

Track 2: Social Media Analytics and Mobile Technology

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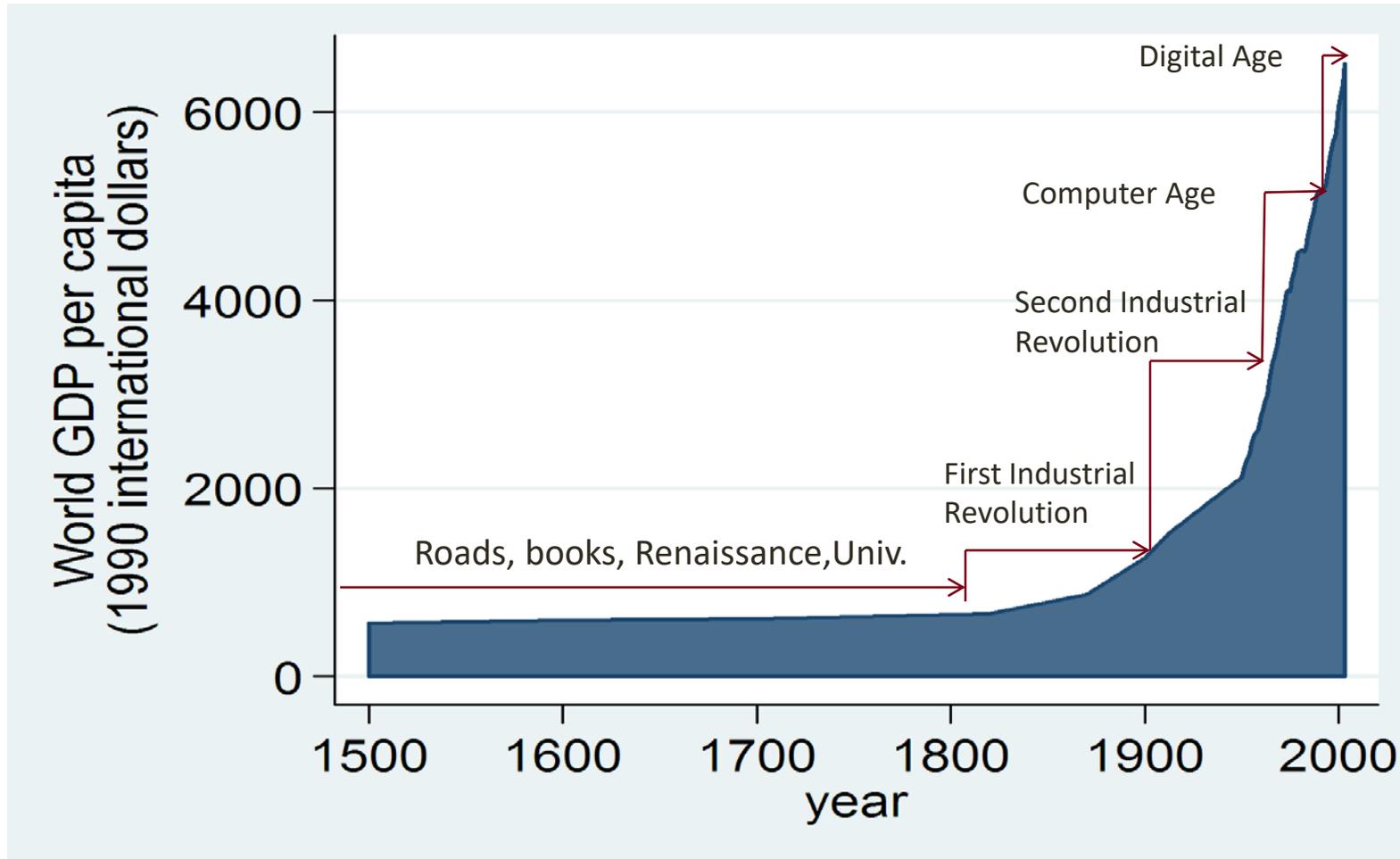
School of Nursing

