Synopsis of the Project:

Intern name: Shwetha MK

Internship Domain: Artificial Intelligence & Machine Learning

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| Project Title- | Water Demand Prediction in an agricultural field for the primary crop using Decision Tree and KNN |
| Problem Statement- | A machine learning-based approach for predicting water demand in agricultural fields, specifically targeting a primary crop. Accurate water demand forecasting is essential for optimizing irrigation practices, ensuring sustainable water usage, and enhancing crop yield. We developed a predictive model utilizing various machine learning algorithms, including linear regression, decision trees, and random forests, to analyze historical weather data, soil moisture levels, and crop growth stages. The dataset, comprising multi-year data from agricultural fields, was preprocessed and split into training and testing sets. Our results indicate that the machine learning models can effectively predict water demand, achieving a high degree of accuracy. |
| Tools- | Python  ML  Spyder  Anaconda  CSV  ML Packages |
| Hardware- | CPU   * Minimum: Multi-core CPU (e.g., Intel i5 or equivalent) * Recommended: High-performance CPU (e.g., Intel i7/i9, AMD Ryzen 7/9) * GPU: * Minimum: Integrated graphics for basic tasks * Recommended: Dedicated GPU (e.g., NVIDIA GTX 1660 or RTX series) for deep learning tasks * High-Performance: NVIDIA A100 or similar for large-   scale training   * RAM: Minimum: 8 GB |

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|  | * Recommended: 16 GB or more for moderate datasets * High-Performance: 32 GB or more for large datasets * Storage: * Minimum: 256 GB SSD * Recommended: 512 GB or more SSD, possibly combined with HDD for larger datasets * High-Performance: NVMe SSD for faster data access * Networking: * For distributed training, ensure a good network setup (e.g., Ethernet with sufficient bandwidth). |
| Software- | * Operating System: * Windows * Programming Languages: * Python: Most common for ML projects * Libraries and Frameworks: * Machine Learning: Scikit-learn, TensorFlow, PyTorch, Keras * Data Manipulation: Pandas, NumPy * Data Visualization: Matplotlib, Seaborn, Plotly * Deep Learning: TensorFlow, PyTorch * Development Environment: * Jupyter Notebook, VS Code, PyCharm. * Version Control: * Git for source code management * Package Management: * Anaconda, pip, or virtual environments (venv) |
|  | * Data Storage Solutions: * SQL/NoSQL databases or local file systems |