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Culture-Based Tourism Development Portal: A DigitalFrameworkforSustainableandCommunity-Driven Cultural Tourism

APROJECTREPORT

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Undertheguidanceof,

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PRESIDENCYSCHOOLOFCOMPUTERSCIENCEAND ENGINEERING

BONAFIDECERTIFICATE

Certified that this report "Culture-Based Tourism Development Portal:A Digital Framework forSustainableandCommunity-DrivenCulturalTourism"isabonafideworkof"RakshithaD P(20221CSG0114),VishalGowdaH(20221CSG0116),SaiSiriNaiduO(20221CSG0124)", who have successfully carried out the project work and submitted the report for partial fulfilmentoftherequirementsfortheawardofthedegreeofBACHELOROFTECHNOLOGY in COMPUTER SCIENCE AND TECHNOLOGY during 2025-26.

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DECLARATION

WethestudentsoffinalyearB.TechinCOMPUTERSCIENCEANDTECHNOLOGY,at Presidency University, Bengaluru, named Rakshitha D P, Vishal Gowda H, Sai Siri Naidu O, hereby declare that the project work titled "Culture-Based Tourism Development Portal: A Digital Framework for Sustainable and Community-Driven Cultural Tourism" has been independentlycarriedoutbyusandsubmittedinpartialfulfillmentfortheawardofthedegree of B.Tech in COMPUTER SCIENCE TECHNOLOGYduring the academic year of 2025-26. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

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Abstract

Tourism in recent years has shifted from traditional sightseeing toward more **immersive cultural experiences**, where travellers seek meaningful engagement with local heritage, traditions,andcommunities.However,mostexistingdigitaltourismplatformsfocusprimarily on **travel logistics**, such as booking transport, accommodation, and basic itinerary planning. These systems often fail to provide opportunitiesfor deeper cultural interaction or community involvement. To address these gaps, this paper introduces the **Culture-Based Tourism Development Portal**, a holistic web-based platform designed to promote cultural heritage through **sustainable and technology-driven tourism**.

The proposed portal integrates **tourists, local artisans, cultural organizations, and tourism boards**intoaunifieddigitalecosystem.Developedusing**HTML,CSS,JavaScript,PHP,and MySQL**, the platform ensures efficient front-end presentation, dynamic content management, and secure data storage.

Akeyfeatureofthesystemisits**content-basedrecommendationmodel**,whichanalyzesuser preferences—such as interests in traditional crafts, history, food, or festivals—to offer personalized cultural suggestions. This enhances user engagement by guiding them toward authentic experiences that match their interests. The platform also supports **online cultural demonstrations**, including virtual craft workshops, storytelling sessions, and live interactions withartisans.Thesenotonlyextendculturalaccessbeyondgeographicallimitsbutalsocreate new income opportunities for local communities.

Theresults ofpreliminarytesting indicate that the portal ismoreaccessible, user-friendly, and culturallyenrichedcomparedtoconventionaltourismwebsites.Itsemphasisonculturaldepth, personalization, and community involvement significantly improves user satisfaction. By combining modern technology with heritage preservation, the portal fosters **responsible tourismpractices**,empowerslocalartisans,andcontributestothesustainabledevelopmentof cultural destinations.

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Abbreviations

Abbreviation	FullForm
CBTDP	Culture-BasedTourismDevelopmentPortal
SDG	SustainableDevelopmentGoals
UI	User Interface
UX	User Experience
HTML	HyperTextMarkupLanguage
CSS	CascadingStyleSheets
JS/ JavaScript	Client-sideScriptingLanguage
API	ApplicationProgramming Interface
DB	Database
CRUD	Create,Read,Update,Delete
ERD	EntityRelationshipDiagram
DFD	DataFlowDiagram
UML	UnifiedModellingLanguage
SQL	StructuredQueryLanguage
SQLite	LightweightSQLDatabaseEngine
IDE	IntegratedDevelopmentEnvironment
CSS	CascadingStyleSheets
SDLC	SoftwareDevelopmentLifeCycle
V-Model	Verification&ValidationModel

