IndustrialInternshipReporton

”PasswordManager”

Preparedby

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Executive Summary
This report provides details of the Industrial Internship provided by upskill Campus andTheIoTAcademy in collaboration with Industrial Partner UniConverge Technologies Pvt Ltd (UCT). Thisinternshipwasfocusedonaproject/problemstatementprovidedbyUCT.Wehadtofinishtheproject including the report in 6 weeks’ time. MyProjectisPassword Manager. Apasswordmanager isasoftwareapplicationorservicedesignedtosecurelystoreandmanageuser’s passwords and other sensitive information, such as usernames, credit card details, and personal identificationnumbers(PINs).Theprimarypurposeofapasswordmanager isto alleviatetheneed for users to remember multiple complex passwords by providing a centralized location where theycan securely store and retrieve their credentials. ThisinternshipgavemeaverygoodopportunitytogetexposuretoIndustrialproblemsanddesign/implement solution for that. It was an overall great experience to have this internship.

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1. Preface

Summaryofthe whole 6weeks'work:

- Researched,designed,developed,tested,implementedsecurity,anddocumentedapassword manager.

NeedofrelevantInternshipincareerdevelopment:

- Gainpracticalexperienceto applytheoreticalknowledgeand build networksforcareer exploration.

BriefaboutYourproject/problemstatement:

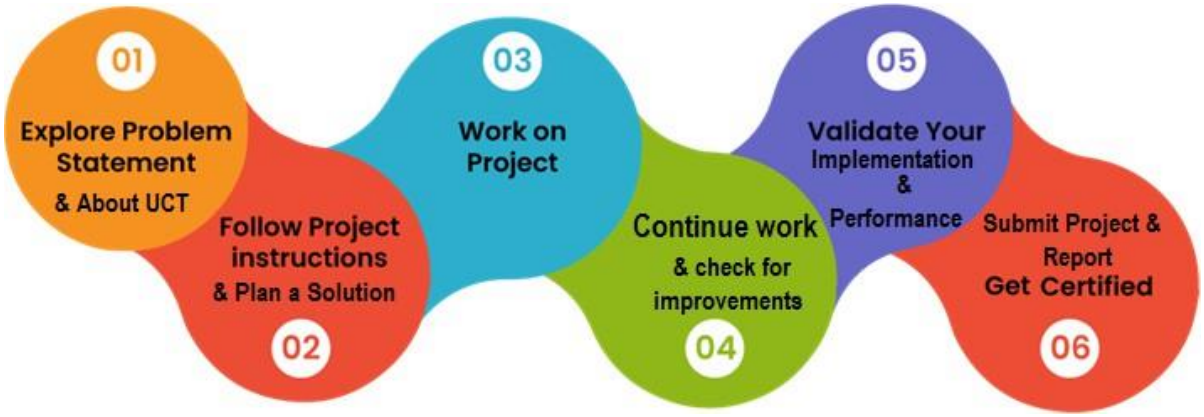
- Developedasecurepasswordmanagertoaddressdatabreachconcerns.

Opportunity given by USC/UCT:

- Accesstoresearchfacilities, industrycollaboration,anddiverseperspectives.

How Program was planned:

- Setobjectives,milestones,roles,responsibilities,timelines,andregularmeetings.



Learnedvaluableskills,gratefulforguidancefrommentors,appreciatesupportfromUSC/UCT. To juniors and peers: Embrace challenges, seek guidance, and collaborate for success.

2. Introduction

AboutUniConvergeTechnologiesPvtLtd

A company established in 2013 and working in Digital Transformation domain and providing Industrial solutions with prime focus on sustainability and RoI.

Fordeveloping itsproductsandsolutionsit isleveragingvarious **CuttingEdgeTechnologiese.g. Internet of Things (IoT), Cyber Security, Cloud computing (AWS, Azure), Machine Learning,CommunicationTechnologies(4G/5G/LoRaWAN),JavaFullStack,Python,Front end** etc.

i. UCTIoTPlatform(UCT Insight)

UCT Insight is an IOT platformdesigned for quick deployment ofIOT applications onthe same time providing valuable "insight" for your process/business. It has been built in Java for backend and ReactJS for Front end. It has support for MySQL and various NoSql Databases.

- It enables device connectivity via industrystandard IoT protocols - MQTT, CoAP, HTTP, Modbus TCP, OPC UA
- Itsupportsbothcloudandon-premises deployments.

