Microsoft Research
FacultySummit

FUTURE/WORLD

2011 — 2031

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FacultySummit

Beyond the Interface: Computing Transformed

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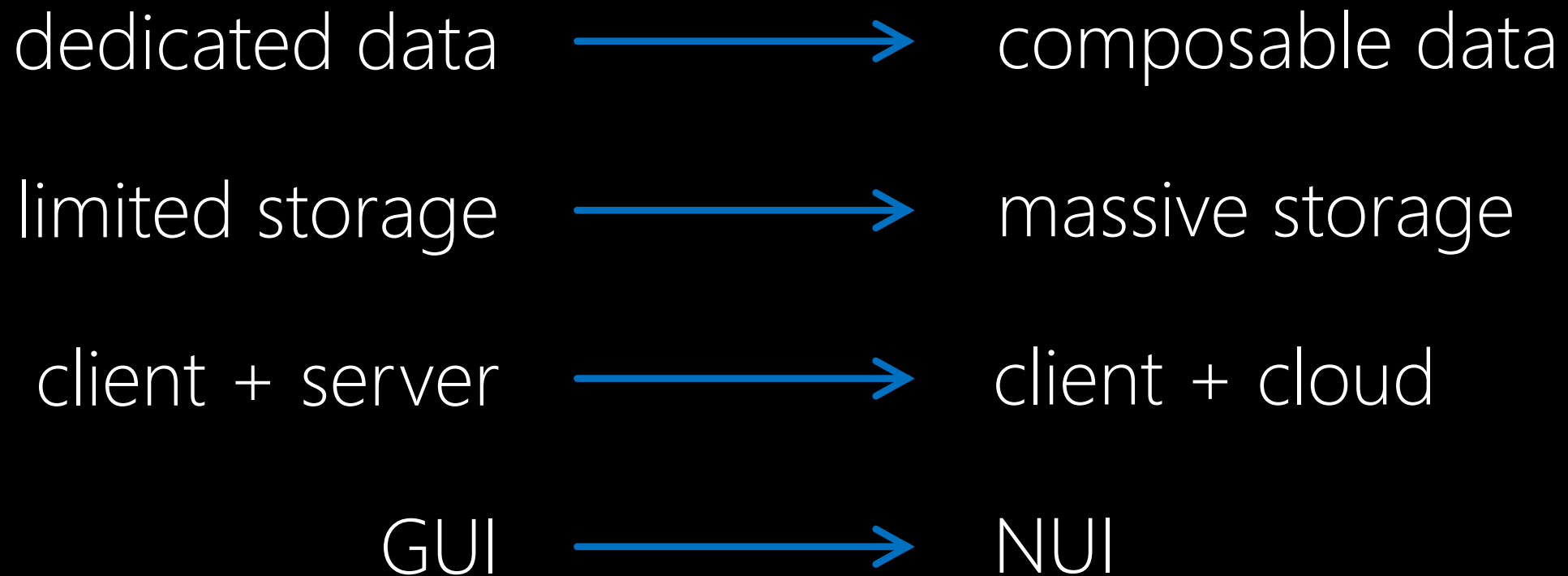
FUTURE/WORLD 2011 2031


dedicated data
composable data
limited storage
massive storage
client + server
client + cloud
GUI
NUI

composable data

massive storage

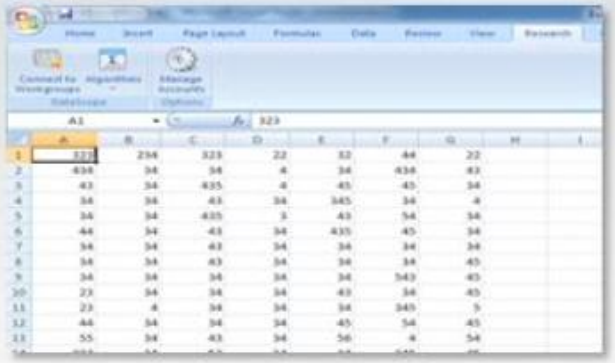
client + cloud

NUI

learning from big data

excel datascope

Client



Excel Features

- User Authentication
- Data Import/Export
- Data Sampling
- Analysis Scheduling
- Job Monitoring

