
fatigue	únava, vyčerpání
impair	poškodit, narušit
impetus	impuls, podnět
intent	úmysl, záměr
intricate	složitý
limb	končetina
locomotion	schopnost pohybu
purpose	účel
salient	hlavní, nejvýznamnější
scalp	pokožka na temeni hlavy
spinal cord	mícha
stroke	mozková mrtvice
surge	nárůst
surgery	operace
sustained	trvalý, nepřetržitý
tissue	tkáň
turn out (to be)...	ukázat se (být nějaký)
voluntary	volní

## Exercises

### 1. Match the expressions on the left with the words on the right and make up semantic pairs. Use each word only once:

- |               |             |
|---------------|-------------|
| 1. electrical | a) surface  |
| 2. cortical   | b) palsy    |
| 3. motor      | c) signals  |
| 4. brain      | d) cord     |
| 5. cerebral   | e) research |
| 6. sustained  | f) disorder |
| 7. spinal     | g) tissue   |

### 2. Complete the sentences using the words in the box.

<b>confluence</b>	<b>brain</b>	<b>surge</b>	<b>technology</b>	<b>research</b>
<b>bodies</b>	<b>nerves</b>			

- Electrical signals produced by..... activity were first recorded in 1875.
- Normal communication and control necessarily depend on peripheral..... and muscles.
- A recognizable field of BCI..... has developed only in the past ten years.
- The recent interest and activity reflect the..... of four factors.
- Modern life-support .....enables the most severely disabled people to survive for many years.
- Even people who may be totally “locked-in” to their..... can lead productive lives.
- One of the factors responsible for the recent..... in BCI research is new recognition of the remarkable adaptive capacities of the CNS.

### 3. Match the halves of the sentences.

- In the 75 years since Berger’s first report, EEG activity has been...
- Brain signals such as the EEG ...
- The availability of powerful low-cost computer hardware ...
- Much of the online signal processing used in present-day BCIs ...

5. The recognition of the remarkable adaptive capacities of the CNS has generated great interest in the possibility of engaging these capacities to...
- a) ...allows complex realtime analyses of brain activity.
  - b) ...establish new interactions between brain tissue and computer-based devices.
  - c) ...impossible or prohibitively expensive until recently.
  - d) ...used mainly for clinical diagnosis and for exploring brain function.
  - e) ...suggested the possibility of non-muscular communication and control.

## Questions

**Answer the following questions. All answers can be found in the text:**

1. What has EEG activity been used for in the 75 years since 1929?
2. What do normal communication and control necessarily depend on?
3. Can you name the four factors that have influenced the development of BCI research in the past ten years?

## Additional questions

1. How would you characterize a BCI?
2. What is the fundamental principle of BCI operation?
3. Would you be able to name a few disciplines involved in BCI research and development?

## TEXT 6: Real-Time Pervasive Monitoring for Postoperative Care

### Vocabulary

accelerometer	měřič zrychlení, akcelerometr
adverse event	nepříznivá událost
bandwidth	šířka (vlnového) pásma, vlnový rozsah
Bayesian classifier	Bayesovský klasifikátor, třídící stroj
capture a snapshot	zachytit zběžný přehled
cholecystectomy	cholecystektomie, operativní odnětí žlučníku
to be discharged	být propuštěn
to be embedded	být vložený
hysterectomy	hysterektomie, operativní odnětí dělohy
to infer	vyvodit
inference	vyvozování, dedukce
incision	incize, řez
multivariate Gaussian model	multivariační Gaussův model
non-intrusive	neobtěžující, nerušivý
post-surgical care	postoperační péče
ureterovaginal fistula	fistula, píštěl na močovodu a pochvě
transient	přechodný
wireless sensors	bezdrátové senzory

### Exercises

#### 1. Decide whether the following sentences are true (T) or false (F).

- a) With the introduction of minimally invasive surgery (MIS), the recovery time of patients has been lengthened significantly.
- b) MIS procedures are conducted through small body incisions with laparoscopic instruments.
- c) The high power demand makes the miniaturisation of the sensors easy.
- d) Compared to other pervasive health monitoring devices, such as the ring sensor and the EKG shirt, the e-AR sensor can capture a range of activities in addition to physiological indices.