Driven to DiscoverSM

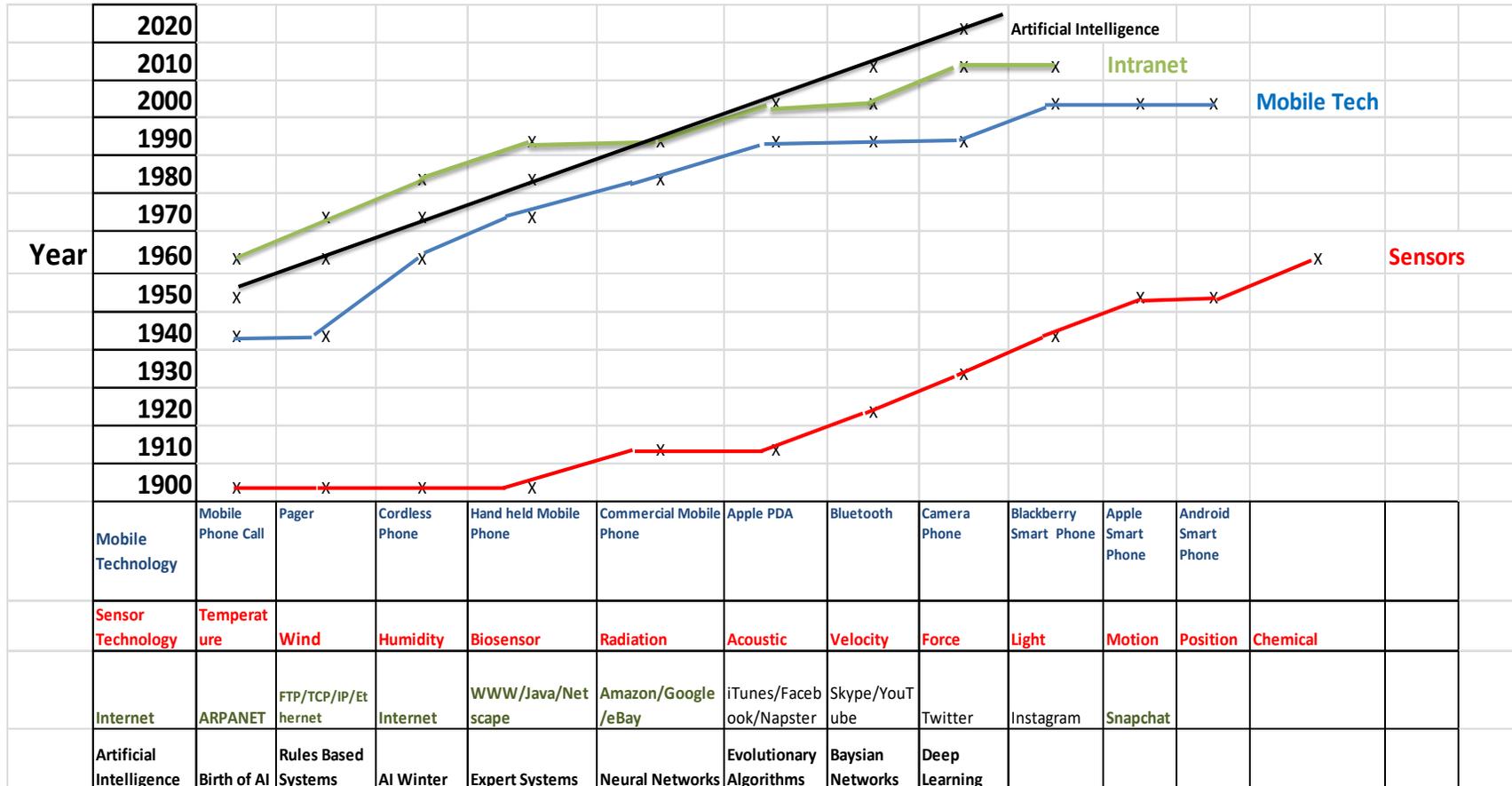
Objectives

- Discuss the impact of social media websites on improving Nursing care using CaringBridge as an exemplar.
- Describe benefits and challenges of sensor technology and the Internet of Things in the care and treatment of Alzheimer's Disease or a related disease (ADRD).
- Discuss the use of mobile technology for improved patient adherence to treatment through education and engagement within the context of cardiovascular disease.
- Review the benefits of online precision engagement in connecting with patients at the right time, in the right place and with the right information based on their personal readiness to engage.

