I.1: Developments for IT infrastructure

AI-Powered Fire and Smoke Detection for Critical IT Infrastructure: AI-powered fire and smoke detection system has been developed for critical IT infrastructure. There was a need for a system capable of accurate and rapid fire and smoke detection using AI-based techniques, with a target of 95% accuracy and a detection time of under two seconds. The system's architecture was designed for compatibility with edge devices and existing fire alarm systems. Publicly available datasets were explored and evaluated, and a scalable system architecture was drafted. Pre-trained models were benchmarked, hardware and software requirements were finalized, and findings and architecture plans were presented to stakeholders. Models were trained on these datasets, focusing on performance metrics, and validated using robust techniques. Pre-trained models were fine-tuned and optimized for real-time performance. Testing of the system was conducted under both real and simulated conditions. The system was also demonstrated to fire and safety personnel, and feedback was gathered for further improvements.

Fig. I.1.1: AI-Powered Fire and Smoke Detection System

Commissioning of new RRCAT computing cloud: IAAS (Infrastructure As A Service) based Computing Cloud to meet short term requirement of users for small and medium capacity server machines has been successfully completed. This computing cloud will enable scientists and engineers to quickly establish computing environment as per their requirement. This Computing Cloud, deployed using open-source tools, comprises of Controller, Compute, Network and Storage node. The computing environment can be established using cloud OS images available for operating systems like Red Hat Enterprise Linux, OpenSUSE, Fedora, Ubuntu, FreeBSD, Scientific Linux, Rocky Linux. Users can quickly create virtual server with required configurations for their short-term computing requirement. These virtual servers will be accessible to the users through their desktop machine over RRCATNet.

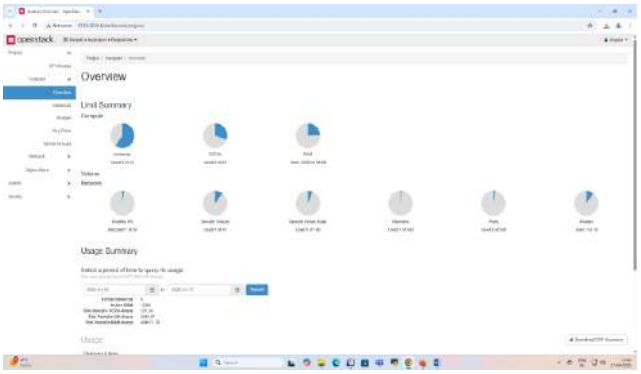

Fig. I.1.2: Dashboard of RRCAT Cloud

*Design & development of secure PDF files Merge/Split facility – PDF-*सहयोगी: PDF-सहयोगी is an in-house designed and developed solution for securely merging/splitting PDF files over Intranet. This ensures confidentiality of sensitive organizational data and solves the problem of unintentional exposure of organizational data on internet, by users. The system allows users to securely log in using email credentials and split/merge PDF files for meeting various documentation requirements. The web interface features an intuitive drag-and-drop interface that renders PDF thumbnails of uploaded files, enabling users to effortlessly reorder pages during both merging and splitting process. The system supports multiple concurrent users and secure communication protocols. Necessary configurations have been made in the system to protect against cross-site request forgery attacks. PDF-सहयोगी will be helpful in improving the security posture of RRCATNet, by solving the problem of exposure of organizational data by users who tend to use free tools in order to merge/split PDF documents.

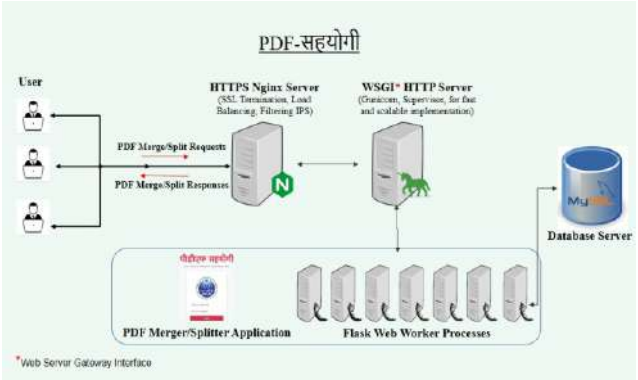

*Fig. I.1.3: Diagram depicting workflow of secure PDF files Merging/Splitting facility – PDF-*सहयोगी

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