Cloud

Data Products

Data Analysis Libraries

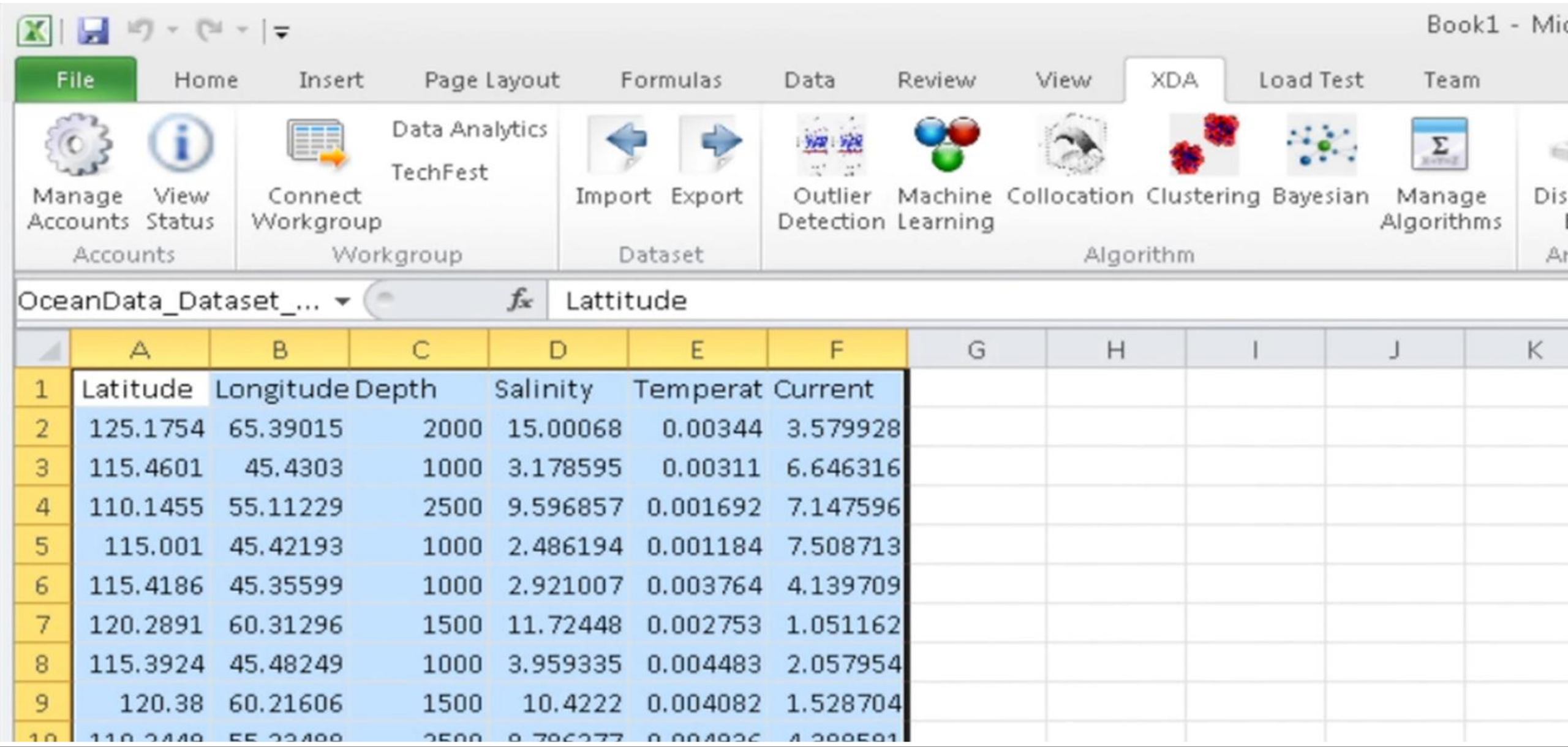
Metadata Tables

Web Service

Workers

Powered by Windows Azure

excel datascope



	A	B	C	D	E	F
1	Latitude	Longitude	Depth	Salinity	Temperat	Current
2	125.1754	65.39015	2000	15.00068	0.00344	3.579928
3	115.4601	45.4303	1000	3.178595	0.00311	6.646316
4	110.1455	55.11229	2500	9.596857	0.001692	7.147596