UI/UX	UserInterface/UserExperience
CRUD	CreateReadUpdateDeleteOperations
HTTP	HypertextTransferProtocol
URL	UniformResourceLocator
Flask	PythonMicro-WebFramework
WBS	WorkBreakdownStructure
PESTEL	Political,Economic,Social,Technological,Environmental, LegalAnalysis
MVC	ModelViewController(conceptuallyusedinstructureddesign)
DBMS	DatabaseManagementSystem
SEO	SearchEngine Optimization
FP	FrontendPage
BP	BackendProcess
QoS	QualityofService
AI	ArtificialIntelligence(futureenhancement)
AR/VR	AugmentedReality/VirtualReality

CHAPTER1

INTRODUCTION

1. Introduction

Tourism has not only changed into a leisure-focused practice but has also become a multidimensional business, which promotes a cultural exchange, economic growth, and empowerment of the community. Cultural tourism is one ofthe segments of tourism that have beencentralintheconservationofheritage,advancementofcultureandlivelihoodsinthelocal area. However, its potential is not always realized, and many culturally rich areas cannot find anentrypointtotheglobalcommunitybecauseofthelackofwell-organizedandaccessibleas well as community-driven digital platforms.

Culture-BasedTourismDevelopmentPortal(CBTDP)isoneofthewebsiteswhichareusedto solve this problem, offering a web-based solution which presents regional cultural resources, suchasheritagesites,localart,cuisine,folklore,festivalsandindigenouscrafts.Thesystemis based on a full-stack development model of HTML/CSS/JavaScript (frontend) and Python Flask+SQLite(backend),whichallowstheseamlessnavigation,accesstotheinformation,and a chance to add some content in the system offered to the local communities.

Thechaptergivesabackground,currentlandscape,contextoftheproblem,sustainabilityfitas well as the outline of the report.

Background

The world has realized cultural tourism as an essential component of sustainable development which leads to cultural exchange and provides a source of income to the locals. The potential ofculturaltourismisgreatinthecountriesofsuchgreatdiversity asIndia. However,thereare numerous cultural resources that are not documented or digital.

Therecentresearchindicatesthatthereisagrowingpreferencetowardsauthentic,community-basedandexperience-basedtourismwherethetouristsareinterestedinmeaningfulexperiences and not sightseeing. This change requires the contemporary digital models that:

- Currenthigh-qualityandeditedculturaldata.
- Marketlocal artists,localfestivalsandheritage.
- Intermediatebetweencommunitiesandbridge tourists.
- Maintaintheintangiblecultural identityindigitalform.

The active development of ICT and web technologies allows building platforms that will interconnectculturalstakeholdersandinternationaltravelers.TheCBTDPisaproductofsuch need to digitalize and preserve cultural heritage via an organized, interactive and community- based digital portal.

CulturalTourismDigitizationRequirement.

Althoughthereistheemergenceofdigitaltourism,thecurrentplatformsprimarilytarget:

- Commercialtourism
- Hotelbooking
- Generalsightseeing

Nosingledigitalplatformexiststhatfocusesonculture-firstexperiences.

Therefore, cultural tourism needs to be digitized to:

- Conserveculture withWeb archives.
- Marketlocaleconomiesthroughonline presence.
- Providetouristswithvalidculturalinformation.
- Offerliveinformationregardingfestivalsand events.
- Stopbeingreliantonuntestedtravelblogs.
- Ensure communities are given a chance to be directly involved in tourism promotion.

The digitization guarantees transparency, authenticity, and sustainability and enables the smaller cultural regions that are commonly undermined by the main tourist destinations.

CurrentTourismTechnologyLandscape.

There are a number of digital tourism tools, which do not serve the needs of cultural tourism completely:

GenericTourismPlatforms

MakeMyTrip, TripAdvisor, Cleartrip are platforms that provide travel-oriented information, but they are not very cultural.

Government Initiatives

Such websites as Incredible India offer cultural descriptions without being interactive, personalized, and involving communities.

TravelBlogsandVlogs

Frequentlyunconfirmed,uncoherent,andunorganizedcultural background.

