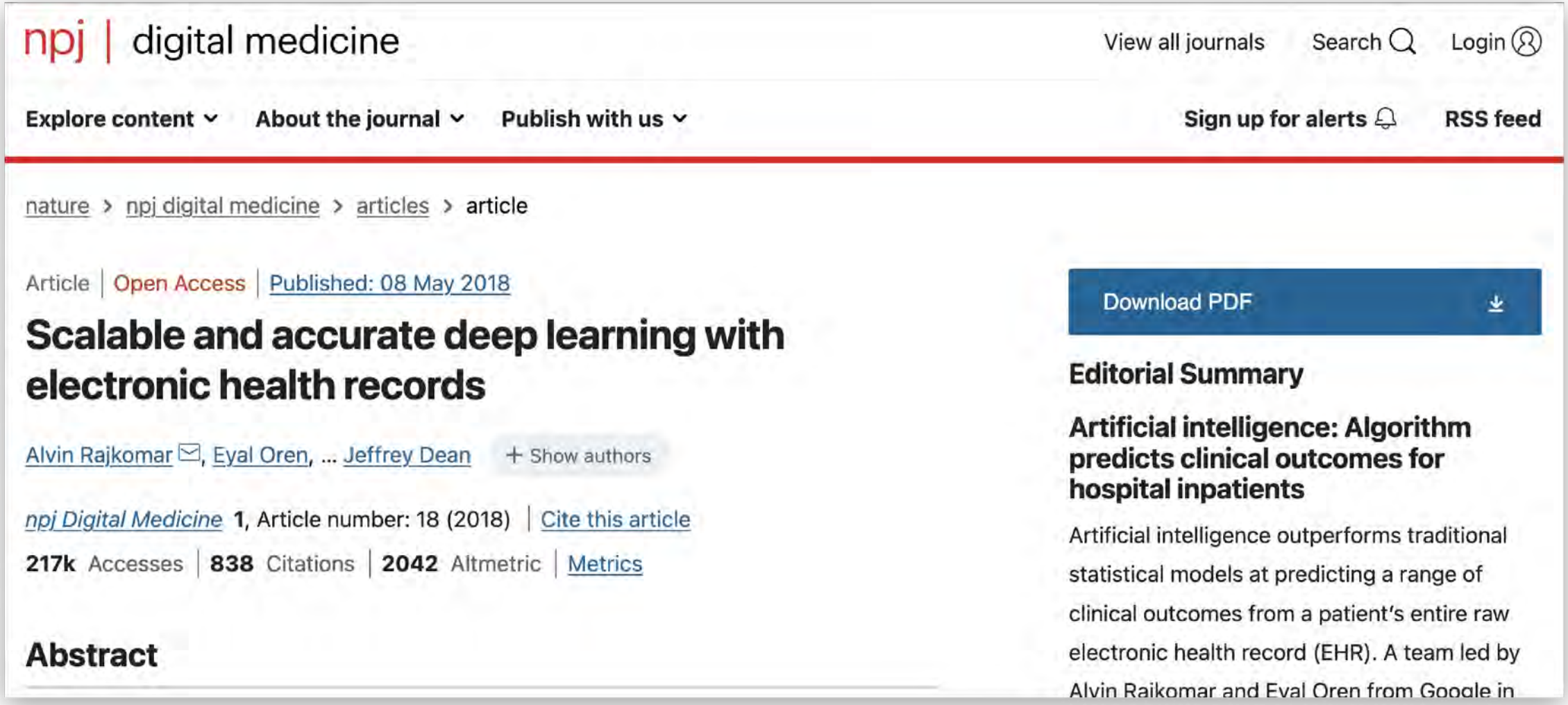
BST-209: Collaborative Data Science in Healthcare

Summer Program in Clinical Effectiveness

31 July 2023

Become familiar with machine learning concepts



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Scalable and accurate deep learning with electronic health records

Alvin Rajkomar, Eyal Oren, ... Jeffrey Dean + Show authors

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Abstract

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Editorial Summary

Artificial intelligence: Algorithm predicts clinical outcomes for hospital inpatients

Artificial intelligence outperforms traditional statistical models at predicting a range of clinical outcomes from a patient's entire raw electronic health record (EHR). A team led by Alvin Rajkomar and Eyal Oren from Google in

Get hands-on coding experience

```
---
title: "Predicting outcome of patients in the ICU"
output: pdf_document
date: "1/1/2023"
---

```{r load_data, include=FALSE}
sql_query <- "SELECT i.subject_id, i.hadm_id, i.los
              FROM `physionet-data.mimiciii_demo.icustays` i;"
data <- run_query(sql_query)
head(data)
```

This document shows how RMarkdown can be used to create a reproducible analysis using
MIMIC-III (version 1.4). Let's calculate the median length of stay in the ICU and
then include this value in our document.

```{r calculate_mean_los, include=FALSE}
avg_los <- median(data$los, na.rm=TRUE)
rounded_avg_los <- round(avg_los, digits = 2)
```

So the median length of stay in the ICU is `r avg_los` days. Rounded to two decimal
places, this is `r rounded_avg_los` days. We can plot the distribution of length of
```

Build collaborations

Photo: 49th Annual Conference of the Society of Critical Care Medicine (SCCM 2020)

Schedule

Overview

- First two weeks, focus on methods for learning from data
    - Responsible machine learning
    - Data wrangling
    - Building and evaluating models
    - Communication of results
- Final week of the course:
    - Explore bias in oxygen saturation measurements.
    - Plan and present a team project.

