Real time smart monitoring of eating patterns during main meals

SPLENDID

Personalised Guide for Eating and Activity Behaviour for the Prevention of Obesity and Eating Disorders

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SPLENDID aimed to **develop new technologies** to monitor how people eat and move during day.
These technologies will be used to give advice to the users on how to improve their eating and their physical activity habits.
Healthy students in schools (Sweden)
Overweight young adults (Netherlands)
SPLENDID

Mandometer

Activity-meter
Chewing sensor

Website(s)

Smartphone
& App

Self-rating
questions
Primary screening stage (school only)

Behavioural assessment stage

Personalised Guidance stage
Mandometer®
Data pre-processing:
Data pre-processing: Healthy female individual, 1Hz
Data pre-processing: Healthy female individual, 1Hz

Duration 7.8 min
Leftovers 4 g
Data pre-processing: Healthy female individual, 1Hz

- Duration: 7.8 min
- Leftovers: 4 g
- Addition: 96 g
Data pre-processing: Healthy female individual, 1Hz

Duration 7.8 min
Leftovers 4 g
Addition 96 g
Mouthfulls 46
Data pre-processing: Healthy female individual, 1Hz

Duration 7.8 min
Leftovers 4 g
Addition 96 g
Mouthfulls 46 g
Data pre-processing: Healthy female individual, 1Hz

\[ y = kx^2 + lx \]
Group characteristics

Intake (g)
- Vegetables with chicken
- Rice with chicken

Time (min)
- Vegetables with chicken
- Rice with chicken

Coefficient K
- Vegetables with chicken
- Rice with chicken

Coefficient L
- Vegetables with chicken
- Rice with chicken
Within individuals

![Graphs showing relationships between intake, time, and coefficients for lunch and dinner meals.](image-url)
Within individuals

![Graph showing data on bites and chews for different food combinations including vegetables & chicken, meatballs & potatoes.](image)
2014-2015
2014-2015
## 2014-2015 Dataset results

<table>
<thead>
<tr>
<th>Data collected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
</tr>
<tr>
<td>Good quality, 98 new + 116 old datasets</td>
</tr>
<tr>
<td>School</td>
</tr>
<tr>
<td>Good quality, 41 datasets</td>
</tr>
<tr>
<td>Young adults</td>
</tr>
<tr>
<td>Good quality, in total 39 recorded meals</td>
</tr>
</tbody>
</table>

Total: >290 meals
A parametric Probabilistic Context-Free Grammar for food intake analysis based on continuous meal weight measurements.

Papapanagiotou V, Diou C, Langlet B, Ioakimidis I, Delopoulos A.

**Indicators**

- **Meal Duration (min):**
  - 0: 20%
  - 5: 80%
  - 13: 23%

- **Total Food Intake (g):**
  - 0: 207
  - 80%
  - 423

- **Weight of leftovers (g):**
  - 0: 397
  - 80%
  - 61

- **Average Intake Rate (g/min):**
  - 1: 43
  - 20%
  - 67

- **Average Bite Size (g):**
  - 2: 6
  - 80%
  - 11

- **Average Bite Frequency (bites/min):**
  - 5: 10
  - 20%
  - 14

- **Bite size standard deviation (g):**
  - 1.69
  - 20%
  - 7.24

- **Food Intake Acceleration Rate (g/min²):**
  - -4.20
  - 20%
  - 1.85

- **Initial Food Intake Rate (g/min):**
  - 0: 31.22
  - 80%
  - 86.53

**Fullness (0-100) before the meal:**
- 9

**Fullness (0-100) after the meal:**
- 79

**How much the user liked his/her food:**
- I liked it a lot
2015-2016
<table>
<thead>
<tr>
<th>School</th>
<th>Data collected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Repetition 1: Good quality, 110 datasets – 3 days/6 classes</td>
</tr>
<tr>
<td></td>
<td>Repetition 2: Good quality, 49 datasets – 2 days/3 classes</td>
</tr>
</tbody>
</table>
Current progress

[Images of the SPLENDID App interface showing current progress in primary screening stages, including activity, meal tracking, and health metrics.]

[Images showing historical and system usage data for the app, indicating recent activities such as exercise and meals.]
Current progress
Current progress
Current progress
Current progress
Collaborators

Also visit: www.i-prognosis.eu

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Thank you