StateTourism Portals

Mostofthemareobsolete, non-responsive,orhighlevel descriptions.

Gaps Identified:

- Absenceofcommunity-based content.
- Littleemphasisonlocalartisansandculture mediators.
- Nocustom-madeculturalitineraries.
- Lackofcentralplatformofheritage, food,art,storiesandevents.

Theseshortcomingsunderscorethefactthatthereisneedtohaveacomprehensive,interactive system that focuses on cultural identity.

ProblemStatement

Themajorityoftheculturalsitesdonothaveonlinepresencethatcan effectivelycapturetheir heritage, traditional activities and community based experiences. The current platforms lack a holistic, genuine, and interactive platform that significantly links cultural assets with tourists.

SDG Alignment

The objectives of the project directly agree with the following UN Sustainable Development Goals (SDGs):

SustainableDevelopmentGoal8:DecentWork&EconomicGrowth.

Empowers craftsmen, entertainers, guides and local merchants.

Goal1: SustainableCitiesandCommunities. Furthering

cultural and sustainable tourism.

Goal2: ResponsibleConsumptionandProduction.

Promotes community and ethical tourism.

Goal3: Goal partnerships.

Bridgescommunities,touristsandculturalorganizations.

Goal 4: Decent work and Economic growth

Empowersworkers,localvendorsandmore.

Thisalignmentwillguaranteethattheportaldoesnotjustmakeacontributionintermsof technology but also in terms of social and environmental contributions.

OverviewofProjectReport

Thisreportisdividedintoninedetailedchapters:

Chapter1 -Introduction

Describesthecontextoftheproject,problem,objectivesandSDGsrelevance. Chapter 2 -

Literature Review

Offersadetailedreviewoftheliteratureonculturaltourismdigitalization,withgapsand opportunities.

Chapter3 -Methodology

Outlinesthemodelofdevelopment,theworkflowofthesystem,andthechoiceofframeworks.

Chapter 4 - Project Management

Discussesschedules,riskassessment,andbudgetingrelyingonthesystematicproject management methods.

Chapter5 -Analysis&Design

Requirements,systemarchitecture,flowcharts,UI/UXdesignanddatabaseschema. Chapter 6 -

Implementation

Thefrontenddevelopment,Flaskbackendprogram,APIdevelopment,andintegratingthe database with SQLite is described.

Chapter7 -Evaluation &Results

Presentstests,testoutcomes,anduserassessmentmeasures.

Chapter8-Social,Legal, Ethical,SustainabilityandSafety Aspects.

Takesaboutthelargerramificationsofthedevelopmentandimplementationoftheportal. Chapter 9 -

Conclusion

Concludesonthegeneralaccomplishments,constraintsandthescopeofthe future.

CHAPTER2

LITERATUREREVIEW

Cultural tourism is an interdisciplinary experience that entails heritage conservation, community involvement, digital revolution, user experience design, and sustainable development. In the last ten years, there has been a lot of research with regard to the impact that digital platforms have on tourism behaviour, cultural engagement, and heritage conservation.Inthischapter,theauthorhasgivenathoroughreviewoftheliteratureavailable on the fields that are pertinent to the (CBTDP) Culture-Based Tourism Development Portal creation. The review summarizes the research results conducted on the digital tourism systems, cultural preservation tools, community-based tourism, as well as on full-stack technological solutions to the development of tourism portals.According to the review, the research gaps are noticed and the project objectives are developed.

Theliterature analysisconsistsofareviewoftheexistingmodelsandresearchonthis topic.

ReviewofExistingModelsand Research.

CulturalTourismBasedandTrends.

Richards,2018-1-CulturalTourism:AReviewoftheRecentResearchandTrends.

Richards gives an extensive discussion of the manner in which cultural tourism has changed to be more active and participatory instead of a passive consumption of heritage by the tourists and the host communities. He points out that tourists are more demanding authentic, participatoryculturalexperiences.Thepaperemphasizesthesignificanceofaccessibilityand value creation in common.

Shortcoming:Lackstechnologicalintegration;nocommentaryonhowdigitaltechnologiesor AI can be used to improve cultural tourism engagement.