Ithasfeaturesto:

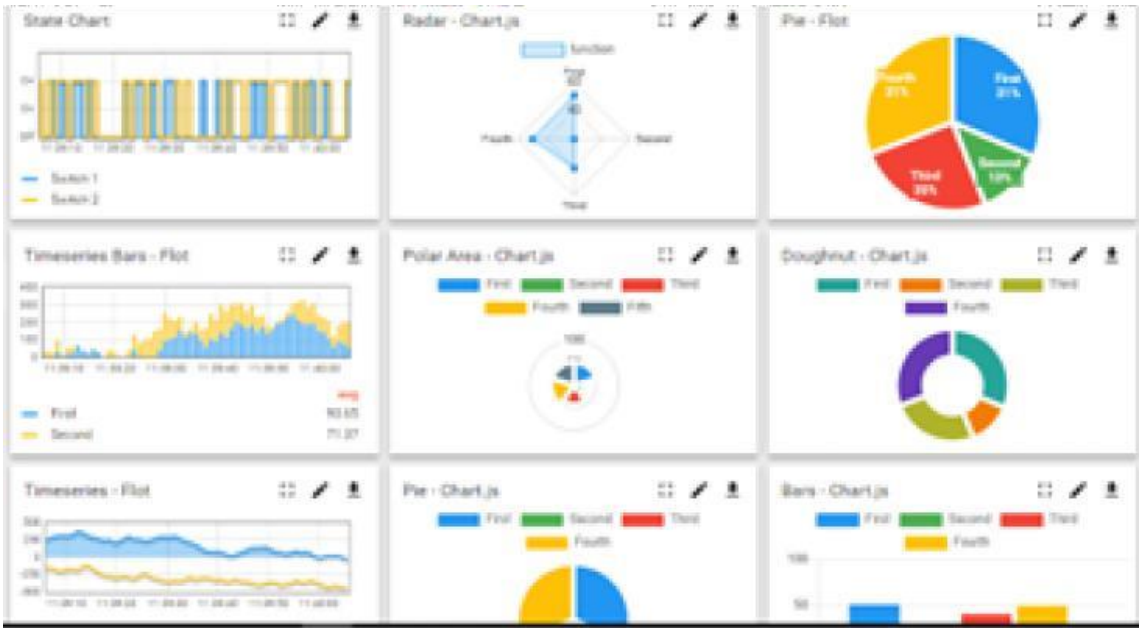
• BuildYourowndashboard

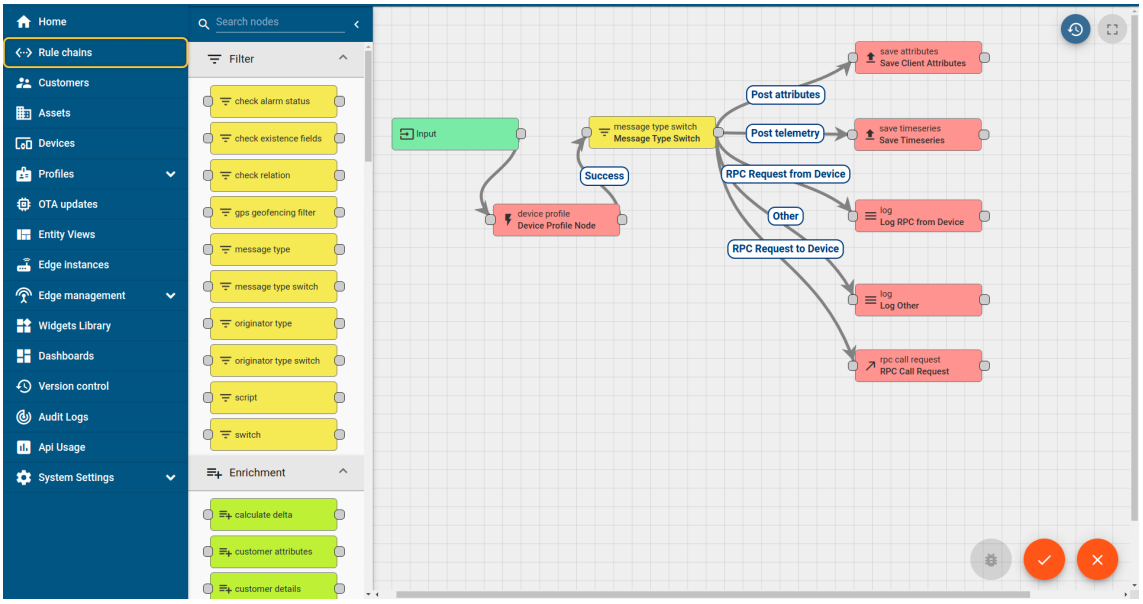
• AnalyticsandReporting

• AlertandNotification

• Integrationwiththirdpartyapplication(Power BI,SAP, ERP)

