

Project Design Phase-I Solution Architecture

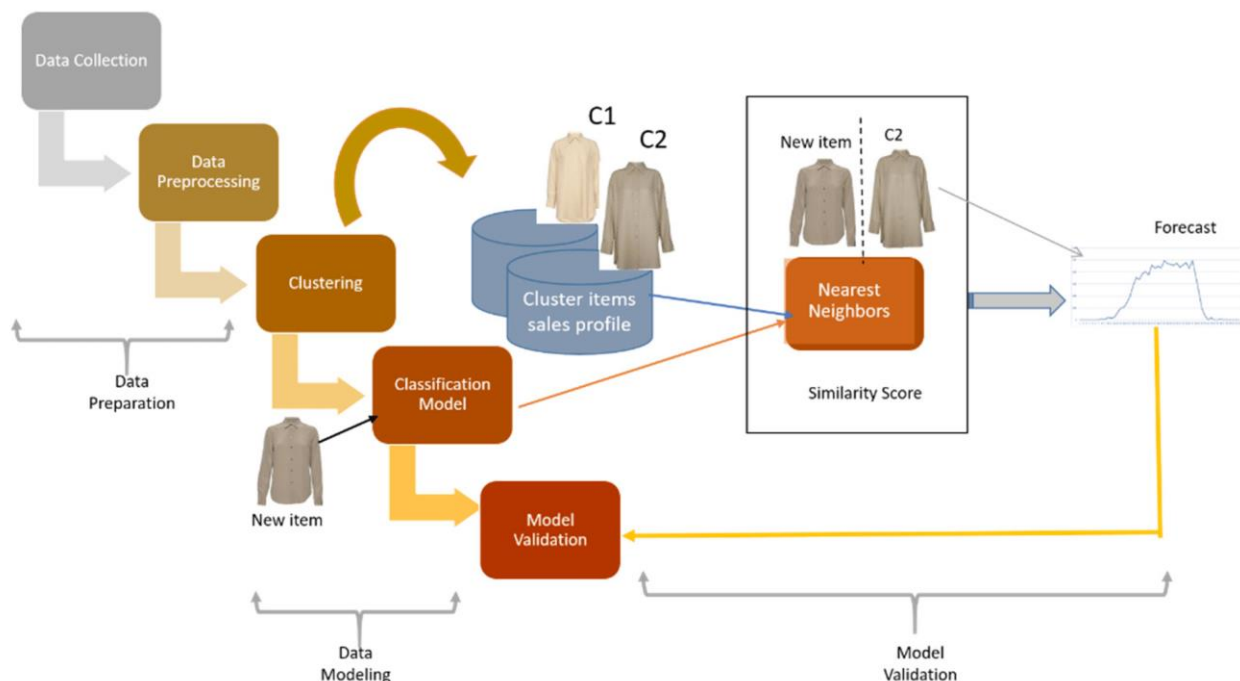
Date	31 October 2023
Team ID	Team-592923
Project Name	Garment Worker Productivity Prediction
Maximum Marks	4 Marks

Solution Architecture:

The Solution Architecture Diagram shows the key components of the garment worker productivity prediction model and how they interact with each other. The data collection and preparation component is responsible for collecting and preparing the data that will be used to train the model. The feature engineering component is responsible for creating new features from the existing data and transforming the features to different scales.

The model selection and training component is responsible for selecting a machine learning algorithm and training the model on the prepared data. The model evaluation component is responsible for evaluating the performance of the trained model on a held-out test set. The model deployment component is responsible for deploying the trained model to production so that it can be used to predict worker productivity in real time.

Solution Architecture Diagram:



Key Components:

1. **Data Ingestion:** Ingest and preprocess the dataset containing various attributes of garment production.
2. **Feature Engineering:** Transform and engineer features to enhance the predictive power of the model.
3. **Model Development:** Implement machine learning algorithms for training and prediction.
4. **Evaluation Module:** Assess the model's performance using various metrics.
5. **Interpretation & Insights:** Analyze and interpret the results to understand factors affecting productivity.
6. **Deployment:** Integrate the trained model into a usable system or application.

Key Techniques:

- **Machine learning algorithms:** There are a variety of machine learning algorithms that can be used to predict garment worker productivity. Some popular choices include linear regression, logistic regression, decision trees, random forests, and gradient boosting machines.
- **Feature engineering:** Feature engineering is a powerful technique that can be used to improve the performance of machine learning models. By creating new features from the existing data, we can provide the model with more information to learn from.
- **Cross-validation:** Cross-validation is a technique that can be used to evaluate the performance of a machine learning model on new data. It involves splitting the training data into multiple folds and training the model on each fold while evaluating it on the remaining folds.
- **Hyperparameter tuning:** Hyperparameter tuning is the process of finding the optimal values for the hyperparameters of a machine learning algorithm. Hyperparameters are parameters that control the training process and the behaviour of the algorithm.

Benefits:

- **Improved productivity:** By identifying the factors that affect worker productivity, companies can take corrective actions to improve efficiency and reduce costs.
- **Enhanced competitiveness:** By using a garment worker productivity prediction model, companies can better plan their production and supply chain, which can give them a competitive advantage in the market.
- **Improved decision-making:** A garment worker productivity prediction model can help companies make more informed decisions about labor allocation, resource allocation, and production planning.

- **Improve their environmental performance:** By reducing waste and optimizing production processes, companies can reduce their environmental impact.
- **Improve their supply chain management:** By better understanding the factors that affect worker productivity, companies can make more informed decisions about their supply chain partners.
- **Improve their brand reputation:** By demonstrating their commitment to social responsibility and ethical business practices, companies can improve their brand reputation and attract more customers.
- **Cost Reduction:** Optimizing resource allocation based on productivity factors.

In summary, our solution architecture integrates transfer learning and convolutional neural networks (CNNs) to create a Garment Worker Productivity Prediction. It operates with continuous learning and adaptation, guaranteeing real-time accuracy and making significant contributions to garment production industries.