

# DSA 8660 Group Project

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## How does IT transform the healthcare sector?

### Introduction

The 2017 Healthcare Information and Management Systems Society (HIMSS) Conference & Exhibition was one of the world’s largest and most influential healthcare IT events. Held from February 19–23, 2017 at the Orange County Convention Center in Orlando, Florida, the event brought together over 40,000 healthcare and IT professionals, including clinicians, policymakers, researchers, tech executives, industry leaders & more. With more than 1200 exhibits and hundreds of educational sessions, HIMSS 2017 served as a dynamic forum for exploring the constantly growing convergence of healthcare and technology. Key themes included cybersecurity, patient engagement, tele-medicine, and deep/machine learning integration for assistive technology, highlighting the growing need for connected and trained systems that support a rapidly growing healthcare landscape.

Since the 2017 conference, groundbreaking technologies have emerged with the potential to alter how healthcare data is managed, analyzed, and protected. Among these, Deep Learning has shown exceptional promise in areas such as medical imaging, diagnostics, and clinical decision assistance - offering accuracy beyond normal practice. A growth in ethical tech like differential privacy - which enable the sharing and analysis of sensitive health data while preserving individual privacy — shows an increasing concern about earning user trust in the era of big data and personalized medicine. These innovations represent both technical progress and also a shift in how healthcare systems operates at massive scale while maintaining trust, security, and ethical responsibility.

One of the key enablers behind the rise of these advanced data technologies is the significant improvement in computing infrastructure - especially through the widespread adoption of Graphics Processing Units (GPUs). Technology like NVIDIA’s CUDA have transformed GPUs from gaming hardware into essential tools for scientific computing, enabling massive parallel processing that powers modern AI and machine learning applications. As the cost of computing has decreased, high-performance tools—such as dedicated GPUs—have become more accessible and standardized, even in personal and enterprise-level systems. This democratization of computing power has allowed a broader range of researchers, developers, and healthcare organizations to experiment with and deploy data-intensive solutions that were once limited to well-funded labs or tech giants.

The focus areas of HIMSS 2017 and the emergence of next-generation information technologies point toward a radical shift for the healthcare sector. As artificial intelligence, improvements in patient privacy, and scalable

data infrastructure get better, they allow the possibility of data-driven personalized care. Our report explores how these technologies are driving change across the healthcare sector - from hospital workflows and patient experience, to large-scale population health management. By analyzing data sets from HIMSS 2017, we will begin to understand how convergence of healthcare and technology is redefining the foundations of patient care.

```
# loading datasets
```

```
HAEntity <- read.csv("data/HAEntity.csv")
head(HAEntity)
```

```
##   HAEntityId SurveyId ParentId UniqueId EntityNo
## 1      856165    56048    856162    44570 100067299
## 2      856166    56048    856162    27264    24193
## 3      856168    56048    856162    27265    24195
## 4      856169    56048    856162    27251 100051340
## 5      856170    56048    856162    27252 100051341
## 6      856171    56048    856162    27260 100059711
##
##                                     Name HAEntityTypeId HAEntityType
## 1 Behavioral Health at Marietta Memorial Hospital          2 Sub-Acute
## 2                               The Rehabilitation Center          2 Sub-Acute
## 3                               The Strecker Cancer Center          3 Ambulatory
## 4                               Marietta Health Care Physicians, Inc.          3 Ambulatory
## 5                               Wayne Street Medical Campus - Primary Care          3 Ambulatory
## 6                               Marietta Hospital Belpre Medical Campus          3 Ambulatory
##
##                                     CBSA MedicareNumber Address1
## 1 Parkersburg-Marietta-Vienna, WV-OH          401 Matthew Street
## 2 Parkersburg-Marietta-Vienna, WV-OH        1106 Colegate Drive
## 3 Parkersburg-Marietta-Vienna, WV-OH          401 Matthew Street
## 4 Parkersburg-Marietta-Vienna, WV-OH          400 Matthew Street
## 5 Parkersburg-Marietta-Vienna, WV-OH          802 Wayne Street
## 6 Parkersburg-Marietta-Vienna, WV-OH          125 Lee Street
##
##   Address2 City State Zip Phone Website Fax EmailConvention
## 1 Division H Marietta OH 45750 7403741501 NA
## 2 1st Floor Marietta OH 45750 7403741464 NA
## 3 Level G Marietta OH 45750 7403765000 NA
## 4 Marietta OH 45750 7403744500 NA
## 5 Suite 200 Marietta OH 45750 7405684190 NA
## 6 Belpre OH 45714 7404239640 NA
##
##   ProfitStatus ServicePopulation Type YearOpened
## 1 NA Behavioral Health NA
## 2 NA Rehabilitation 1993
## 3 NA Oncology 1993
## 4 NA Family Practice 1995
## 5 NA Family Practice 1995
## 6 NA Internal Medicine, Pediatric NA
##
##   OwnershipStatus NofFTE VendorSelStrategy NofBeds NofStaffedBeds FreeStanding
## 1 Owned NA 13 13 False
## 2 Owned NA 17 17 False
## 3 Owned NA NA NA False
## 4 Owned NA NA NA False
## 5 Owned NA NA NA False
## 6 Owned NA NA NA False
##
##   SameISSystem AcuteId NofPhysicians NofHCareVisits FTETotal DataCenterAcuteId
## 1 True 856163 NA NA NA NA
```

## 2	True	856164	NA	NA	NA	NA
## 3	False	NA	4	NA	NA	NA
## 4	False	NA	1	NA	NA	NA
## 5	False	NA	3	NA	NA	NA
## 6	False	NA	1	NA	NA	NA
##	PhysFT	PhysAffiliated	PhysTotal	IsImaging	PhysResidents	PhysHospitalists
## 1	NA	NA	NA	False	NA	NA
## 2	NA	NA	NA	False	NA	NA
## 3	NA	NA	NA	False	NA	NA
## 4	NA	NA	NA	False	NA	NA
## 5	NA	NA	NA	False	NA	NA
## 6	NA	NA	NA	False	NA	NA
##	PhysOther	NofIntensiveCareBeds	AverageDailyCensus	Latitude	Longitude	
## 1	NA	NA	NA	39.43069	-81.46479	
## 2	NA	NA	NA	39.43888	-81.44446	
## 3	NA	NA	NA	39.43132	-81.46489	
## 4	NA	NA	NA	39.43125	-81.46483	
## 5	NA	NA	NA	39.41248	-81.43749	
## 6	NA	NA	NA	39.27217	-81.58209	
##	IsIDSACOCClassified	IsIDSPCMHCertified	IsIDSPlanningACO	IsIDSPlanningPCMH		
## 1	False	False	False	False	False	
## 2	False	False	False	False	False	
## 3	False	False	False	False	False	
## 4	False	False	False	False	False	
## 5	False	False	False	False	False	
## 6	False	False	False	False	False	
##	NoOfNeonatalIntensiveCareBeds	PhysicianExtenders	PercVirtServers			
## 1	NA	NA	NA			
## 2	NA	NA	NA			
## 3	NA	0	NA			
## 4	NA	0	NA			
## 5	NA	0	NA			
## 6	NA	1	NA			
##	PercVirtComputers	County	DisasterMsgId	IsNICUPresent		
## 1	NA	Washington	NA	False		
## 2	NA	Washington	NA	False		
## 3	NA	Washington	NA	False		
## 4	NA	Washington	NA	False		
## 5	NA	Washington	NA	False		
## 6	NA	Washington	NA	False		

```
# summary(HAEntity)
```