5	115.001	45.42193	1000	2.486194	0.001184	7.508713
6	115.4186	45.35599	1000	2.921007	0.003764	4.139709
7	120.2891	60.31296	1500	11.72448	0.002753	1.051162
8	115.3924	45.48249	1000	3.959335	0.004483	2.057954
9	120.38	60.21606	1500	10.4222	0.004082	1.528704

excel datascope: powered by "daytona"

Technologies:

Azure data analysis services

MapReduce optimized for iterative processing

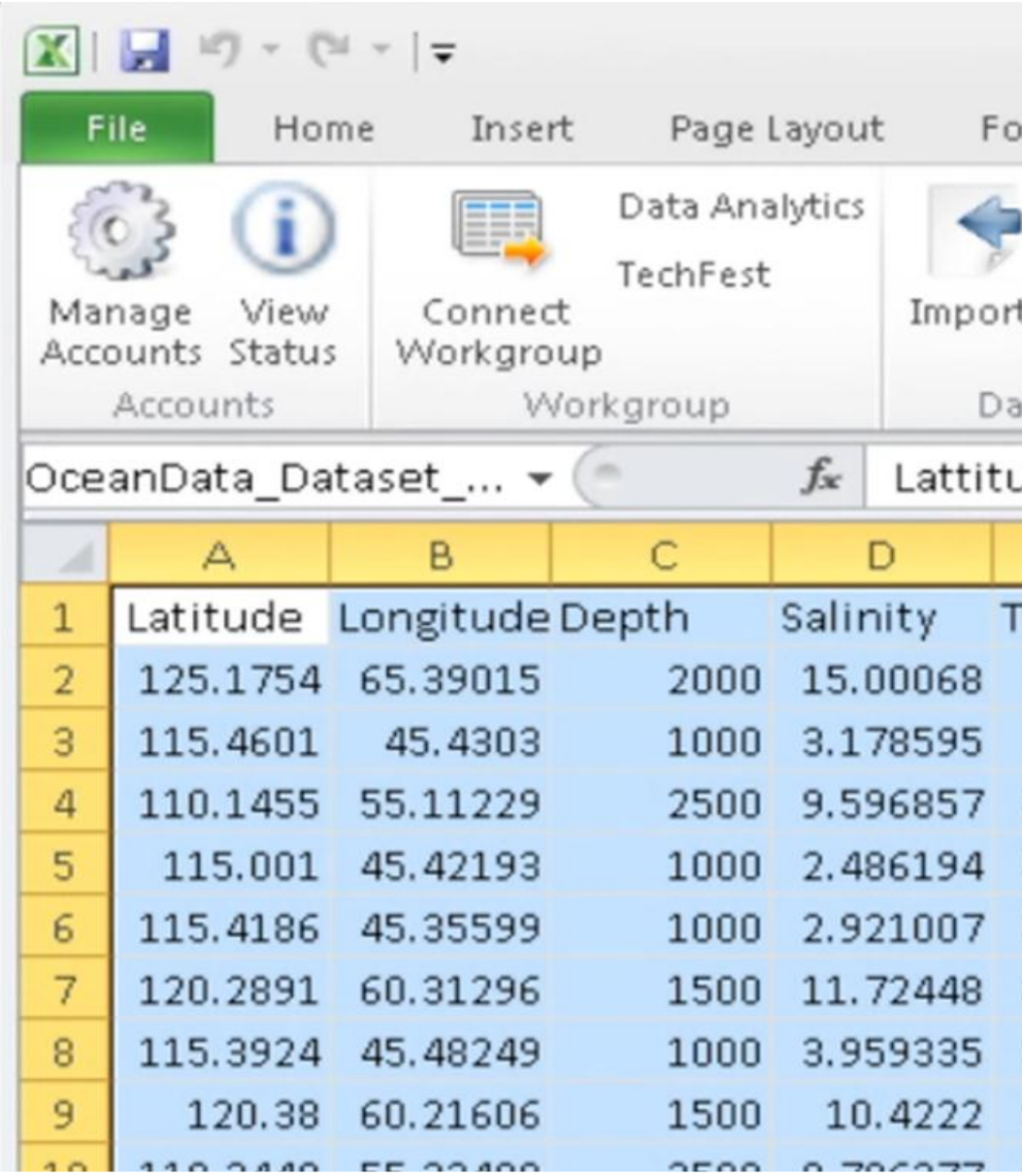
Challenges:

