**Capstone Project Plan for Analysis**

**Medical AI Research**

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* **Problem statement:**

Predicting Postoperative Blood Transfusions for Coronary Artery Bypass Graft Patient

* **Dataset:**

From national medical database

|  |  |  |
| --- | --- | --- |
| **Year** | **# of rows** | **# of columns** |
| 2020 | 1493 | 276 |
| 2019 | 1639 | 274 |
| 2018 | 1821 | 274 |
| **TOTAL** | **4953** | **274** |

* **IV: 20 features have been pre-selected for modeling based on previous research**
  1. Sex: Male, female
  2. Race: White, black, other
  3. Body mass index (BMI) (using height and weight)
  4. INOUT: inpatient, outpatient
  5. Age
  6. ANESTHES: general, regional, other
  7. DIABETES
  8. SMOKE
  9. DYSPNEA
  10. FNSTATUS2
  11. HXCOPD
  12. ASCITES
  13. HXCHF
  14. HYPERMED
  15. DIALYSIS
  16. DISCANCR
  17. STEROID
  18. WTLOSS
  19. BLEEDIS
  20. TRANFUS
* **DV:** *OTHBLEED* (had blood transfusion or not, *binary*)
  + Can be further divided into intraoperative vs. postoperative (3 classes)
    - Intraop, postop, no transfusion
  + Target variable not imbalanced (~50%)
* **Proposed analysis plan:**
  + Classification model (binary or multi-class(3))
  + Feature Selection: Random Forest
  + Modeling: try at least three, from simple to complex
    - Logistic Regression (traditional)
    - MLP (shallow NN)
    - FNN (deep NN)
  + Performance index: Accuracy & F1
* **Timeline:**

|  |  |
| --- | --- |
| **Week** | **Progress** |
| 1/23 | Choose research project, write analysis plan & timeline, get dataset |
| 1/30 | Data preprocessing & EDA, set up github repo |
| 2/6 | Feature selection & Logistic regression |
| 2/13 | MLP |
| 2/20 | FNN |
| 2/27 | Discuss the preliminary results |
| 3/5 | Discuss the preliminary results |
| 3/12 | Spring break – prepare for presentation |
| 3/19 | Preliminary presentation |
| 3/26 | Improve model based on feedback |
| 4/2 | Set up GUI for visualization |
| 4/9 | Write up paper |
| 4/16 | Wrap up paper and prepare for presentation |
| 4/23 | Final presentation and paper submission |