

Internship at PSeGS- Punjab State e-Governance Society, SAS Nagar, Punjab (O/o Directorate of Governance Reforms & Public Grievances, Punjab)

1. **About PSeGS:** Punjab State e-Governance Society is a Society under the Department of Governance Reforms and Public Grievances, Government of Punjab. PSeGS is an implementing agency for various IT and e-Governance projects across the departments in the State of Punjab.
2. **About Internship opportunity:** PSeGS is involved with in-house development of various software designed for various departments under Govt. of Punjab for the purpose of providing seamless services to the citizens in an easy and transparent manner.

PSeGS welcomes students pursuing B.E. / B.Tech in CSE and other disciplines as required from time to time in its software development division. The interns would be assigned projects on the latest IT/e-governance projects like chatbot for different services, face recognition, services auto-suggestion, duplicate data detection, real-time transactions dashboard, document processing and recognition, certificate on the block chain. The interns shall also have an opportunity to oversee live projects of PSeGS (mainly in .NET and MSSQL). PSeGS is also keen to harness the young talent with a zeal for learning so that the internship proves to be great learning opportunity for budding software engineers.

3. **Stipend:** Rs. 15,000/- per month.
4. **Duration:** Up to 6 months.
5. **Qualifications:** Pursuing B.E. / B.Tech in CSE and other disciplines as required from time to time with at least 60% marks in previous semesters

6. **Ideal intern candidate shall possess the following technical skills:**

AI/ML, NLP

- Strong understanding of AI/ML, and NLP fundamentals, including popular algorithms, techniques, and neural network architectures.
- Proficiency in programming languages such as Python or R, along with experience using ML libraries and frameworks like Tensor Flow, Keras, or scikit-learn, etc.
- Familiarity with NLP tasks and techniques, including text classification, sentiment analysis, named entity recognition, and experience with NLP libraries such as NLTK, SpaCy, or Hugging Face Transformers.
- Ability to work with large datasets, perform data preprocessing, handle missing or noisy data, and evaluate ML and NLP models using appropriate metrics.

Kind of work we do: We are developing a cutting-edge mobile app screening tool, leveraging advanced AI techniques and models, to assess the likelihood of pulmonary tuberculosis based on cough sound data. The solution combines state-of-the-art machine learning algorithms, such as deep learning and signal processing, with sophisticated data

analysis methods. By processing and analyzing the unique characteristics of cough sounds, the AI model can accurately detect patterns indicative of pulmonary tuberculosis. The core of the solution lies in the AI model that performs the inference based on the cough sound data and symptoms. We trained the model using large datasets of cough sound recordings from individuals with confirmed tuberculosis cases, along with data from healthy individuals. This training process involved various machine learning libraries and frameworks, which are renowned for their capabilities in building deep neural networks. To extract meaningful features from the cough sound data, we employed advanced signal processing techniques, spectrogram analysis, and wavelet analysis, including label encoding, entity extraction/detection etc.

Dashboards using D3 libraries

- Proficiency in JavaScript, HTML, and CSS for frontend web development, along with experience using D3.js or similar data visualization libraries.
- Understanding of data visualization principles and the ability to implement different chart types using D3.js.
- Familiarity with data formats, such as JSON, and the ability to work with data-driven approaches in D3.js.
- Knowledge of responsive design principles and experience integrating interactive charts and graphs in web applications.

Kind of work we do: Our work revolves around creating visually appealing and informative dashboards, equipped with charts, graphs, and other visualizations, as well as interactive data tables. For instance, we are responsible for developing Chief Minister's Dashboards, where we analyze indicators and create informative visual representation in the form of graphs, heatmaps, and other advanced visualizations like pie charts, bubble charts, bar charts, and hierarchy charts, as well as interactive data tables. We collect data through APIs, perform validation, and define Key Performance Indicators (KPIs) based on project types, such as Service Delivery, Scheme Implementation, and Infrastructure Development etc. We evaluate the performance of departments, districts, and field officers through data quality rating and monitoring of key indicators. To accomplish these tasks, our developers utilize a variety of tools and technologies. We employ D3.js for data binding, manipulating SVG elements, handling events, and dynamically updating visualizations.

Databases

- Proficiency in working with SQL and NoSQL database management systems (DBMS) such as MySQL, PostgreSQL, SQL Server, MongoDB etc., including data modeling and SQL querying.
- Knowledge of database administration tasks, backup and recovery, performance tuning, and security measures.
- Familiarity with database tools and frameworks, such as phpMyAdmin, pgAdmin, or MySQL Workbench, etc.
- Understanding of data migration, integration, and familiarity with NoSQL databases and cloud-based database services.

Kind of work we do: As part of our team, you will be involved in managing large databases accessed by high volumes of read/write transactions from web and mobile applications, as well as reporting tools. Working on projects such as the Public Grievance Redressal System (PGRS) and e-Sewa, you will work closely with the development team, designing database solutions that align with business requirements and implementing necessary schema changes under the guidance of AppDev. Your responsibilities will include giving consultation to development teams in implementing optimization techniques such as normalization, indexing and archiving to ensure efficient read/write transactions. As a DBA, you will be responsible for establishing robust backup and recovery strategies, and performing integrity checks of backups. Additionally, you will conduct regular health

checkups, monitor resource utilization, scale servers without data loss, review and optimize queries, and suggest better queries to development teams for improved performance.

Web application development (frontend/backend)

- Proficiency in frontend technologies such as HTML, CSS, JavaScript, and frontend frameworks like React, Angular, or Vue.js.
- Understanding of responsive design, UI/UX principles, and the ability to create visually appealing and user-friendly interfaces.
- Experience with server-side programming languages (e.g., Python, Java, PHP, Node.js, C#), and building RESTful APIs.
- Knowledge of databases, including SQL or NoSQL query languages, and integration with third-party services.
- Familiarity with backend testing, deployment, security best practices, and working with API documentation.

Kind of work we do: Our team is responsible for the development and improvement of large-scale web applications and APIs for our department and other government entities, serving both citizens and government officials. With a user-friendly frontend, we ensure that our applications are intuitive and accessible to citizens with varying levels of technical expertise. For instance, we have developed forms for hundreds of services on the Connect portal and e-Sewa platform, enabling citizens to easily access and avail various government services. Our interface design prioritizes simplicity, multilingual support, and minimal data fields for citizens to fill. Leveraging API integration, we automatically fetch information from other government platforms, when available, to streamline the form-filling process. The information submitted by citizens through these forms undergoes further processing by government officials at different levels, following predefined workflows with permissions and access control. Throughout the application process, citizens receive timely updates via SMS and WhatsApp messages, keeping them informed of the status of their applications in addition to the possibility of tracking the application status online. To ensure an optimal user experience, frontend developers ensure visually appealing and intuitive interfaces, while backend developers handle framework development, API deployment, feature integration, security implementation, and more.

- a. Great problem-solving skills
- b. Passionate about implementing and launching new ideas/ applications.
- c. Ability to translate business requirements into technical solutions.
- d. Innovative, creative, and willing to contribute ideas and learn new things.

7. Other benefits for the interns:

- i. Working on cutting edge technologies like .NET, MSSQL, Cloud, DevOps, etc.
- ii. Deep understanding of the delivery of services to the citizens.
- iii. Developing self-awareness with regard to attitudes, values, behavior patterns, and so forth that influence work.

Interested students may send their resumes to psegs.career@gmail.com. For any clarifications, please call: +91 79869 99481. For details regarding PSeGS, please visit the website: <https://dgrpq.punjab.gov.in/>