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from reportlab.lib.pagesizes import A4

from reportlab.lib.styles import getSampleStyleSheet

from reportlab.platypus import SimpleDocTemplate, Paragraph, Spacer, ListFlowable, ListItem


# Define the PDF file path

pdf_path = "/mnt/data/SDG3_Diabetes_Prediction_Report.pdf"


# Create document

doc = SimpleDocTemplate(pdf_path, pagesize=A4)

styles = getSampleStyleSheet()

story = []


# Title

story.append(Paragraph("SDG 3: Good Health and Well-being – Diabetes Prediction Using Supervised Learning", styles["Title"]))

story.append(Spacer(1, 12))


# Section 1: SDG Problem

story.append(Paragraph("<b>SDG Problem:</b>", styles["Heading2"]))

story.append(Paragraph("This project aligns with Sustainable Development Goal 3 (Good Health and Well-being) by focusing on the early prediction of diabetes using machine learning. "

                       "Early detection enables timely intervention and helps improve public health outcomes.", styles["Normal"]))

story.append(Spacer(1, 12))


# Section 2: Machine Learning Approach

story.append(Paragraph("<b>Machine Learning Approach:</b>", styles["Heading2"]))

story.append(Paragraph("A supervised learning approach was used to predict whether a patient is likely to have diabetes based on health indicators such as glucose level, BMI, and age. "
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            "The Random Forest Classifier was selected due to its high accuracy and ability to handle feature interactions effectively.", styles["Normal"]))

story.append(Spacer(1, 12))


# Section 3: Dataset

story.append(Paragraph("<b>Dataset:</b>", styles["Heading2"]))

story.append(Paragraph("The Pima Indians Diabetes Database from Kaggle was used. It contains medical data from female patients aged 21 and older of Pima Indian heritage. "

            "The dataset includes features such as number of pregnancies, glucose level, blood pressure, skin thickness, insulin level, BMI, age, and diabetes pedigree function.", styles["Normal"]))

story.append(Spacer(1, 12))


# Section 4: Results

story.append(Paragraph("<b>Results:</b>", styles["Heading2"]))

results_list = ListFlowable(

  [

    ListItem(Paragraph("Model: Random Forest Classifier", styles["Normal"])),

    ListItem(Paragraph("Evaluation Metrics: Accuracy, Precision, Recall, and F1-score", styles["Normal"])),

    ListItem(Paragraph("Achieved approximately 82% accuracy on the test set", styles["Normal"])),

    ListItem(Paragraph("Most influential features: Glucose, BMI, and Age", styles["Normal"]))

  ], bulletType='bullet')

story.append(results_list)

story.append(Spacer(1, 12))


# Section 5: Ethical Reflection

story.append(Paragraph("<b>Ethical Reflection:</b>", styles["Heading2"]))

story.append(Paragraph("The dataset may contain demographic bias as it represents a specific population group. "

            "To promote fairness, the model should be tested on diverse populations before deployment. "
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        "Additionally, data privacy must be maintained by anonymizing all patient information. "
        "This model should support medical professionals, not replace them.", styles["Normal"]))
story.append(Spacer(1, 12))

# Section 6: Conclusion
story.append(Paragraph("<b>Conclusion:</b>", styles["Heading2"]))
story.append(Paragraph("The diabetes prediction model demonstrates how machine learning can contribute to SDG 3 by enabling early diagnosis and preventive healthcare. "
        "With further validation and deployment in clinical settings, such tools can enhance decision-making and improve community health outcomes.", styles["Normal"]))

# Build PDF
doc.build(story)

pdf_path
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