Supplementary Material 1. Code for myopia lens recommender

```
setwd("xxxxxx") # Move the working directory to the folder containing data
for (brand in c("DSDO", "DOT", "DIMS", "HALT", "HORI")) {
  saveRDS(models[[brand]], file = paste0("models/model_", brand, ".rds"))
}
recommend_brand <- function(new_patient) {
  features <- c("GENDER", "AGEofONSET", "Sphere", "Cylinder", "Axis",
                "K1", "K2", "AST", "PD", "WTW", "AL", "CCT", "AD", "LT", "VT")

  # Ensure column order
  new_patient <- new_patient[, features]

  # Load all models
  model_files <- list.files("models", full.names = TRUE)
  brands <- gsub("models/model_|\\.rds", "", model_files)
  names(model_files) <- brands

  predictions <- vapply(models, function(mod) predict(mod, new_patient), numeric(1))


  sorted_result <- sort(predictions)

  cat(">>> Predicted RateofAL for each optical design (lower is better):\n")
  print(round(sorted_result, 4))

  best_design <- names(sorted_result)[1]
```

```
    cat("\n>>> Recommended optical design: ", best_design, "\n")

    return(list(
        prediction = round(sorted_result, 4),
        recommendation = best_design
    ))
}

# Simulate a new patient
new_patient <- data.frame(
    GENDER = 1, # (0=Female, 1=Male)
    AGEofONSET = 10,
    Sphere = -2.5,
    Cylinder = -1.0,
    Axis = 90,
    K1 = 42,
    K2 = 44,
    AST = -1.0,
    PD = 6.5,
    WTW = 11.5,
    AL = 24.0,
    CCT = 550,
    AD = 3.0,
    LT = 3.5,
    VT = 17.0
)
```

```
# Prediction and recommendation

res <- recommend_brand(new_patient)
```