Long Term World Growth in Gross Domestic Product/Per Capita



The Perfect Storm: Mobile Technology, Sensors, The Intranet & Artificial Intelligence



Sources of Data in Healthcare



- Electronic Health Record
- Health Insurance Claims
- Sensor Data (2.9 billion)
- Geo-spatial Data (GPS mapping)
- Patient Reported Outcomes (quantified self movement)
- Human Genome (6 billion/pair)
- Financial Systems (credit cards, bank accounts)
- Environmental and Weather Data
- Social Media (1.8 billion subscribers in top 5 websites)

Social Media

Forms of electronic communication (such as websites for social networking and microblogging) through which users create online communities to share information, ideas, personal messages, and other content (such as videos)



The Intranet of Things

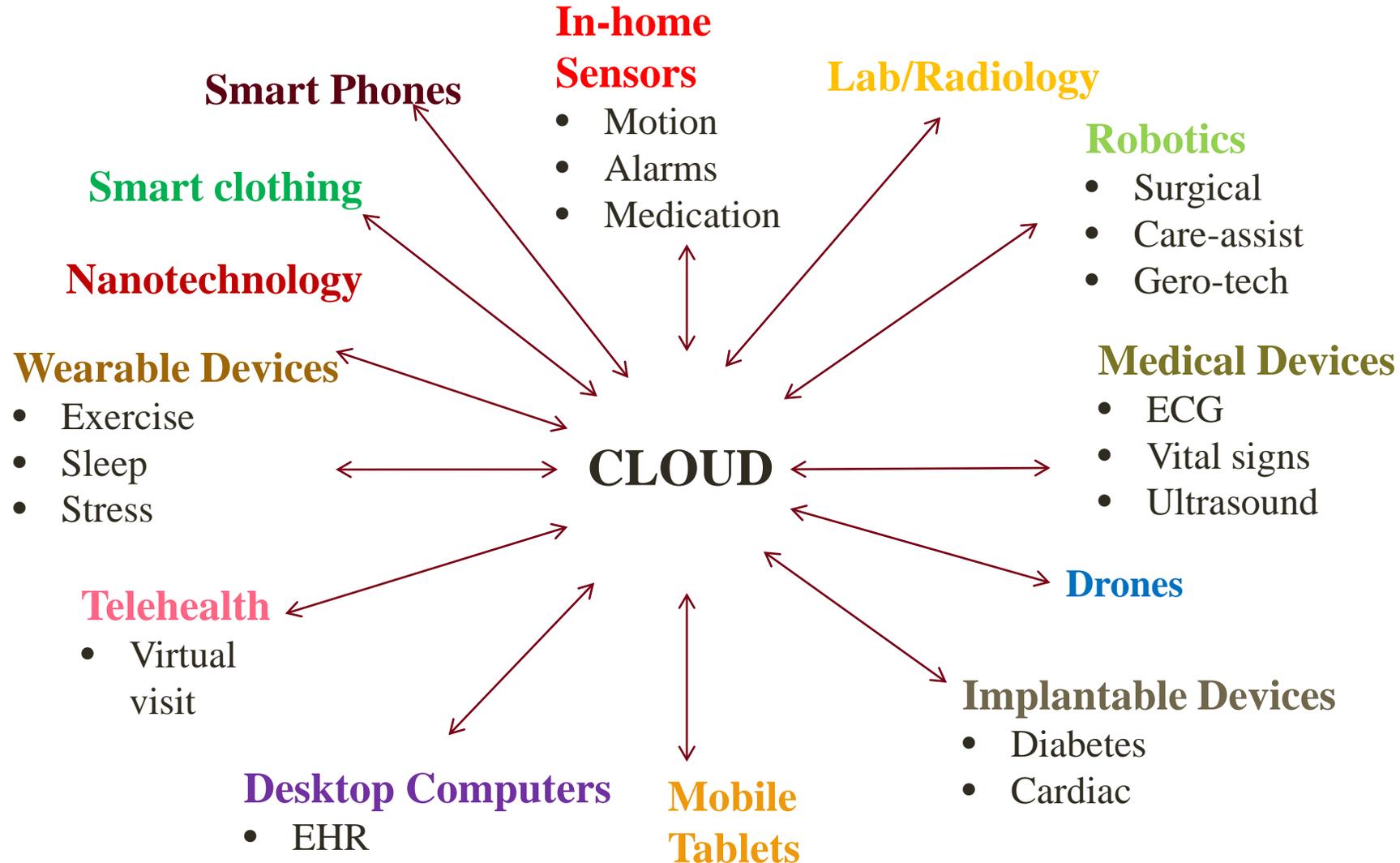
“The integration of people, processes and technology with connectable devices and sensors to enable remote monitoring, status, manipulation and evaluation of trends of such devices.”