Exponential data growth

Latency

Cost and time tradeoff

Continuous analytics on streamed data



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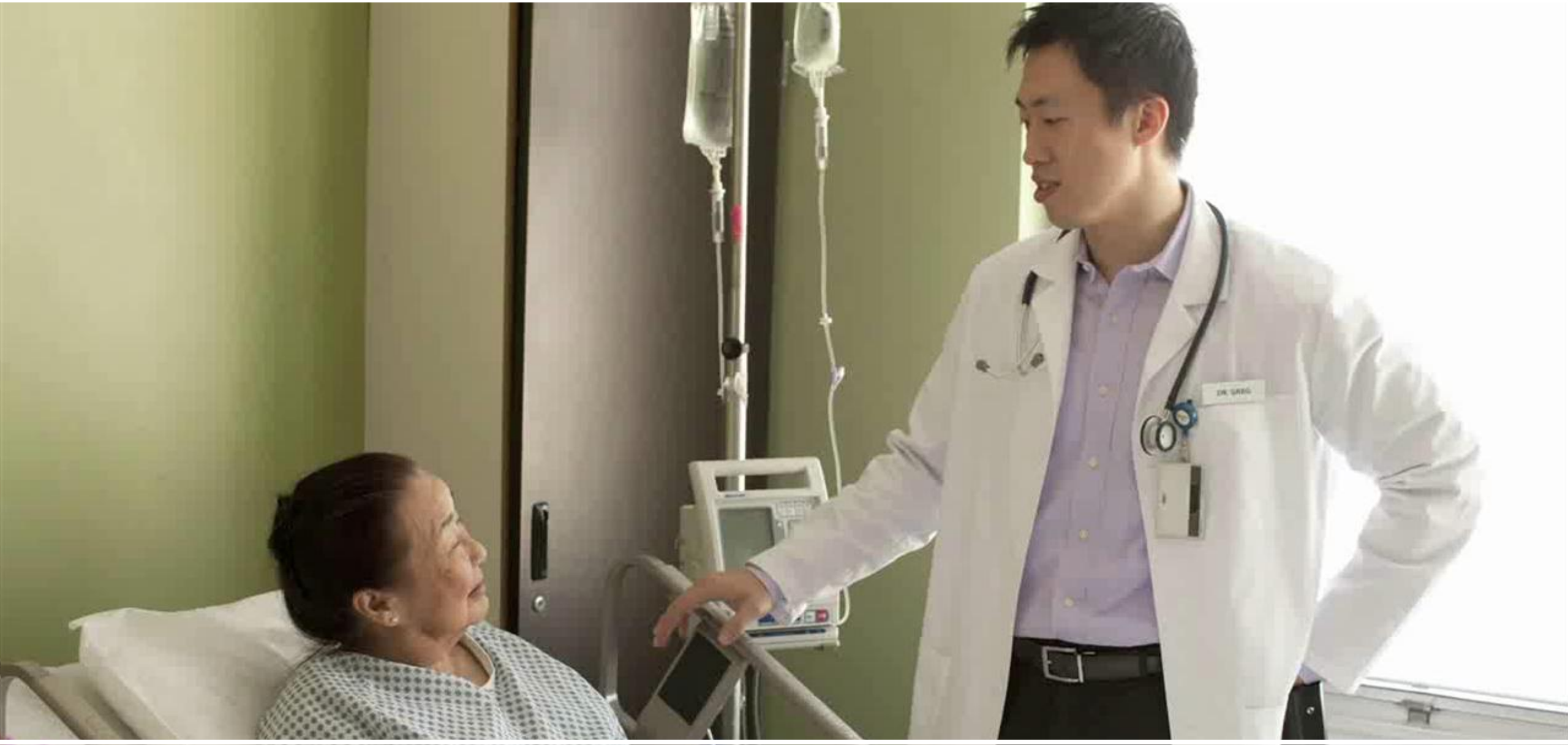
predicting readmission of hospital patients



