Mini-Project 1 Report on Automated Behavior and Rule-Breaking Detection System

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1. Introduction

The identification of rule-breaking and inappropriate behavior is a growing area of research in artificial intelligence. With the rise of smart surveillance, education monitoring, and workplace regulation systems, automated solutions are required to detect such behaviors in real time.

This mini-project, Automated Behavior and Rule-Breaking Detection System, focuses on the first milestone: Data Collection and Preparation. The main goal of this stage is to build a structured and labeled dataset that can later be used to train machine learning models for detecting good and bad behavior.

2. Methodology

To achieve this milestone, the following steps were carried out:

1. **Data Definition**

   o   Clearly defined what constitutes "good behavior" and "bad behavior" within the project scope.

   o   Examples: Following rules (good), ignoring safety norms (bad).

2. **Data Collection**

   o   Gathered raw data from selected sources such as videos, images, or activity logs.

   o   Focused on ensuring diversity in the dataset to capture different behavior scenarios.

3. **Data Annotation**

   o   Labeled the collected data with appropriate tags such as *Good Behavior* or *Rule-Breaking Behavior*.

   o   Ensured consistency and accuracy in annotation to avoid bias.

4. **Data Preparation**

   o   Cleaned the dataset to remove duplicates, noisy samples, or irrelevant entries.

   o   Preprocessed the data (resizing images, normalization, formatting).

   o   Split the dataset into **training, validation, and testing sets** for later use.

3. Work Done

Block Diagram of the Process

Raw Data Sources → Data Cleaning → Data Annotation → Preprocessing → Final Dataset

Start

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Define Behaviors

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Collect Raw Data

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Annotate Data

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Clean & Preprocess

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Create Final Dataset

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End
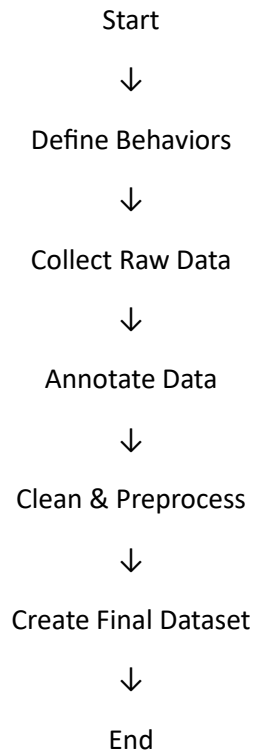
Output of This Milestone

- A well-structured dataset consisting of good and bad behavior samples.

- Dataset split into training, validation, and testing portions.

- Statistical details such as dataset size and class distribution documented for further stages.

4. Discussion of Results

The milestone was successfully completed with a labeled dataset ready for model training. The dataset ensures that the project has a strong foundation for the next steps. By defining clear behavior categories, we eliminated ambiguity in data labeling.

Key results of this stage:

i. Data is now standardized and usable for ML training.

ii. Both positive (good behavior) and negative (rule-breaking) samples are included.

iii. Potential dataset imbalance was noted and documented, to be handled in later stages.

5. Extension of the Work

The next steps in the project will involve:

Δ **Model Training & Evaluation**: Using the prepared dataset to train machine learning models for classification.

Δ **Model Integration**: Developing an inference pipeline that can classify new unseen data in real time.

Δ **Post-Processing**: Designing alert or logging systems that act upon detected behaviors.

Δ **Dataset Expansion**: Continuously adding new samples to improve model accuracy and generalization.