• RuleEngine





ii. **SmartFactoryPlatform( )**

Factorywatchisaplatformforsmart factoryneeds. It

provides Users/ Factory

- withascalablesolutionfortheir Productionandassetmonitoring
- OEEandpredictivemaintenancesolutionscalinguptodigitaltwinforyourassets.
- tounleasedthetrue potential of thedata that theirmachines aregeneratingandhelps to identify the KPIs and also improve them.
- A modular architecture that allows users to choose the service that they what to start and then can scale to more complex solutions as per their demands.

ItsuniqueSaaSmodelhelpsuserstosavetime,costandmoney.

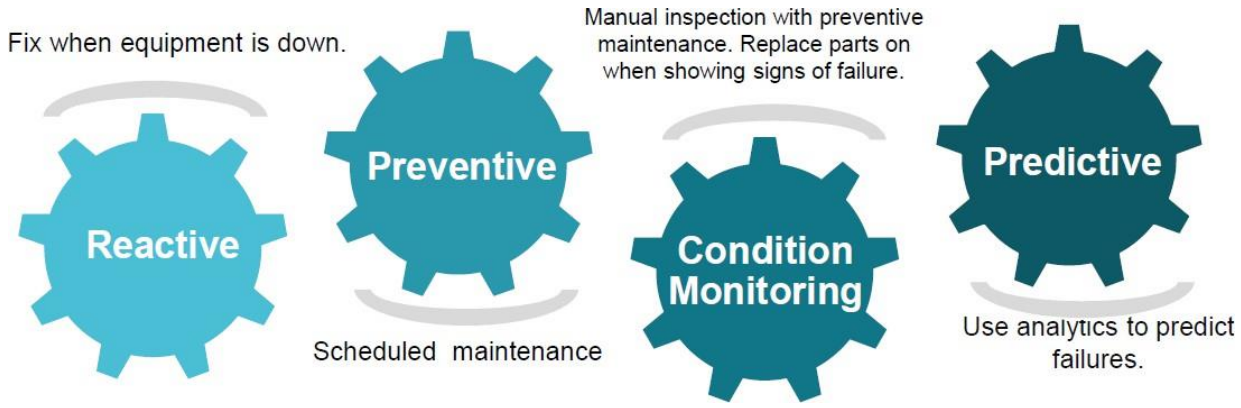
Machine	Operator	Work Order ID	Job ID	Job Performance	Job Progress		Output		Rejection	Time (mins)				Job Status	End Customer
					Start Time	End Time	Planned	Actual		Setup	Pred	Downtime	Idle		
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i
CNC_S7_81	Operator 1	WO0405200001	4168	58%	10:30 AM		55	41	0	80	215	0	45	In Progress	i

iii. LoRaWAN basedSolution

UCT is one of the early adopters of LoRAWAN teschnology and providing solution in Agritech, Smart cities, Industrial Monitoring, Smart Street Light, Smart Water/ Gas/ Electricity metering solutions etc.