Peter Lewis. First use of the term given at a presentation to U.S. Federal Communications Commission (FCC) in 1985.

<https://www.youtube.com/watch?v=sGQeWRpmlU>

The Intranet of Things

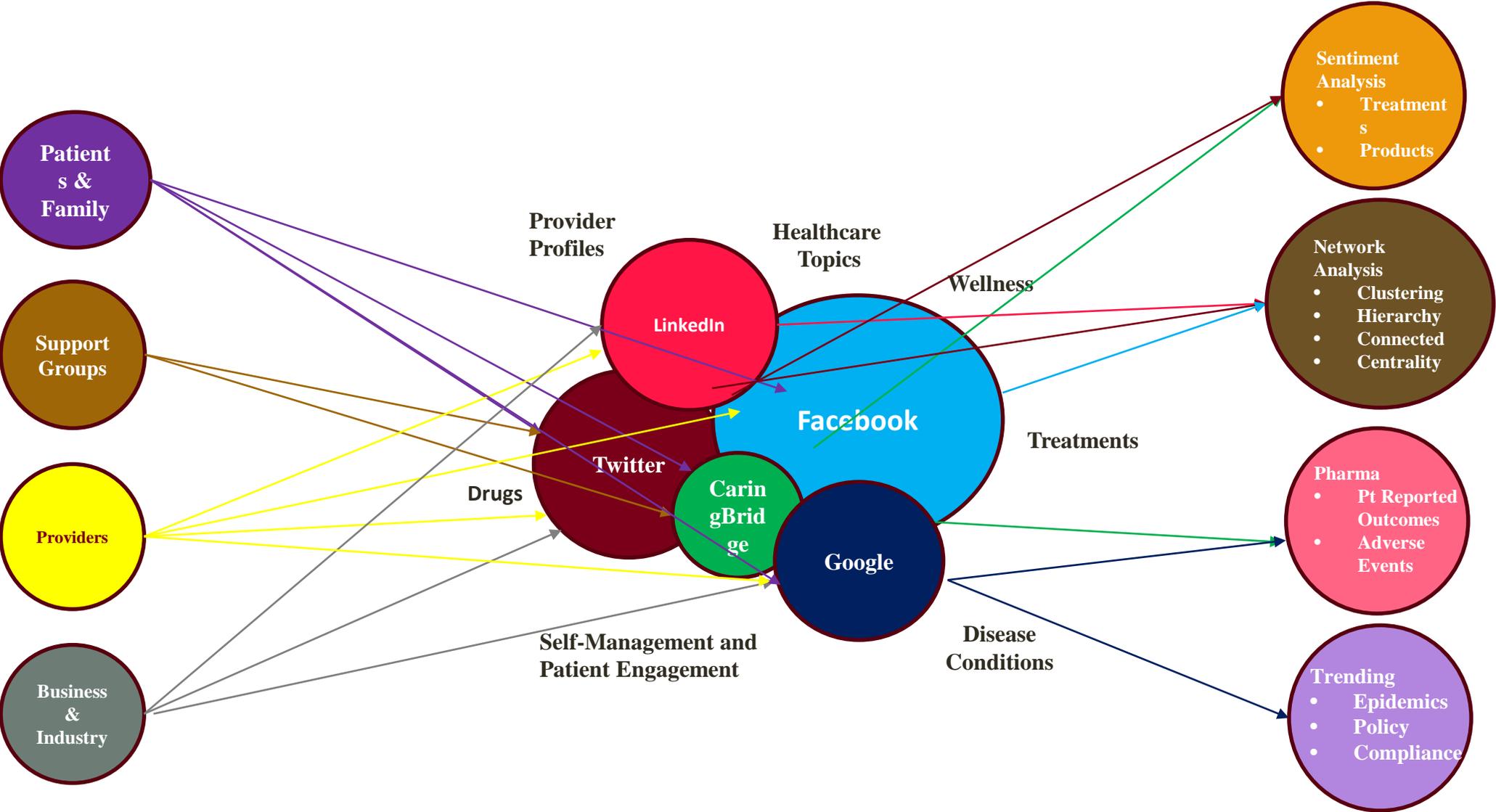


Track 2:

Social Media Analytics and Mobile Technology

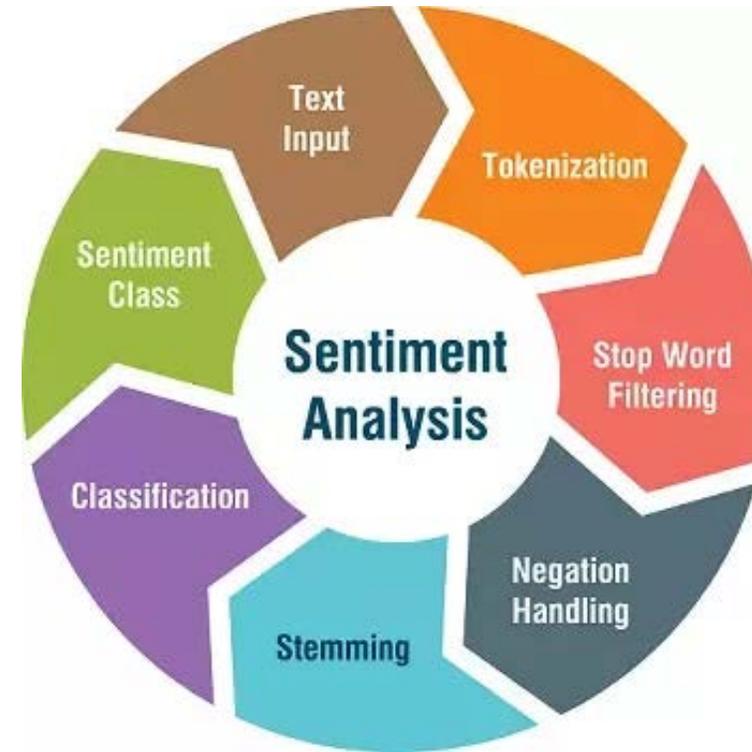
- **9:30 am**
 - **10:00 am**
 - **11:00 am**
 - **12:00 pm**
 - **1:00 pm**
 - **2:00 pm**
 - **3:00 pm**
- **Introduction** – Tom Clancy and Martin Michalowski
 - **Nursing Insights From CaringBridge Notes** – Karen Monsen
 - **The eNeighbor: A Proactive Health Monitoring Intervention for Dementia Caregivers** – Rachel Zmora
 - **Lunch**
 - **Improved Patient Adherence Through Mobile Technology** – Martin Michalowski
 - **Improving Care Through Precision Engagement and the Interactive Care Model** – Karen Drenkard
 - **Reflection (All)**

Healthcare Social Media Data Analytics



Sentiment Analysis/Opinion Mining

- The process of computationally identifying and categorizing opinions expressed in a piece of text, especially in order to determine whether the writer's attitude towards a particular topic, product, etc., is positive, negative, or neutral.



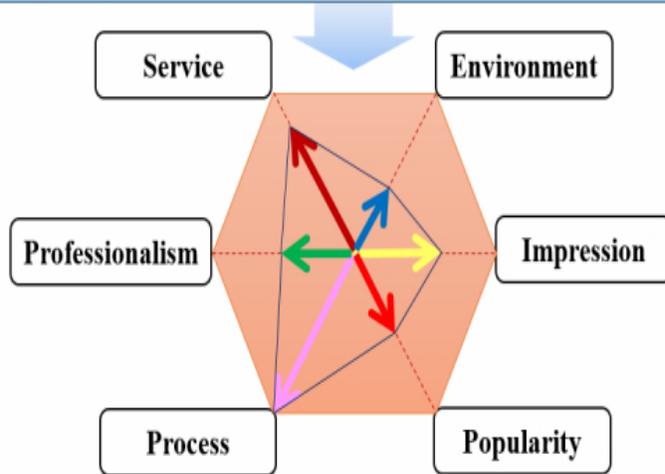
Crawly, John. Reproduced from Quora at:
<https://www.quora.com/Who-are-the-leading-providers-of-sentiment-analysis-for-social-media-data-and-which-companies-use-them-versus-developing-their-own-technology>

Sentiment Analysis

xxMom 1 (2013/05/01 23:29)
 I'm recommending Satbeul's pediatric clinic. ^^
 They were kind while conducting the health evaluation program on my kid yesterday.

jjxxxxx (2013/05/03 02:29)
 I'm recommending Dr. Lee Jeongwoo's pediatric clinic~. I really like Dr. Lee ^^ I'm not sure if the clinic is nearby though.

nowMxx (2013/05/04 21:53)
 I'm also recommending Dr. Lee's pediatric clinic.



