Brian Macdonald, Florida Panthers

LinkedIn: bmacNHL
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Intro for panel on consulting:

Past

- B.S. Electrical Engineering, Lafayette College, Easton, PA
- Masters and Ph.D. in Mathematics, Johns Hopkins University, Baltimore, MD
  - Shout out to Hsin-hao Su!
- Assistant and Associate professor at United States Military Academy, West Point, NY
- Two liberal arts colleges! A few years of experience teaching.
- Started working on sports data, in part because students like sports

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Present:

- Director of Hockey Analytics, Florida Panthers
  Director of Data Science and Research, Florida Panthers
  - Act as a consultant within the org. Clients: other departments
  - Act as a client for projects with business analytics students at U. Miami
  - Teach a very informal course in data science within the org

- Adjunct professor of sports analytics, FAU, Boca Raton, FL
  - Non-technical sports analytics course for MBA students
  - Team-taught with Dennis Lock
    - Miami Dolphins Director of Football Analytics
    - One of the authors of the Lock-Lock-Lock-Lock-Lock book

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Future:

- Part-time faculty at University of Miami
- More student projects with UM
  - I'll be both faculty advisor and the client.
  - Might end up talking to myself (even more than usual)

Agenda for this talk

- I asked $3 \leq n \leq 4$ people what they would like to hear about.
- Discuss a few projects that we have worked on
  - Projects that I've presented to math/stats/analytics/business students
  - Good examples of several important aspects of data science
    - multivariate thinking
    - Interpretation and communication
  - One project that students worked on for us
    - What skills did they use?
    - What skills and experience did they gain?
  - None of them are out of reach for junior/senior level projects
    - Assuming some experience in coding in R or another language
- What do we look for in interns/students?
- Where do we need the most help?
- Thoughts on things to consider when determining curriculum.

Projects

Note to self: Switch to other presentation!

Goal of the project

Create an interactive visualization of customer data on map of south FL.

- Didn’t have one specific business application in mind
- Guessed it would have several business applications
- Wanted visualizations, not tables of numbers
- Wanted interactive, not static

Main Steps:

- Acquire, clean, organize, merge data from these sources:
  - Internal sales data
  - Census
  - Google maps
  - FDOT traffic data
- Visualize on map of south FL
- Create interactive web app

See other presentation

What skills did they use/learn?

- R skills
  - Data acquisition (google maps, census)
  - Data management (merging google maps, census, and sales data together)
  - Data visualization (creating heat maps, scatter plots, within Shiny)
- How to develop reproducible work that others can build on in the future.

Ways we built on their work:

- Created 4 maps side-by-side
- Added more census data
- Added scatter plots
- All were fairly straightforward because code was organized and commented.

- How to develop work that can be automated and updated daily

What didn’t they use/learn?

- Build models
- Interpret results of model
- Communicate results of model
- Provide recommendations

Students in the upcoming semester will be continuing this and will gain experience in these areas.

They will also gain experience in data management, because we still need help there.

Comments

- Data management
  - Sometimes said: 80% data management, 20% analysis and other stuff.
  - Data management is our biggest bottleneck
    - We need more help in this area than analysis
    - When I'm looking for interns, coding experience is non-negotiable
  - Course priorities are not always aligned with these needs
    - At least not in the courses I taught
    - And not in my own attendance example

- Multilevel models
  - Often have categorical variables with lots of levels (in hockey and business)

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Future projects

- Data visualization
- Lead scores
- Email Marketing
- Digital marketing
- Where should we build future ice rinks for youth hockey and figure skating?