

Digital Transformation of Healthcare

Building a Data Driven Pipeline

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Digital Transformation of Healthcare

- Healthcare Informatics
 - The management and use of patient healthcare information driven by insights gained using health information technology
 - The goal is to provide higher quality care (lower cost, greater availability, new healthcare opportunities) to our patients
- Course Objectives
 - Outline the components which form model bioinformatics pipelines
 - Critique clinical decision support tools
 - Evaluate study results and model predictions
 - Discuss types of machine learning models
 - Assess data quality
 - Calculate economic feasibility of informatics projects
 - Investigate biases within models
 - Analyze and evaluate raw data
 - Design new bioinformatics pipeline for application within the healthcare system

Course Overview

- Lecture format
 - Each class will focus on a specific part of the pipeline
 - Explore theoretical constructs through discussion and small group work
 - Work through real world cases using theoretical framework
- Final Project
 - Each student will present an informatics project to the class over the last two lectures
- Grading
 - Class is Pass/Fail
 - Grade is based on participation and final project
- Course Leaders
 - Michael Snow - msnow1@montefiore.org
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Lecture Schedule

1. Overview of course and introduction to building data driven bioinformatic pipelines
2. Building clinical decision support systems (Implementation)
3. Evaluating study results and model predictions (Modeling and Analysis)
4. Overview of machine learning models - part 1 (Modeling and Analysis)
5. Overview of machine learning models - part 2 (Modeling and Analysis)
6. Assessing data quality (Data Preparation)
7. Study Design and Data sources (Data Collection)
8. Calculating economic feasibility and impact (Stakeholder concerns)
9. Bioinformatics ethics and stakeholder engagement (Stakeholder Concerns)
10. Healthcare administrative databases (Infrastructure)
11. Exploratory data analysis (Hypothesis Generation)
12. Presentations - part 1
13. Presentations - part 2

Any Questions

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Objectives

After this lecture students will be able to

- Describe the different phases of a healthcare informatics project
- Diagram an informatics project as a pipeline

Metastatic Epidural Spinal Cord Compression

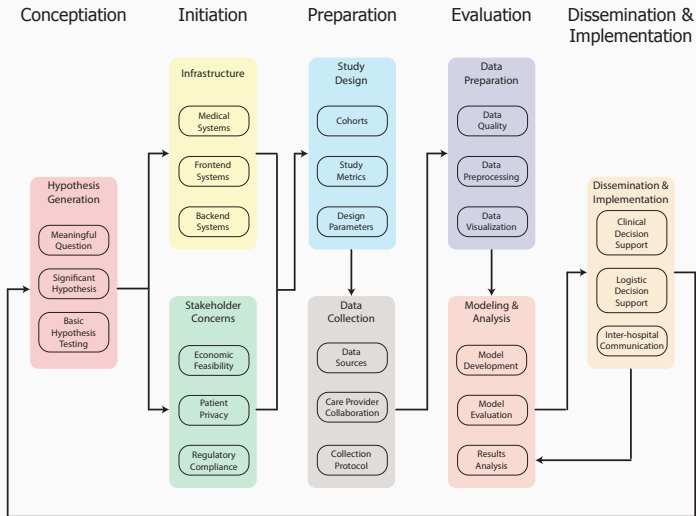
- Overview
 - Occurs in 2% to 5% of all cancer patients
 - Cord compression is the first manifestation in about 20% of patients
 - Survival is generally less than 6 months
 - Prognosis negatively correlates with severity of presenting symptoms
- Diagnosis
 - Clinical Findings + Imaging (MRI or CT)
- Treatment
 - Surgery
 - Radiation therapy

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Let's build our own pipeline for spinal cord compression

Healthcare Informatics Pipeline



Further Reading

- Weapons of Math Destruction
- Journal of the American Medical Informatics Association (JAMIA)
- Journal of Internet Medical Research
- arXiv.org