District	Threads, n	Messages, n	Messages per thread, n	Messages containing quality factors, n
Seoul	10,832	54,392	5.02	12,421
Daegu	8072	47,419	5.87	4240
Busan	5965	28,910	4.85	9509
Daejeon	3952	22,475	5.69	2358
Incheon	775	5184	6.69	1525
Gwangju	2826	15,368	5.44	2012
Total	32,422	173,748		32,065 (18.45%)
Average	5403.66	28,958	5.59	

Use of the Omaha System for ontology-based text mining to discover meaning within CaringBridge social media journals

Karen A.Monsen, Sasank Maganti, Robert A.Giaquinto, Michelle A.Mathiason, Ragnhildur I.Bjarnadottir, Mary JoKreitzer

Goals

Examine the feasibility of using ontology-based text mining with CaringBridge social media journal entries to understand journal content from a whole-person perspective.

Specific aims

- Describe Omaha System problem concept frequencies in the journal entries over a four-step process overall, and relative to Omaha System Domains,
- Examine the four step method including the use of standardized terms and related words.



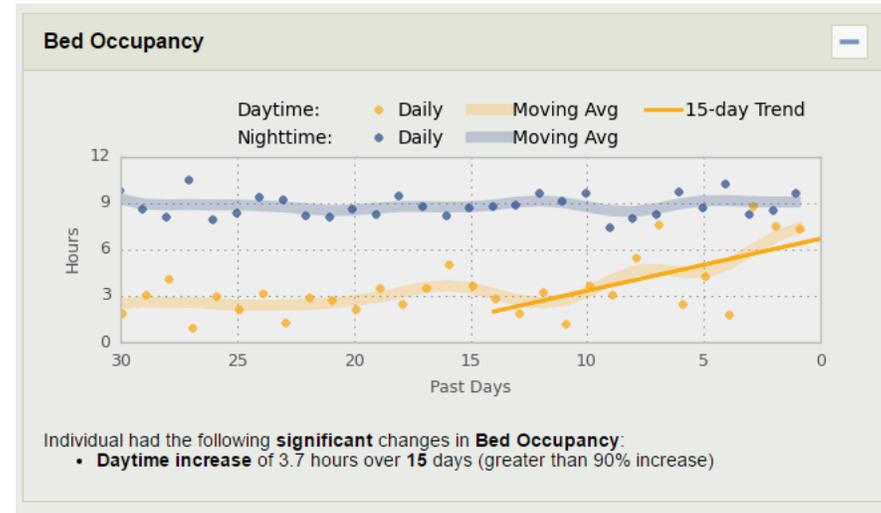
Alzheimer's Disease or a Related dementia (ADRD)

- 5.7 million persons with Alzheimer's disease or a related dementia (ADRD) in the U.S. (Alzheimer's Association, 2018)
- Over 16 million family caregivers for these individuals in 2017 (Alzheimer's Association, 2018)
- The majority of care hours (78%) provided to persons with ADRD is from family/unpaid sources (Friedman et al., 2015; Stone, 2015)
 - ADRD family care was valued at \$232 billion (Alzheimer's Association, 2018)

Specific Aims

- Do family caregivers of persons with dementia perceive a remote activity monitoring (RAM) system as feasible and useful over 6 months and up to 1.5 years?
- Whether and RAM technology improves key family caregiver outcomes over a 6-month period
 - Caregiver self-efficacy and competence
 - Caregiver distress

Passive Health Monitoring



1

Sensors detect a change in behavior

By passively monitoring patterns in activities of daily living, the GreatCall system is able to identify residents who may be undergoing a significant behavioral change, generating an alert.

