IAPA NATIONAL CONFERENCE — DAY 2: MANAGING the CHALLENGES of NOW - and their FUTURE IMPLICATIONS
ADVANCING ANALYTICS | 2020
iapa — Institute of Analytics Professionals of Australia

INTERPRETABILITY vs EXPLAINABILITY in MACHINE LEARNING
with CYNTHIA RUDIN

BLACK BOX PREDICTIVE MODEL is a FORMULA that is either too COMPLICATED to UNDERSTAND or PROPRIETARY.
- DENIED PAROLE — miscalculated COMPAS SCORE
- INCORRECT AIR QUALITY MONITORS

INTERPRETABLE MODEL OBEYS DOMAIN-SPECIFIC SET of CONSTRAINTS - EASY to UNDERSTAND COMPUTATIONS

PREVENTING BRAIN DAMAGE in CRITICALLY ILL PATIENTS
- EXPENSIVE
- HOW DO WE ALLOCATE MONITORS?
- 2HELPS2B
  - ★ CREATED by CLINICIANS
  - ★ ACCURATE as BLACK BOX
  - ★ DOCTORS CAN MAKE the CALL

RESULTED in a REDUCTION of MONITOR USE - MEANING MORE PATIENTS are BEING MONITORED!

COMPAS SCORE vs. CORELS — PREDICTING ARRESTS
(AGE? PRIOR ARREST SCORE?)

EXPLAINABLE ML WHEN you USE a BLACK BOX and EXPLAIN AFTERWARDS

INTERPRETABLE MODEL ≠ EXPLANATION of BLACK BOX

⚠ DOUBLE TROUBLE: FORCING you to RELY on TWO MODELS that DISAGREE
⚠ TYPOs: PROBLEM when INPUTTING DATA
⚠ IF you PRODUCE an ACCURATE INTERPRETABLE MODEL, WHY EXPLAIN a BLACK BOX?

APPROXIMATIONS are NOT EXPLANATIONS!
? DOES COMPAS DEPEND on RACE?
a 1% ERROR RATE = 75% of a TYPO!

THIS LOOKS LIKE THAT! → DEEP LEARNING
EVEN for COMPUTER VISION, we STILL HAVE an INTERPRETABLE MODEL of the SAME ACCURACY as a BLACK BOX!

TELLING THE PATIENT CARE STORY through DATA
with DR. PAMELA PEELE

LOTS of DATA... NO GLUE!
- UPMC HEALTH PLANS
- the SWEET SPOT
- CONTRACTED NETWORK + PARTNERS
- UPMC CLINICAL ENTERPRISE
  - ● MEDICAL + PHARMACY SERVICES
  - ● ELECTRONIC MEDICAL RECORDS
  - ● SELF REPORTED ● WEARABLES...

MODELLING the READMISSION RISK
VARIATION in PRACTICE PATTERNS
COMPARISON ACROSS DIFFERENT HOSPITALS

PROVIDER NETWORK PLOT

MOVEMENT of PATIENTS ACROSS FACILITIES and PROVIDERS
PROVIDER PATIENT SHARING

HOW DO MEMBERS MOVE AROUND PHYSICIANS?
EVERY MEMBER is GEO-CODED!
PHYSICIAN REFERRAL PATTERNS

TOPOGRAPHY of DISEASE
67 CHRONIC DISEASES
INFORMS USE of RESOURCES
DYSFUNCTIONAL REFERRAL NETWORKS

LOWERS IQ
SENTINEL CHILD APPROACH to LEAD POISONING
WE KNOW WHO is POSITIVE - WE FIND EVERY UNTESTED CHILD NEARBY and TEST THEM

DO WE NEED to OUTREACH and ASSIST THEM?

GLUING HOUSEHOLDS together
ONE PERSON, ONE CONTRACT!
USE of HEALTHCARE BEFORE/AFTER DEATH of ANOTHER HOUSEHOLD MEMBER
OPIOID USE + MISUSE

HOMELESSNESS
- PARTNERING in COMMUNITY
- PROVIDES HOUSING
- GO to DOCTOR and COMPLETE TREATMENT PLAN

SAVES $6400 per YEAR!
JUST in MEDICAL COSTS!
PATHWAYS to WORK

DANGERS of BIG DATA
an INFORMATION-RICH ENVIRONMENT CREATES a SCARCITY of WHAT it CONSUMES!

DEVELOPING an ANALYTICS MATURITY JOURNEY
with SVETA FREIDMAN

A LONG JOURNEY that NEVER HAPPENS OVERNIGHT!
PREDICT + ACT
WHERE DO YOU START? — MATURITY MODELS
UNDERSTANDING the DATA
GAP BETWEEN EXPECTATION and REALITY!

ASK the RIGHT QUESTIONS → EXECUTIVE SUPPORT → UNDERSTAND PRIORITIES → UNDERSTAND BUSINESS DRIVERS (loop)

EVOLVE your DATA + ANALYTICS MATURITY by TAKING STEPS in:

1. STRATEGY
- ★ CLEAR VISION
- ★ WORK with LEADERS to DEVELOP
- ★ ACHIEVABLE GOALS

2. PEOPLE
- ★ ALL ABOUT the TEAM
- ★ ENSURE PROPER SKILLS
- ★ UNDERSTAND LIMITATIONS
- ★ FLEXIBLE MODEL — CONSULTANTS

DECENTRALISED / CENTRALISED → HYBRID MODEL — LEARNING FROM EACH OTHER!

