Sport training system based on ECG monitor

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Target user

High motivated for sport achievements sportsman.

High motivated sportsman:
- Uncertain subjective health assessment
- Often underestimate real drill training load
# Over training

## Sportsman
- Feels tired
- Wants to stop training

Eventually it leads to decreasing his training productivity

## Over training can lead to:
- Cold diseases
- Immunodeficient
- Withdrawal from the sport
How to prevent the over training?

Track functional state

Functional state:
- Determine level of organism vital activity
- Response for physical drills load
How measure functional state?

The most used functional state index is Heart Rate Variability (HRV)

Heart rate regulation:
- Rhythmic pacemakers activity
- Modulating effect of vegetative nervous system

Analysis of heart rate can allow to assess how well organism systems work
### HRV scores parameters

#### Time domain parameters
- **SDNN** - the standard deviation of NN intervals
- **RMSSD** - the square root of the mean squared difference

#### Frequency domain parameters
- **Total spectrum power** (up 0.4 Hz)
- **Low frequency power** (0.04-0.15 Hz)
- **High frequency power** (0.15-0.4 Hz)
- **LF/HF ratio**
What is this system for?

The main purposes:

- Prevent fatigue
- Determine over training in early stages
System components

- Alive ECG monitor
  - ECG
  - Android device
    - Beat detector
      - beat-to-beat intervals
    - Frequency domain HRV analysis
    - HRV processor

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Functional state determination rules

**Normal state**

**Measures values for normal state**
- Total spectrum power > 3000
- Low frequency power > 500
- High frequency power > 500
- LF/HF < 1

**Unnormal state**
Functional state test

To make test user should:

- Attach ECG monitor electrodes to the body
- Lie horizontally and relax. Push the start button
- After 5 seconds user will hear beep sound. It means he has to not move.
- At the end of test system will play the same sound again and give report.
System in action

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Feature proposal

- Support for other HRV measure and analysis approaches
- Support for other HR data source (oxymetry devices or using phone camera)
- Dynamic HRV tracking during exercises