2

Algorithms generate an actionable alert

The GreatCall dashboard generates a HealthNote™ alert that outlines the change in behavior, providing graphical and text representations of the observed change.

3

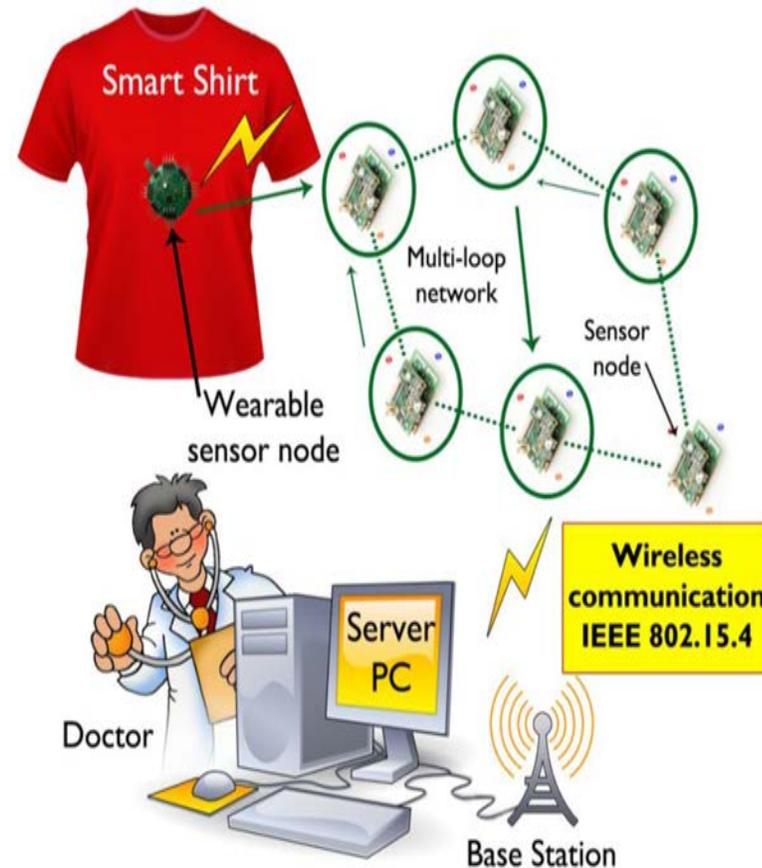
Caregiver provides an intervention

A caregiver then interacts with the resident to determine if an intervention is required, whether it's a change in medication, additional services, or simply wellness education.

Prevention: Cardiovascular Disease

Mobile Technology & Sensors

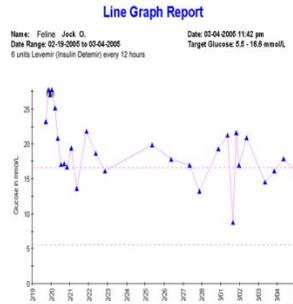
- Beat to beat variability
- Fluid status
- Sleep quality
- Apneic spells
- Vital signs
- Lab tests (via smart phone app)
- Med. adherence (via digitized pills)



Heart Disease Monitoring

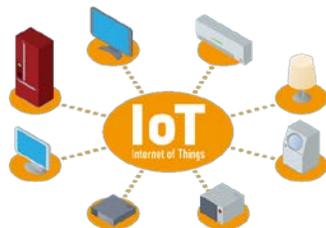
5. Act

Patient adjusts medications
and other factors
(Augmented Behavior)



4. Analyze

ECG signals
are trended and care
plan created.
(Augmented Intelligence)