predicting readmission of hospital patients

Odds ratio	Evidential Finding
0.29207	Num past 1yr visits = more than 10
0.27172	In a previous visit Sodium = L
0.23211	In a previous visit ABG Arterial O2 Hb = C
0.21646	Patient had dx = Health services for specific procedures, not carried out
0.21139	Patient was given "Famotidine" during a previous 1yr visit.
0.20785	Hour of visit = 10
0.19002	Patient had dx = Symptoms involving skin and other integumentary tissue
0.18684	Patient had dx = Functional digestive disorders, not elsewhere classified
0.18167	Patient had dx = Gastrointestinal hemorrhage
0.17978	Patient was given "Nitroglycerin" during a previous 1yr visit.
0.17697	Gaps since using warfarin family is less than 2 days
0.16159	Monocyte Absolute Count = H
0.15941	Patient was given "Carvedilol" during a previous 1yr visit.
0.15610	Patient was given "Cyclobenzaprine Hcl" during a previous 1yr visit.
0.15590	Patient had dx = Depressive disorder, not elsewhere classified
0.15260	In a previous visit Pulmonary Po2 = L
0.15209	Fungus Culture = normal
0.14204	Patient was given "MORPHINE SULFATE" during a previous 1yr visit.
0.14141	Num past 3m visits = between 5 and 11
0.14015	Patient was given "Levalbuterol Hcl" during a previous 1yr visit.
0.13644	Gap since last visit = between 2 and 7 days
0.12955	Free T4 = H
0.12542	Patient had dx = Gastric ulcer
0.11285	In a previous visit Prothrombin Time = H
0.10869	Number of heart conditions is 3

depression

gastric ulcer or GI drugs

predicting readmission of hospital patients

N	FACTORS_ANTI_READMISSION
ers of fluid, electrolyte, an	stayed 3-6 days in the hospital / Number of heart conditions is 0 / Pat
rs of fluid, electrolyte, and	Num past 3m visits = 2 / Number of heart conditions is 0 / Admission
	Gap since first HF = infinite / Admission reason is empty / Marital Stat
-base balance / Patient ha	Num past 3m visits = 2 / Ave gap of past yr visits = between 61 and 3
	Gap since first HF = infinite / Number of heart conditions is 0 / Marital
Chronic renal failure	Num past 3m visits = 2 / Num past 1yr visits = 2 / Marital Status is equ
ards to health / Patient ha	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa
	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa
-base balance / Patient ha	Num past 3m visits = 1 / stayed 3-6 days in the hospital / Ave gap of
	Num past 3m visits = 1 / Ave gap of past yr visits = between 61 and 3
= between 15 and 30 days	Was NOT admitted during last year / Num past 3m visits = 2 / Gap sin
personal history presentinç	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa
	Was NOT admitted during last year / Num past 3m visits = 2 / Ave gap
	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa
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	Was NOT admitted during last year / Num past 3m visits = 1 / Ave gap
	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa
	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa
	Was NOT admitted during last year / Num past 3m visits = 1 / Num pa