iv. PredictiveMaintenance

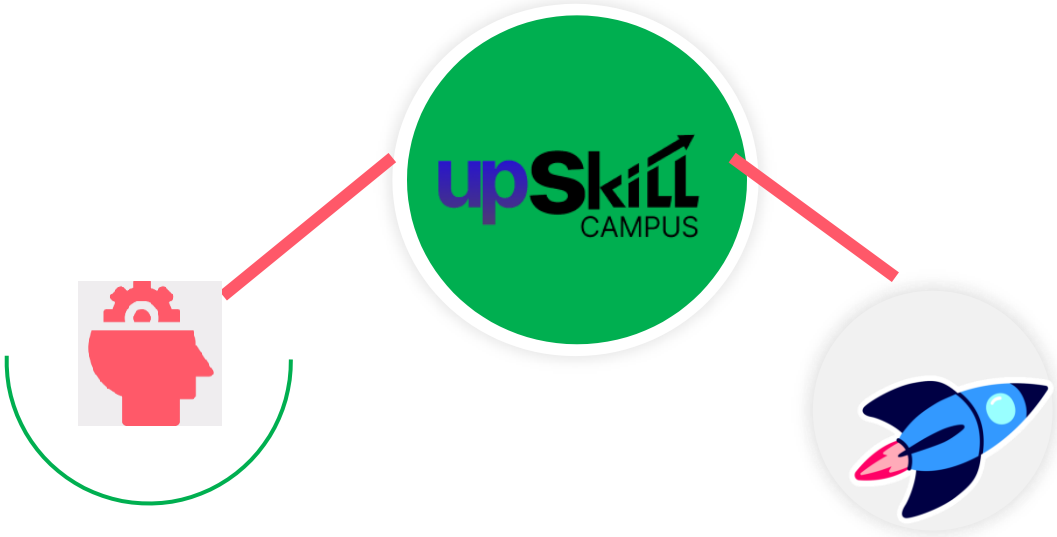
UCT is providing Industrial Machine health monitoring and Predictive maintenance solution leveraging Embedded system, Industrial IoT and Machine Learning Technologies by finding Remaining useful life time of various Machines used in production process.



AboutupskillCampus(USC)

upskill Campus along with The IoTAcademy and in association with Uniconverge technologies has facilitated the smooth execution of the complete internship process.

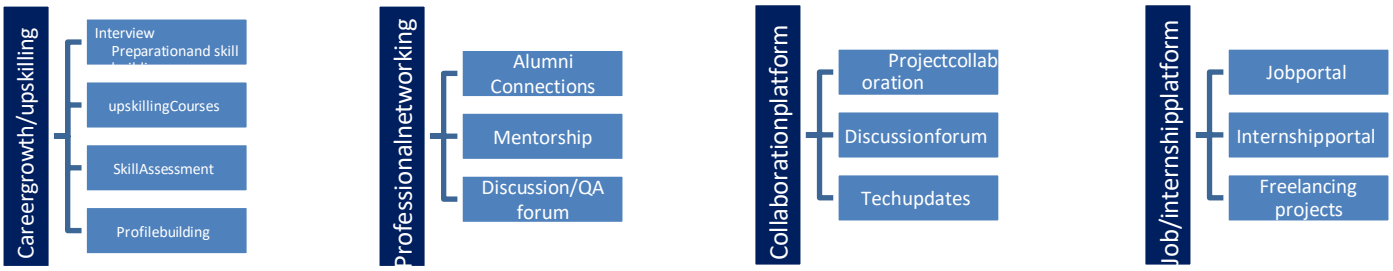
USC is a career development platform that delivers **personalized executive coaching** in a more affordable, scalable and measurable way.



Seeing need of upskilling in self paced manner along-with additional support services e.g. Internship, projects, interaction with Industry experts, Career growth Services

upSkill Campus aiming to upskill1millionlearnersin next 5 year

https://www.upskillcampus.com/



TheIoTAcademy

TheIoTacademyisEdTechDivisionofUCTthatisrunninglongexecutivecertificationprograms in collaboration with EICT Academy, IITK, IITR and IITG in multiple domains.

ObjectivesofthisInternshipprogram

Theobjectiveforthis internshipprogramwasto

☛getpracticalexperienceofworkingintheindustry.

☛tosolverealworld problems.

☛tohaveimprovedjobprospects.

☛tohaveImprovedunderstandingofourfieldanditsapplications.

☛tohave Personalgrowthlikebettercommunicationand problemsolving.

Reference

[1] https://www.uniconvergetech.in/

[2] https://www.upskillcampus.com/

Glossary

Terms	Acronym
IndustrialIoT	IIoT-UtilizingIoTforremotemonitoring,control,andoptimizationinindustries.
UpskillCampus	USC-Careerplatformofferingscalableexecutivecoachingforskillenhancement.
RemainingUseful Life	RUL-Predictingmachinefailuretimeusingdata-drivenmodelsforproactive maintenance.
Electronics and ICTAcademy	EICT-Indiangovernmentinitiativeforskilldevelopmentinelectronicsand ICT.

3. ProblemStatement

To Designand implement a passwordmanager application inPythonthat allowsusersto securely store and manage their passwords for various online services.

