**Smart foodie - 5 hotspots where the food and "the digital" are converging**

Wilkinson, J., Professor of Nutrition & Public Food systems, Aalborg University - Nanyang Technical University. Singapore, September 27, 2017

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**Digitalisation & Nutrition**

**Facts & Figures DK/Nordics**

- Between 80% and 90% of the population use mobile ICT devices.
- 88% of Danish consumers own a mobile phone/smartphone.
- 86% of Danes carry out digital self-service.
- 88% of Danes do online shopping.
- 22% of internet users aged 16 and 74 are skeptical about IT security.
- Revenue of wearables and according to Statistics Denmark - the sale of smart watches has risen by 141 percent in recent years.
- 52% of internet users across 17 countries report using 3 or more devices for work.

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**Agenda**

1. Realtime dietary assessment technologies and ICT - assisted foodchoice data acquisition.
2. New sensations and experiences of virtual & augmented food reality technologies.
3. Smart Exposure Response Technologies.
4. Internet of Food Things.
5. Smart foodscape mapping technologies.

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**Realtime dietary technologies and ICT - assisted foodchoice data acquisition.**

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**New imaging technologies for food identification.**

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**Other approaches**

- ASA24 – Automated Self Administered 24h
- TADA: Technical Assisted Dietary Assessment
- Data Diet Record System (DDRS)
- Smart Plate
- Smart Fork
- TelSpec

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**Illustration:**

- FoodScape lab floor plan for the students at Integrated Food Studies.
- Exposure A: MealSnap.
- Exposure B: SenseCam & Video Barometer.
- Exposure C: TADA.
- Exposure D: Administered 24h.
Is the DIMS accurate? Validation 2: Odense University Hospital

Hypothesis
High correlation between DIMS data and standard weighed method

Results:
- Correlation: DIMS total energy/standard total energy (r = 0.990 and p-value < 0.01)
- Correlation: DIMS total protein/standard total protein (r = 0.974 and p-value < 0.01)

Is the DIMS saving time? The Aalborg feasibility study

- Reduces the time spent on NM from 15 to 4 minutes
- Patients at nutritional risk produced increased amounts of plate waste, with less energy & protein intake when compared to patients not at nutritional risk
- It can be used in co-creation mode improving accuracy

Is the DIMS robust in practice? The Herlev stress test

Intervention:
- Front End Nutrition & Meal support
- Meal hosting

Results:
- No significance pre-/ post test
- DIMS functions well with a trained operator
- Meal hosting requires training

Acknowledgements: Broader
Michael Nielsen Shero
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Internet of food Things

Predicting shelflife through IoT, RFID & BT

Eating, Ageing, Digitalisation
- The eating robot
  - The case of hotels

Smart Exposure Response Technologies (SERT)

Smart Exposure Response Technologies (SERT)

Eating, Ageing, Digitalisation, Place
A smart home to elderly
- Goal: to reduce the cost of moving
  - Older persons in their home
- Wrist band & sensors
- Individual going out of bed, to the
  toilet
- An app shows if anything is
  something strange:
- Big data does predictions:
- Increased toilet visits can flag up a
  urinary tract infection.
- Changes in gait can predict an
  impending fall, the leading cause of
  injury among older adults.
- Only things missing: fluid
  consumption recording.

Milestones

[Diagram]
<table>
<thead>
<tr>
<th>Device</th>
<th>Reliable</th>
<th>Easy to use</th>
<th>Can we read the data</th>
<th>Can we control the data</th>
<th>Does it provide useful data</th>
<th>Fast and user-friendly</th>
<th>Battery life</th>
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Eating insects – does informed choice make a difference on acceptance of consuming edible insects?

Proceedings from ICCAS 2017

AAU CPH

Exposure Response Model

EEG Electro Encephalo Graphy

Reading facial expressions
PPG Photo Plethysmo Gram
• See also Electro Galvanic Skin response or Skin conductivity measurement and GSR/GSR (Electrodermal Activity)

A snapshot of the virtual supermarket

Food'n science - overall aim & target
• To co-develop food & nutrition Web science & digital literacy to the benefit of young people in elementary school
• For children aged 8-12 year
• Elementary school
• Mediators: teachers of natural sciences and home economics

New sensations and experiences of virtual & augmented food-reality technologies.

From FSL to Street Science & Food'n Science
• Foodscape Lab: Teaching of graduate students
• Refined at annual Researchers Festivals
• Refined at Annual culture nights
• Conceptualized in the Food'n Science Program

Refining Food'n Science components at Aalborg Universitarium summer 2017
Seven items for Universitarium

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<tr>
<th>Item</th>
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<tr>
<td>The Virtual Shopper</td>
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<td>Eye4food</td>
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<td>Growing Blue &amp; Green in the city</td>
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<td>The DIMS calorie identifier</td>
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<td>Veggie Matchi</td>
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<td>The SOCIAL Vegetable Nudge</td>
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<td>Cooking Down Memory Lana</td>
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Micro foodscape heat mapping

Multisource decision making on shop placement

Conclusion

• Interface between food & the digital requires research attention
• In terms of Big Food Data analytics ("the soft part")
• In terms of Sensors & Devices ("the hard part")
• In terms of Research Infrastructures ("hard" & "soft")
• No university can do this alone due to the complexity of the task
• Interdisciplinarity, cross border and knowledge triangulation is key

Thanks for your attention

http://www.capfoods.aau.dk/newslist/news/vous‐connaissiez‐le‐model‐aalborg‐cid331849

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