Technologies:

Connected systems, devices, sensors

Machine learning & cost/benefit analysis

Predictive models

Decision-theoretic inference

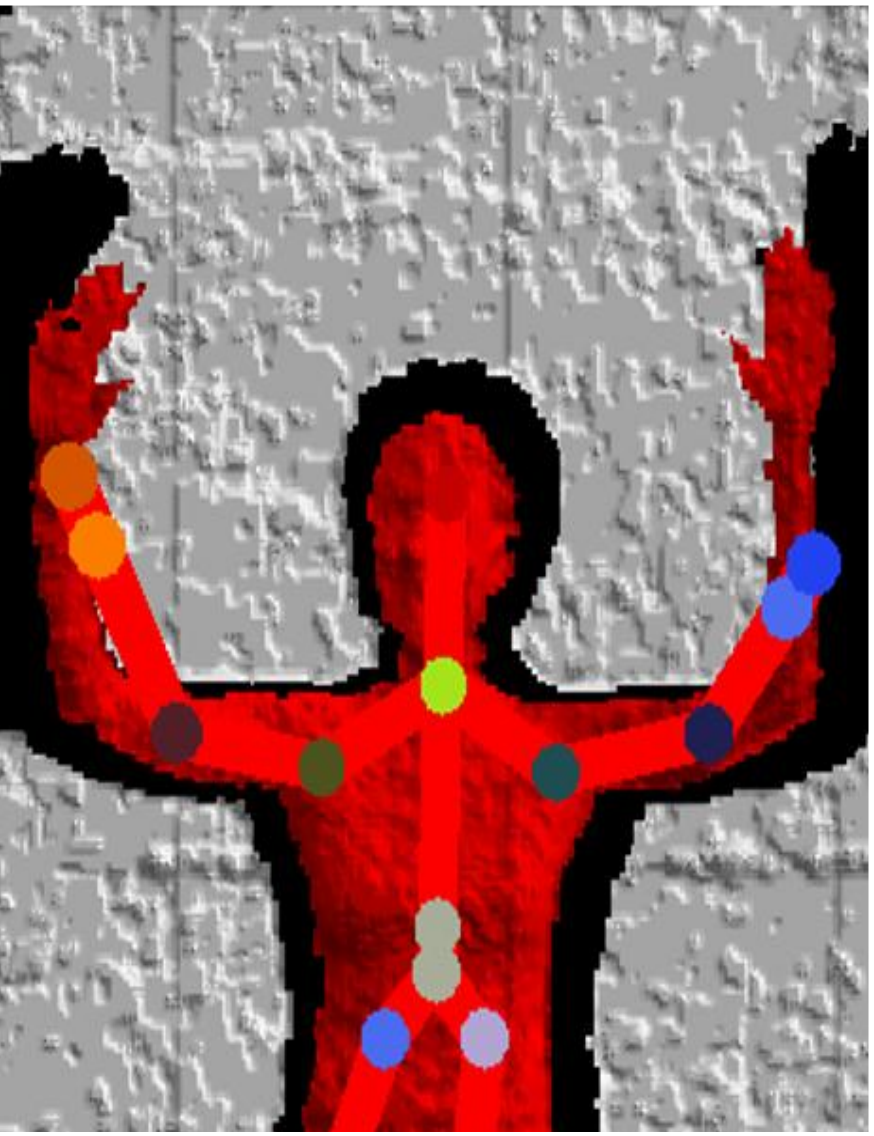
Challenges:

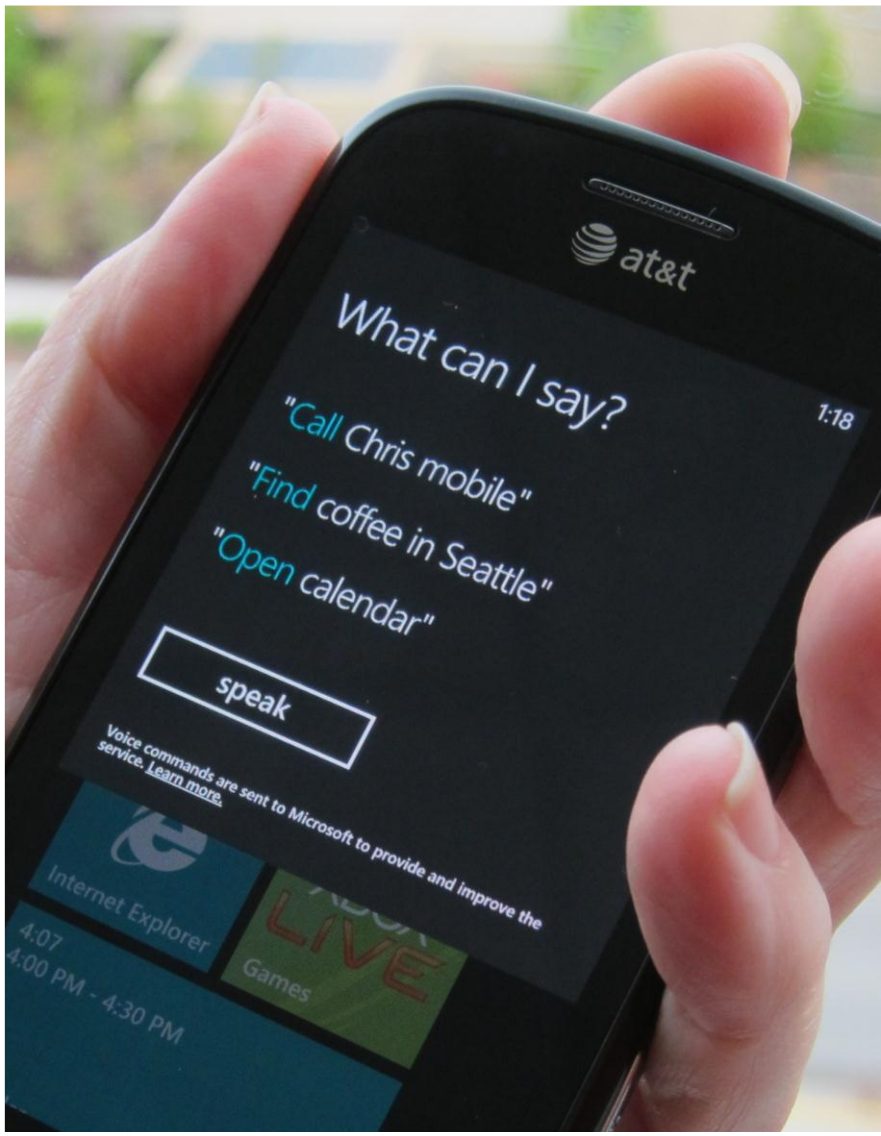
Inducing causality

Transfer learning

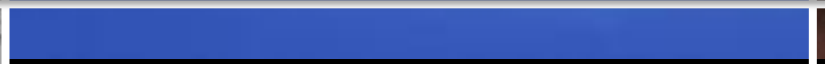
Temporal reasoning

Privacy and security

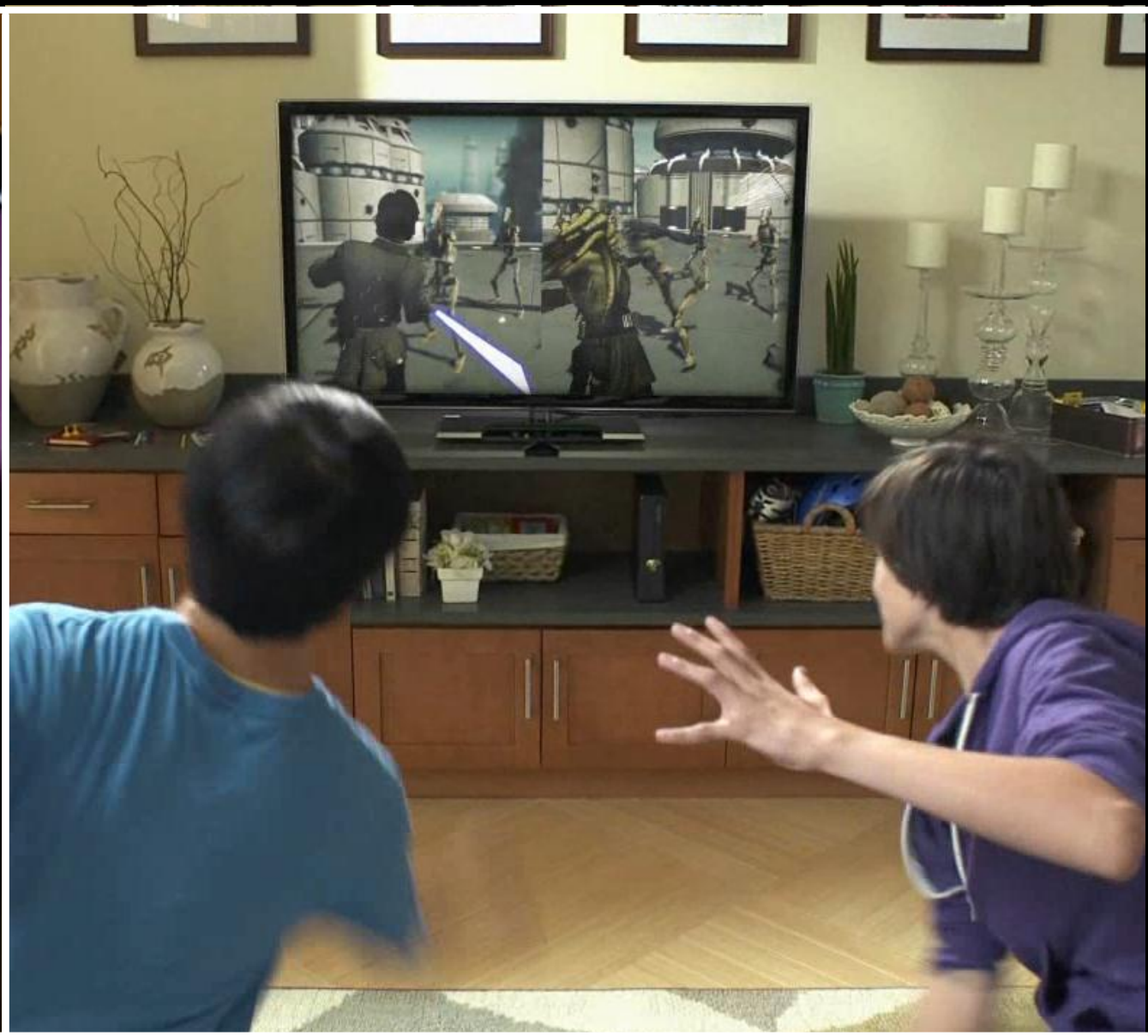




natural user interfaces



kinect: from impossible to possible



kinect: under the hood

Technologies:
Machine learning
Depth sensing
Speech recognition
Gestural interface
Parallel computing
Computer vision
Sound processing
Identity recognition

Challenges:
Ambient noise, variable light
Annoying little-brother problem

avatar kinect: a new way to be social

avatar kinect: facial mesh

avatar kinect: under the hood

Technologies:
Low-cost VGA sensor
Multi-person audio
Expression capture
Handling sensor data with low latency

Challenges:
Accurate head/body geometry capture
Low light/IR sensing
Hand/finger tracking
Eye gaze detection

Projects
Review
Group Treatment Sessions
Evaluate
New Bionic Contact Lenses
Prepare for
Regional Diabetes Symposium
Poland
Carole
Kastner
Steve
Chisholm
Martin
Penor
Lori
Jean
Virginie
Singh
Gurinder
Hao
Chen
Herman
Anne
Andersen
Thomas
Next Patients

computing transformed