Description: The password manager is a Python project that securely stores and manages user passwords.Itallowsuserstostoretheirpasswordsforvariousaccounts,generatestrongpasswords, and retrieve passwords when needed.

Scope:The scopeofthisproject involves implementing encryption algorithmsto secure password storage, designing a user interface to input and retrieve passwords, and developing functions to generate strong passwords and store/retrieve them from a database.

4. ExistingandProposedsolution

ExistingSolutions:

TraditionalPasswordManagers:Storepasswordssecurelybutvulnerabletobreaches.

Browser-Based Managers: Convenient but risky if browser is compromised.

Self-HostedManagers:Morecontrolbutrequiretechnicalexpertise.

OfflineManagers:Securelocallybutlimitedaccessibilityandsynchronizationissues.

ProposedSolution:

Developahybridpasswordmanagerwithend-to-endencryptionandmulti-factorauthenticationfor security.

ValueAddition:

Enhanced Security

ImprovedAccessibility

Streamlined User Experience

Cross-PlatformCompatibility

a. Codesubmission(GitHublink):

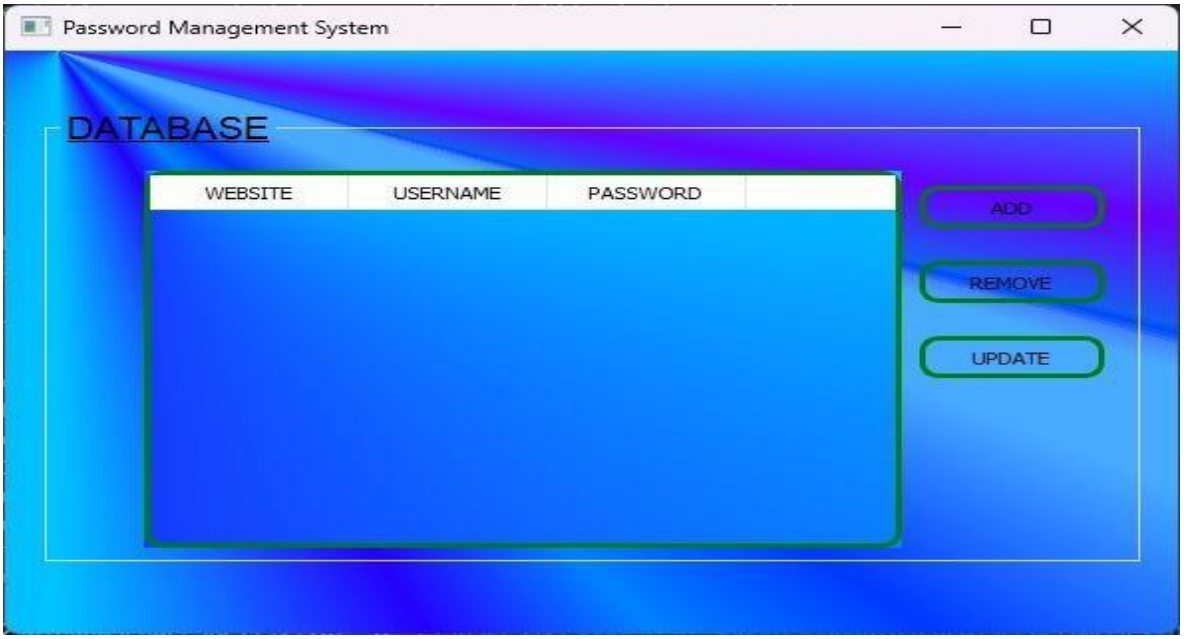
https://github.com/kiranmai30/upskillcampus/blob/main/PasswordManager.py.zip