3. Aggregate

ECG tracked over time for
and individual



1. Create

Sensors send
ECG signals
Via home monitor



2. Communicate

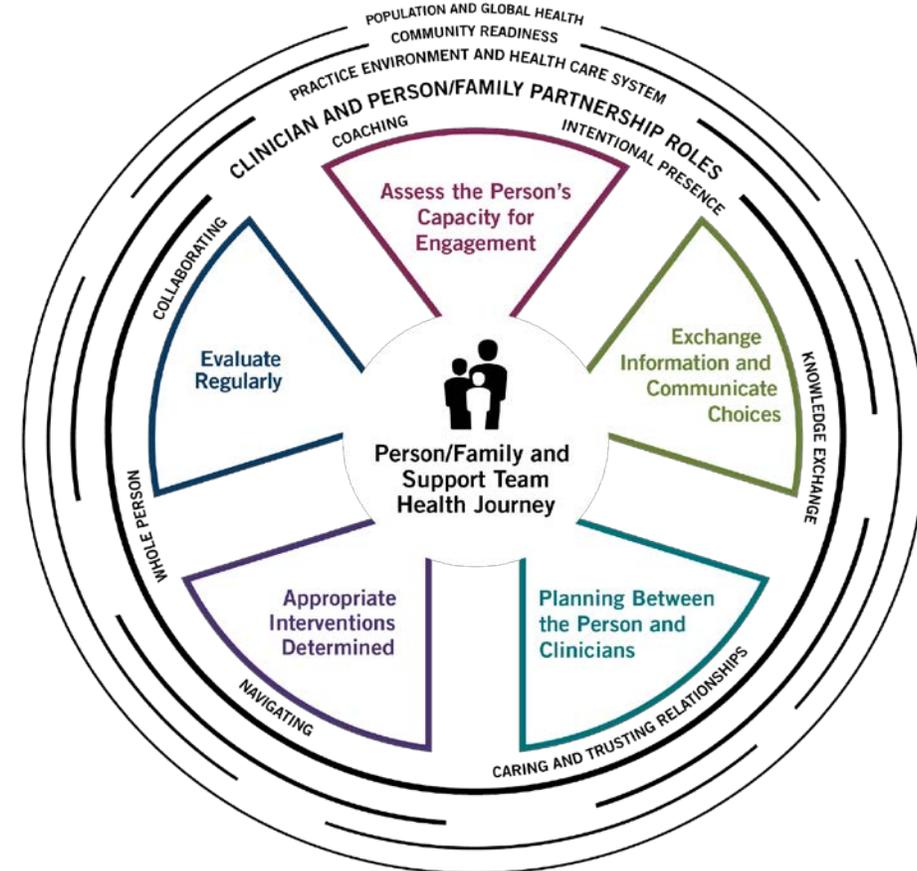
Signals sent via
Bluetooth and the Intranet

<https://www.geek.com/chips/temporary-tech-tattoos-could-monitor-your-health-pay-for-your-coffee-1640423/>

Precision Engagement

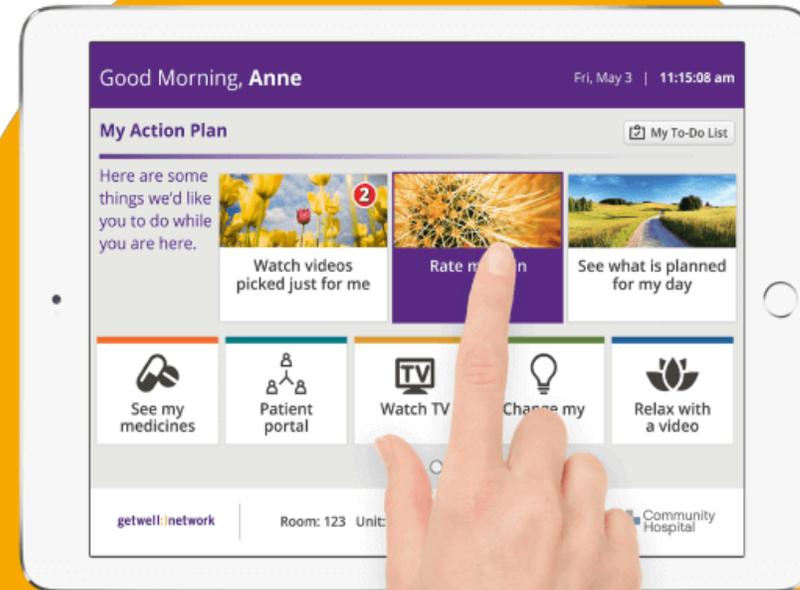
Connecting with patients:

- At the right time,
- In the right place,
- With the right information based on their personal readiness to engage.



Key Imperatives for PE

1. Supported by evidenced based science
2. Engaged across the care continuum
3. Personalized patient education
4. Capturing the patient's voice
5. Interoperability



GetWellNetwork website. Accessed 4/4/2018:
<https://www.getwellnetwork.com/solutions/patient-engagement/inpatient/>

Social Media Analytics and Mobile Technology



Questions?