BUILD a MULTI-SKILLED TEAM
- DATA ANALYST
- DATA SCIENTIST
- DATA ENGINEER

3. GOVERNANCE
- ★ WHO is USING WHAT ASSETS?
- ★ FRAMEWORK

4. TECHNOLOGY
- ★ DEVELOPING PLATFORMS for INTEGRATED ANALYTICS
- ★ PACKAGE APPLICATIONS for QUICK WINS

RUN LOOPS, not LINES!
EXISTING DATA → NEW UNDERSTANDING → PREDICTIONS
QUICK WINS in CONSUMER ANALYTICS
EMBED ANALYTICS in FRONT LINE TOOLS!

DRIVING BETTER USE of & ACCESS to GOVERNMENT DATA
with DR. PHILLIP GOULD

DATA AVAILABILITY & TRANSPARENCY BILL
PEOPLE are NERVOUS about DATA SHARING

DELIVER BETTER GOVERNMENT SERVICES e.g. PREPOPULATED TAX FORMS
TELL US ONCE!
PRIVATE SECTOR ALSO INVOLVED (with CONTROLS)
USE DATA to DEVELOP POLICY and PRODUCTS

LARGE DATA SETS
COMMONWEALTH DATA
HEALTH, EDUCATION...

WE'VE ARRIVED at a SIGNIFICANT MILESTONE in DATA REFORM!
2017 2018 2019 2020

DRIVING BETTER DATA PRACTICES, ATTITUDES and CULTURE...

MORE CONSISTENT DATA SHARING → STREAMLINED MODERN and SAFE DATA SHARING
ADDED SAFEGUARDS
AUTHORITY to SHARE

PUBLIC SECTOR SHARING
INTERNAL AGENCY ACCESS ONLY
CLOSED DATA | SHARED DATA | OPEN DATA RELEASE

SAFE GUARDS | PARTNERSHIPS TRANSPARENCY | PUBLIC BENEFIT — only when IT'S SAFE

AGENCIES HAVE NO DUTY to SHARE
COMPLIANCE is an IMPORTANT FUNCTION, but SEPARATE to this BILL

DATA SHARING PRINCIPLES
your FEEDBACK will HELP US GET the REFORMS RIGHT!

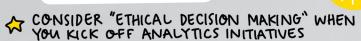### DELIVERING the 3 S's of DATA SCIENCE - SUCCESS, SUSTAINABILITY and SCALABILITY
DR. ALEX ANTIC

DATA SCIENCE SUCCESS HINGES ON:
1. HAVING the RIGHT PEOPLE in the RIGHT ROLES
2. CLEAR ALIGNMENT to STRATEGIC GOALS with MEASURABLE OUTCOMES
3. COMMUNICATION and COLLABORATION

The NEED for CDL ~ COMPULSORY DATA LITERACY
KSHIRA SAAGAR

- ★ to KEEP UP with RAPID MARKET CHANGES, you NEED to be CONNECTED to the DATA
- ★ BECOMING DATA LITERATE and HAVING DATA INFERENCE SKILLS is INCREASINGLY IMPORTANT
- ★ ACTUALLY - those SKILLS are a MUST HAVE NOW!

RESPONSIBLE AI: WHY IT MATTERS even MORE NOW
ANGELA KIM

- ★ CONSIDER "ETHICAL DECISION MAKING" WHEN you KICK OFF ANALYTICS INITIATIVES
- ★ "ETHICAL AI by DESIGN" CAN ENSURE MAXIMISING the VALUE CREATED by ANALYTICS PROJECT
- ★ RESPONSIBLE AI is even MORE in this TIME of UNCERTAINTY

PRODUCT ANALYTICS: VITAL FOR THE NEW DIGITAL ECOSYSTEM
DUHITA KHADEPAU

- ★ ANALYSIS of CONSUMER BEHAVIOUR, MARKET TRENDS and CURRENT ECONOMIC SITUATION is a TRADITIONAL ANALYTICS FOCUS
- ★ PRODUCT ANALYSIS is an ESSENTIAL PART of MOVE to DIGITAL PRODUCT
- ★ KEY to CONSIDER is TOOLS and TECH, TALENT and DATA ORG STRUCTURES, and DATA LITERACY and DATA DEMOCRACY within the ORGANISATION

INVISIBLE WOMEN: the NEED for GREATER GENDER DIVERSITY in DATA
KEEGAN O'SHEA

- ★ DIVERSITY is CRITICAL to a HIGH PERFORMING ANALYTICS TEAM
- ★ with LOW RATES of STUDY in STEM and DATA SCIENCE, WHAT WILL ENCOURAGE MORE WOMEN in ANALYTICS?
- ★ BETTER COMMUNICATION of the QUALIFICATIONS and DAY-to-DAY ACTIVITIES of the ROLES and MORE OPPORTUNITIES to CONNECT with PRACTIONERS