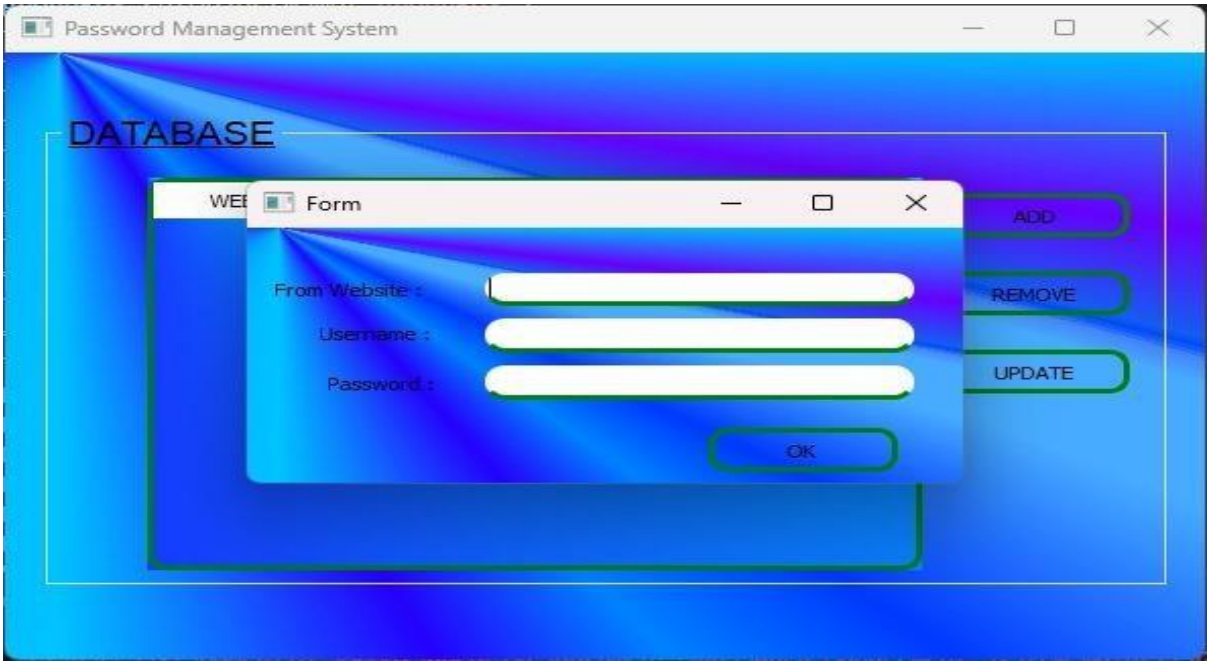
b. Reportsubmission (GitHublink):

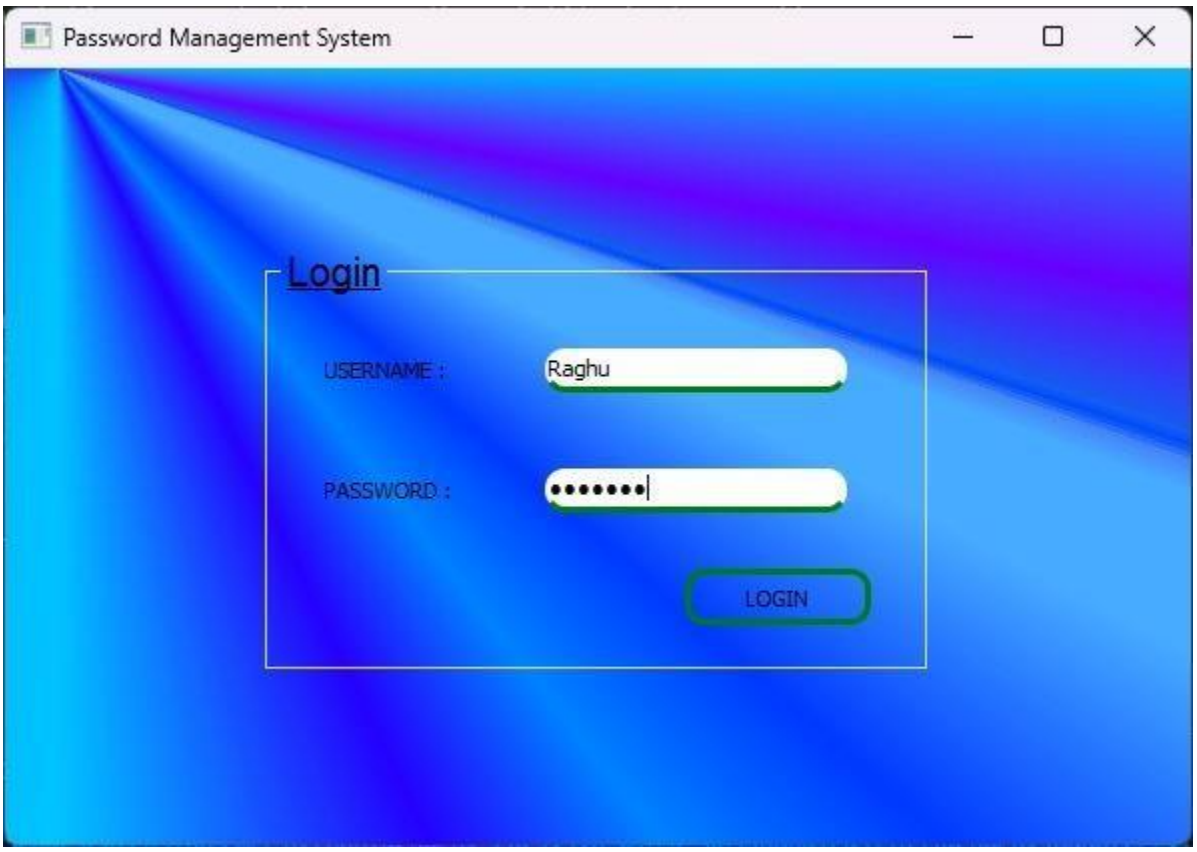
https://github.com/kiranmai30/upskillcampus/blob/main/PasswordManager_Kiranmai_USC_UCT.pdf