**2. Replace the word *in italics* with a synonym. The first letter is given to help you.**

- a) The care of the patients is mainly relied on regular visits by home-care nurses. r.....
- b) The precision of the technique is demonstrated with lab experiments. a.....
- c) The disadvantage of this approach is that it is difficult to accurately quantify the recovery process. d.....
- d) By positioning the sensor on the ear, the motion artefacts of the SpO2 sensor can be decreased. r.....
- e) This study will concentrate on the use of motion information to deduce the recovery progress of the patients. f..... i.....

**3. Read the definitions and write the correct word. The first letter is given to help you.**

- a) An instrument which reacts to certain physical condition: s.....
- b) To improve quality or value of something: to e.....
- c) To check the development or progress of something regularly: to m.....
- d) To be officially allowed leaving hospital: to be d.....
- e) An adjective used to describe the situation that lasts only a short time or is constantly changing: t.....

## Questions

**Answer the following questions. All answers can be found in the text.**

1. What does this paper examine?
2. How would you explain what postoperative care is?
3. What is a crucial element of the postoperative care?
4. What is an e-AR sensor? What is it used for?
5. What does the abbreviation BSNs stand for?

## TEXT 7: Biomedical and Health Informatics in Translational Medicine

### Vocabulary

align	seřadit, srovnat
arise	vynořit se, vyvstat
assumption	předpoklad, domněnka
bidirectionally	dvojsměrně, obousměrně
burgeoning	rozvíjející se, vzkvétající
breach	porušení
diverge	lišit se
elevate	povýšit
encompass	zahrnovat, obsahovat
epistemology	teorie poznání
to the fore	do popředí (zájmu)
jeopardize	riskovat, dávat něco v sázku
magnify	zvětšit
mesh with	zapadat do sebe, jít dohromady
multifarious	rozmanitý
outcome	výsledek
proliferation	šíření, rozrůstání
provider	poskytovatel
reasoning	uvažování, dedukce
scaling	sestavování stupnic, škál
startling	1. udivující, 2. alarmující, znepokojivý
thereby	tím, důsledkem čehož
thorny	ožehavý, palčivý, zapeklitý
inwiieldy	1. nepraktický, 2. těžkopádný
violation	porušení, překročení (zákona, pravidel, apod.)

### Exercises

1. Read the definitions and write the correct word. The first letter is given to help you.

- A range of particular type of thing: s.....
- A small difference in sound, appearance, feeling or meaning: n.....
- Information and understanding about a subject which a person has, or which all people have: k.....
- Device which is more advanced or complex than others: s.....
- To form an opinion about something or someone after you have examined the evidence or thought carefully about them. to j.....

2. Replace the word *in italics* with a synonym. The first letter is given to help you.

- a) This research requires a *professional* in the field. e.....
- b) The data must be *assessed*. e.....
- c) New informatics approaches must be developed to *get* explicit and precise computational modeling of multifarious systems y.....
- d) Experimental protocols designed by doctors versus scientists *vary* in choices for an individual person. d.....
- e) Diverse groups *include* vast expertise and resources to attack the broad spectrum of work necessary in biology and its allied basic sciences. e.....

3. Write opposites to the following words. The first letter is given to help you.

- a) reliable u .....
- b) relevant l .....
- c) increasing d .....
- d) available u .....
- e) direct l .....

## Questions

Answer the following questions. All answers can be found in the text.

1. What are the main objectives of the text?
2. What will bioinformatics optimally translate? What problem will this process face?
3. Why must new informatics approaches be developed?
4. What is *translational medicine*?