Week 1

	Talk (2-2.30pm)	Workshop (2.30-3.30pm)
Mon 31 Jul	Course introduction	Leo Celi (MIT)
Tue 1 Aug	Vinith Suriyakumar (MIT)	Responsible ML
Wed 2 Aug	Ahmed Abdelfattah (Harvard)	Responsible ML
Thu 3 Aug	Tristan Naumann (Microsoft)	Introduction to ML
Fri 4 Aug	Danielle Bitterman (Harvard)	Introduction to ML

Week 2

	Talk (2-2.30pm)	Workshop (2.30-3.30pm)
Mon 7 Aug	Fábio Duarte (MIT)	Introduction to ML
Tue 8 Aug	Suzy McKinney (Harvard)	Tree models
Wed 9 Aug	Weiwei Pan (Harvard)	Tree models
Thu 10 Aug	Vesela Kovacheva (Harvard)	Process mining
Fri 11 Aug	Eugenio Zuccarelli (CVS)	Generative AI

Week 3

	Workshop (2 - 3.30pm)
Mon 14 Aug	Project (pulse oximetry)
Tue 15 Aug	Project (pulse oximetry)
Wed 16 Aug	Project (pulse oximetry)
Thu 17 Aug	Prepare group presentations
Fri 18 Aug	Group presentations

Presentation (Fri 18 Aug)

- Propose a project
- 6 minute talk (group, slides)
  - Introduction
  - Goals
  - Data
  - Methods

Groups

Group 1

João Matos

Naira Link

Sumedha Arya

Richard Newcomb

Yusuke Takeda

Group 2

Renata Proa

Chrystinne Fernandes

David Gritsch

Alon Dagan

Max Kravitz

Group 3

Niklas Adams

Fredrik Willumsen Haug

Asimina Lazaridou

Pui Ning Pauline Yeung

Marcela Marsiglia

Group 4

Lasse Hansen

Zara Sheikh

Hiten Naik

Kieun Seok

James Stone

Group 5

Nikolaj Munch

Sarah Loh

Heena Manglani

Rachel Rosen

Sung Hae Chang

Group 6

Tristan Struja

Khushboo Teotia

Ana Cecilia Farfan Ruiz

Hiroki Mizuno

Annie Liu

Sul A Lee

Katherine Ravi

Group 7

David Restrepo

Ardel Romero Pabon

Kevin An

Hanh Nguyen

Lais Duarte

Group 8

Eptehal Nashnoush

Krishnaveni Parvataneni

Christopher Callahan

Alon Dagan

Margaret Ong

Mark Kravitz

Group 9

Kevin Ma

Vidya Raghavan

Kai-Qian Kam

Alexandra Geanacopoulos

Anisha Gundewar

Group 10

Po-Chih Kuo

Chao-Ju (Luna) Chen

Tina Shiang

Hannah Chan

Rodrigo Rosa Gameiro

Group 11

Leo Anthony Celi

Jack Gallifant

Adrien Carrel

Heng Cai

Christopher Dall

Evaluation

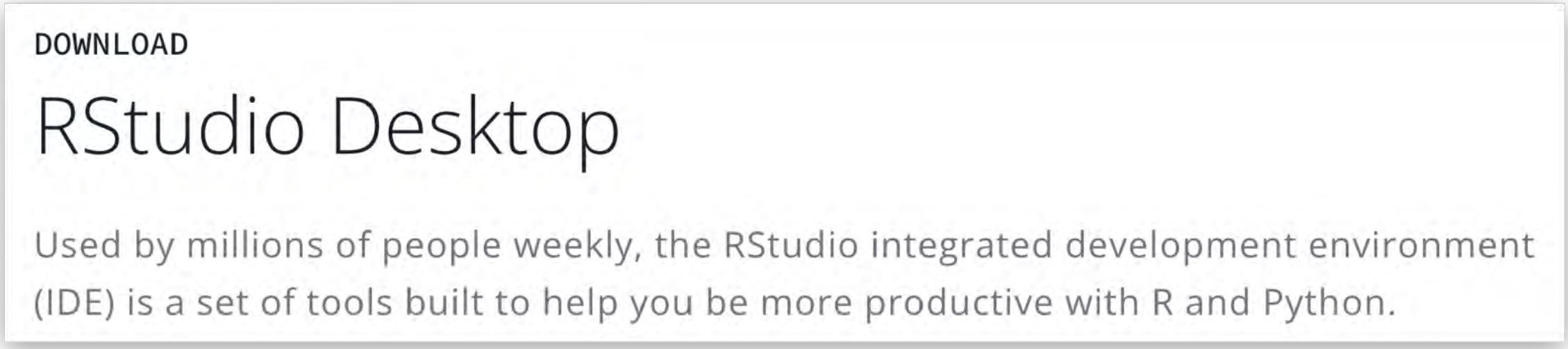
Final grades based on:

- Attendance and participation: 60%
- Group presentation 40%

Any questions?

Getting set up

RStudio



https://posit.co/download/rstudio-desktop/

Course materials

https://github.com/mit-lcp/bst209