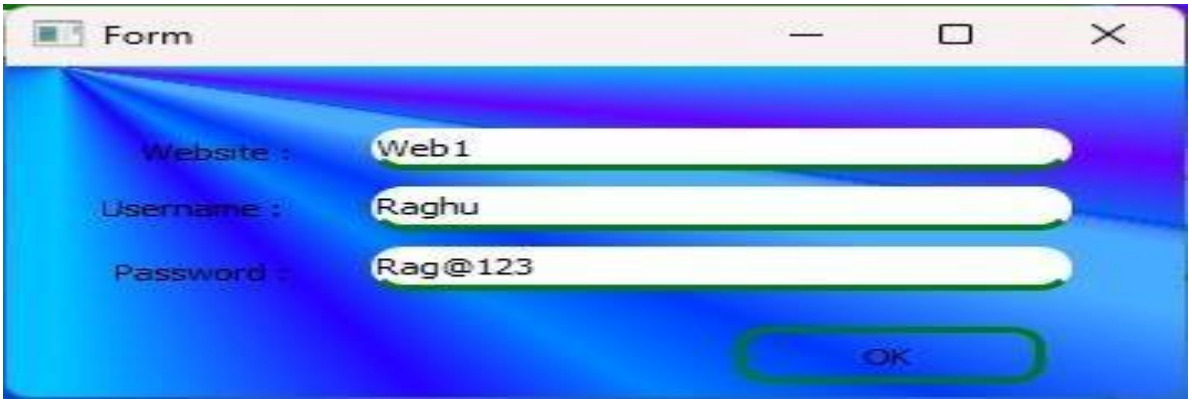
c. ProposedDesign/Model

Interfaces:






Password Management System
Login
USERNAME :
Raghu
PASSWORD :
LOGIN


Form
Website :
Web1
Username :
Raghu
Password :
Rag@123
OK

d. PerformanceTest

ConstraintsIdentification:

Memory: Limitedmemoryresourcescouldaffectthescalabilityofthepasswordmanager,especially with large datasets.

Speed: Slowresponsetimesforcriticaloperationscould impact userexperienceandproductivity.

Accuracy:Incorrectstorageorretrievalofpasswordscouldcompromisedataintegrityandsecurity.

Durability: Inadequatedurabilitycouldresultindatalossorcorruption,underminingthereliability of the password manager.

Power Consumption: High powerconsumption coulddrain devicebatteriesquickly,reducing usability, especially on mobile devices.

HandlingConstraintsinDesign:

Memory: Implementefficientdatastructuresandoptimizememoryusagetominimizefootprint.

Speed: Employefficientalgorithmsandcaching mechanismstoimproveresponsetimes.

Accuracy: Implementrobusterrorhandlinganddatavalidationtoensureaccuratepassword storage and retrieval.

Durability: Use reliable storage mechanismsandimplementbackup and recovery strategies to enhance data durability.

PowerConsumption: Minimizebackgroundprocessesandoptimizeresourceusagetoreduce power consumption.

TestResultsandRecommendations:

Memory: Test resultsshowedthat memoryusagewaswithinacceptable limitsformoderate-sized datasets. Recommendation: Continue monitoring memory usage and optimize further if scaling issues arise.