## TEXT 8: Continuous Functional Activity Monitoring Based on Wearable Tri-axial Accelerometer and Gyroscope

### Vocabulary

accelerometer	akcelerometr, měřič zrychlení
accuracy	přesnost
aging	stárnutí
angle	úhel
angular rate	úhlová rychlost
axial	osový, axiální
deviation	deviace, odchylka
drift	drift, vychýlení
duration	délka trvání
elderly	starší lidé, v letech
episode	příhoda
gait	tempo, chůze
gyroscopes	gyroskop
impact	dopad, účinek, vliv
inertial	setrvačný
intrinsic	vnitřní
limitation	omezení
limited mobility	omezená hybnost
locomotion	schopnost pohybu, pohyb
mean angle	průměrný, střední úhel
on-going	probíhající
optical motion capture	proces nahrávání pohybu skutečného objektu, převedení na digitální model
peak	vrchol, maximum, nejvyšší bod
pervasive	všudypřítomný, vše prostupující
post hoc	následný
posture	póza, držení těla, postoj
prevalence	převaha, běžný výskyt
quantification	vyčíslení, stanovení množství
questionnaire	dotazník
real-time feedback	skutečná zpětná vazba
responsiveness	schopnost reagovat, citlivost
sliding	posuvné, zasunovací
step/stride frequency	kroková frekvence
stroke	mozková mrtvice
tilting angle	úhel náklonu
to boost	oživit, zesílit, podpořit
transition	přechod
threshold	hranice
wavelet transforms	transformace zvlňení
wearable	nositelný
wireless	bezdrátový



## Exercises

### 1. Read the definitions and write the correct word. The first letter is given for you to help.

- a) Being past middle age and approaching old age: e.....
- b) Poor movement of individuals from place to place: l..... m.....
- c) A list of questions, usually printed, submitted for replies that can be analyzed for usable information: q.....
- d) The length of time that something lasts or continues: d.....
- e) The condition or quality of being true, correct, or exact; precision; exactness: a.....

### 2. Decide whether the following sentences are true (T) or false (F).

- a) A slower gait, a reduction of daily walking distance and a decrease in the number of walking episodes are indicators of disease progression. ....
- b) Devices using accelerometers alone to measure angles are very accurate in all situations. ....
- c) The standard deviation (SD) of the three angles in the FAM system is calculated in every three second. ....
- d) They are implementing the mentioned algorithms on the smartphone for real-time online monitoring. ....
- e) The aging of the population and the increase of chronic diseases and Parkinson's disease have a significant impact on most western health care systems. ....

### 3. Write opposites to the following words. The first letter is given for you.

- a) healthy u.....
- b) accurate i.....
- c) ability d.....
- d) identified u.....
- e) detected u.....

## Questions

**Answer the following questions. All answers can be found in the text.**

1. What is the main objective of the researchers in question?
2. What parts does their device consist of?
3. What is the purpose of smartphone here?
4. What body parts will the three FAM sensors be attached to?

## TEXT 9: iGAIT: An interactive accelerometer based gait analysis system

### Vocabulary

acceleration	zrychlení
accelerometer	akcelerometr, měřič zrychlení
annual fee	roční poplatek
assessment	vyhodnocení, posudek
asymptomatic	asymptomatický, bez příznaků
cadence	kadence, tempo
centre of mass	těžiště
control subjects	zde: kontrolní skupina
costs	náklady
cycle period	doba cyklu, délka cyklu
discriminate	rozlišovat, dělat rozdíly
easy to operate	s jednoduchým ovládáním
employ	použít, zapojit
extracted	extrahovaný
fall risk	nebezpečí pádu
femoral	stehenní
frequency domain	oblast četnosti
gait pattern	vzor pohybu, chůze
heel	pata
hip arthroplasty	endoprotéza kyčelního kloubu
intervention	intervence, zásah
intrusive	rušivý
lower back	spodní část zad
machine learning	strojové učení
medial	průměrný, obvyklý, střední, mediální
mounted on	upevněný, namontovaný
musculoskeletal pain syndromes	muskuloskeletární syndromy bolesti
neurodegenerative disease	neurodegenerativní onemocnění
osteoarthritic	osteoartritický
patterns	vzor, vzorec, model
portable	přenosný
prediction	prognóza, predikce
process information	zpracování informací
progress	pokrok, vývoj
single limb support	opora jedné končetiny
spatio-temporal	časoprostorový
step counter	krokoměr
stride length	délka kroku
swing power	míra pohupování
tibial	holenní
transfemural amputee	osoba s transfemurální amputací
triaxial	triaxiální, tříosý
user specific needs	specifické potřeby daného uživatele
vertebral column	páteř

## Exercises

### 1. Decide whether the following sentences are true (T) or false (F).

- a) There is publicly available software for the analysis of lower back acceleration data during walking.
- b) Accelerometer-based analysis systems are cheap to produce; they can be easily carried and are user friendly.
- c) The most sophisticated application of accelerometers is a step counter.
- d) Some accelerometer manufacturers provide data analysis software packages.

### 2. Complete the sentences using the words in the box.

process	fee	patterns	fall	platform
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- a) We provide such service only to the registered customers who pay an annual f.....
- b) Elderly people are being monitored to predict f..... risk.
- c) Many types of accelerometers have been reported as being used in monitoring gait p.....
- d) It provides an interactive and user friendly p..... to visualise acceleration data.
- e) This software is designed to p..... extracted information.

### 3. Read the definitions and write the correct word. The first letter is given for you to help.

- e) Able to be carried or moved easily, especially by hand: p.....
- f) Increase of speed or velocity: a.....
- g) Beauty or harmony of form based on a proportionate arrangement of parts: s.....
- h) A particular way or manner of moving on foot: g.....
- i) An unpleasant sensation occurring in varying degrees of severity as a consequence of injury, disease, or emotional disorder: p.....

## Questions

**Answer the following questions. All answers can be found in the text.**

1. What does this paper present?
2. What types of gait features can be derived from iGAIT?
3. What range of frequencies has this system been designed for?
4. What is the placement position of the mentioned device?
5. What are the reasons for that?

## Additional Questions

1. How many steps does the procedure for gait analysis include? Name them.
2. Describe the process of signal collection.
3. How is the average walking velocity calculated in iGAIT?

## TEXT 10: The SVEC III Vectrocardiographic Lead System

### Vocabulary

anterior	přední, anteriorní
axis	osa
cardiac	srdeční
cathode ray	katodový paprsek
coils	cívky
consecutive	následný
dipolar	dipólový, dvojpólový
distort	zkreslit výsledek
field	pole
fix the electrodes	upevnit elektrody
inhomogeneities	nehomogenost
lead	svod
loops	smyčky
misplacement	špatné umístění
orthogonal	ortogonální, pravoúhlý kolmý
orthonormal	ortonormální
plane	rovina
point source model	model bodových zdrojů
posterior	zadní, posteriorní
recordings	záznamy, natáčení
reproducibility	reprodukovatelnost, opakovatelnost
resistivity	rezistivita, měrný el. odpor
scalar	skalár, fyzikální veličina charakterizovaná jen velikostí
stereovectroelectrocardiography	stereovektroelektrokardiografie
supersede	nahradit
surface	povrch
surrounding	okolí, obklopující
tetrahedron	čtyřstěn
thorax	hrudník
transverse	příčný, kolmo uložený
tube	obrazovka
vectrocardiography	vektrokardiografie
voltage	napětí
volume conductor	prostorový vodič

## Exercises

### 1. Decide whether the following sentences are true (T) or false (F).

- a) A good vectrocardiography system should have three orthogonal leads.
- b) The first VCG loop was constructed manually from the six signals of the Einthoven lead system.
- c) So called Wilson tetrahedron is a three dimensions VCG system.
- d) Fixing the VCG system electrodes takes a long time.

### 2. Complete the sentences using the words in the box.

electrodes	easy	electric	moving	misplacement
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- e) The lead system shall be as insensitive as possible to m..... of the electrodes.
- f) All the thorax e..... are placed on the same transverse plane.
- g) The Frank lead system is most e..... to apply.
- h) The large orthogonal and linear area is obtained by m..... the electrodes further away from the source.
- i) VCG means recording the dipolar component of the cardiac e..... source.

### 3. Match the halves of the sentences.

- 1. August Waller was the first ...
  - 2. Hubert Mann was the first ...
  - 3. Wilson and Johnston were the first ...
  - 4. Schmitt and Simonson were the first...
- 
- a) ...to draw the VCG loop.
  - b) ...to design SVECIII Vectrocardiographic lead system.
  - c) ...to add the third dimension to the VCG with a lead system called Wilson tetrahedron.
  - d) ...to record the electric activity of the human heart.

## Questions

**Answer the following questions. All answers can be found in the text.**

1. What does this paper examine?
2. Apart from SVECIII, what other two widely applied VCG systems are being discussed?
3. Which of the three most popular VCG systems is the easiest to apply?
4. What is being said about an easy application in relation with the system reproducibility?
5. What is the advantage of the SVECIII system?