Speed: Tests indicated satisfactory response times for critical operations. Recommendation: Regularly benchmark performance and optimize as necessary to maintain responsiveness.

Accuracy: Testsconfirmedaccuratepasswordstorageandretrievalwithoutdatalossorcorruption. Recommendation:Implement periodic integritychecksandcontinuoustestingtoensureaccuracy.

Durability: Thepasswordmanagerexhibitedresilienceagainstsystemfailures,withdatarecovery mechanisms functioning as expected. Recommendation: Conduct stress tests and simulate failure scenarios to validate durability further.

Power Consumption: Power consumption tests revealed minimal impact on device battery life. Recommendation: Continuously monitor power usage and optimize resource management to prolong battery life, especially for mobile devices.

TestPlan/TestCases

Memory Usage: Measure the amount of memory the password manager consumes during different operations (e.g., login, password generation, storing new passwords).

Speed: Evaluate the time taken for critical operations such as retrieving a password, generating a new password, or syncing data.

Accuracy: Ensurethatpasswordsarestoredandretrievedaccuratelywithoutlossor corruption.

Durability: Assess the resilience of the password manager against data loss or corruption, especially during unexpected system crashes or interruptions.

Power Consumption: Measure the impact of the password manager on device battery life, especially for mobile devices.

TestProcedure

Memory Usage: Monitor the memory usage of the password manager using system tools or profiling libraries during various operations.

Speed: Usetimingmechanismstomeasuretheexecutiontimeofkeyfunctionswithinthepassword manager.

Accuracy: Perform stress tests by storing and retrieving a large number of passwords to ensure data integrity.

Durability: Simulate system failures or interruptions during password management operations to evaluate data recovery mechanisms.

PowerConsumption: Usepowermonitoringtoolsordevice-specificmetricstomeasurethe impact of the password manager on battery life.

PerformanceOutcome

MemoryUsage:Ensurethatmemory usageremainswithinacceptablelimits,optimizingdata structures and algorithms if necessary to minimize memory footprint.

Speed: Aimforfastresponsetimes,optimizingcriticalfunctionsandimprovingalgorithmefficiency to enhance overall performance.

Accuracy: Verifythatallpasswordsarestoredandretrievedaccuratelywithoutanylossor corruption, implementing error handling and recovery mechanisms if needed.

Durability: Ensure robustness against unexpected failures or interruptions, implementing backup and recovery strategies to safeguard user data.

Power Consumption: Minimize power consumption byoptimizing code execution and reducing unnecessary background activities, thereby extending device battery life.

e. Mylearnings

Application Development Skills: Working on a password manager project in Python enhances skills in application development, including user interface design, data storage, and security implementation.

Security Awareness: Building a password manager involves understanding security principles such as encryption, hashing, and secure storage, which are valuable skills in cybersecurityroles.

Problem-Solving Abilities: Developing a password manager requires problem-solving skills to address challenges like data synchronization, multi-factor authentication, and cross-platform compatibility.

Portfolio Enhancement: Completing a password manager project demonstrates practical coding skills and project management abilities, which can strengthen one's resume and portfolio.

Understanding User Needs: Designing a user-friendly password manager involves considering user experience and feedback, fostering empathy and communication skills essential in client-facing roles.

Overall, learning Python and undertaking a password manager project provide a solid foundation inprogrammingandapplicationdevelopment, alongwithvaluableskillsapplicableacross various career paths in technology.

f. Futureworkscope

Insummary,thefuturescopefor apasswordmanagerinvolves:

1. Enhancingsecuritywithadvancedencryptionandauthenticationmethods.

2. Ensuringcross-platformcompatibilityforseamlessuserexperience.

3. ImprovingUI/UXandaddingfeatureslikepasswordstrengthassessment.

4. Enablingsecuresharingandcollaborationfunctionalities.

5. Managingothersensitiveinformationbesidespasswords.

6. Strengtheningcloudsync,backup,anddatarecoverymechanisms.

7. Adheringto compliancestandardsandregulations.

8. UtilizingAIandMLforthreatdetectionand personalization.

9. Engagingwithopen-sourcecommunitiesforinnovationand transparency.

10. Providinguser educationtopromotecybersecurityawareness.

Byfocusingontheseareas,passwordmanagerscancontinueto evolveasessentialtoolsfor protecting digital identities and sensitive data.