Urry&Larsen,2011--TheTouristGaze3.0

It is based on this sociological work that presents the ways in which the traveling person develops meaning based on the focus on what is referred to as the tourist gaze, which is influencedbyculture,mediaandtheglobalizationprocess.Itbringsouttheperceptionsof cultural spaces and experiences among tourists.

Limitations: Despitehavingahighlyrichtheoreticalbase,thestudyfailstomentiondigital transformation and how new platforms can redefine the tourist gaze in a digital era.

CulturalTourismDigitalization.

SmithandRobinson,2019-CulturalTourisminadigitalworld.

Thisessay discusseshow cultural tourism hasbeen transformed asaresult of thefast digital revolution. The digital platforms increase accessibility, user-generated content, and online promotion.Theauthorsclaimthatusercentereddesign,multimediamaterial,andinteractive story telling are all important in cultural learning.

Limitations: FailstodiscussAIoranalytics-basedpersonalizationandalsobrieflydiscusses the issue of privacy but does not provide solutions.

Tangetal,2024-DigitalTransformationinCulturalTourismEnterprises.

Theauthorspointouttheimpactofdigitaltransformationonthecompetitiveness,operational efficiency,andqualityofculturalexperienceoftourismbusinesses.Suchtechnologiesasdata analytics, mobile apps, and digitalized cultural resources reinforce visitor interactions.

Limitations: Concentratesonbusinesses,andnot community-basedculturalecosystems.

Cuomoetal.,2021--DigitalTransformation&Co-DesignedTouristExperiences.

Thisresearchpaperisdevotedtoco-designmethodsindigitalexperiencesinthecontextof which tourists and cultural stakeholders co-create digital experiences. It focuses on digital storytelling, user interaction and interface.

Limitations: Doesnotestablishthebarrierstoimplementationofruralcommunitieswith poor digital skills.

TourismBehaviouralandexperiencedesign.

Tussyadiah,2018-Technology&BehaviouralDesigninTourism.

The paper examines the nature of behavioural design, psychology and technology in influencingtouristdecision-making.Itemphasizestheneedofimmersivesettingsinorderto enhance the experience of cultural tourism.

Limitations: Failstodiscussdynamicuserpreferencemodel-basedadaptiveAIsystemsor methods of automation.

Community-basedCulturalTourismPlatforms.

Maqueraetal.,2022--Community-BasedTourism(Peru)IntelligentDigitalPlatform.

Theresearchintroducesanonlineplatformbetweenthe SMEs,guidesandthetouristsinabid to market rural community tourism. The local actors become visible, and this leads to sustainable economic development.

Limitation: Lackscustomization,multi-linguistic,andartificialintelligence-based recommendation systems.

Chengcai,2024.DigitalCulturalTourismtoRevitalizetheRural.

Theresearchpaperevaluatestheuseofdigitaltoolstoreviveruraltourism,usingthesupport of local art, culture, and traditional livelihoods. Illustrates how the internet is important to market rural destinations.

Limitations: Principallyconceptual;doesnothavetechnicalarchitectureordesignmodels.

Sandriesteretal.,2025--DigitalTransformationandCulturalHeritageonthePeri- regions.

This study examines the role of digital technology in heritage conservation and sustainable regionaldevelopmentinlowvisitationregions.Showsthatdigitizationcanleadtoadecrease in cultural marginalization.

Limitations: Doesnotproposeastructuredsystemdesignsuitableforfull-stackweb applications.

RecommenderSystems,AI&HybridModels.

Chalkiadakisetal.,2023HybridRecommenderSystemofCulturalPointsofInterest.

Suggeststhatahybridartificialintelligenceframeworkshouldbeadoptedthatusesboth Bayesian inference and content based filtering to suggest cultural attractions. Enhances cultural suggestions relatedness and heterogeneity.

Limitations: Advanced,lesstransparent,andrequiringusersensitivedata,whichincreases the privacy concerns.

Solano-Barlizaetal.,2024--RecommenderSystemsinTourismIndustry.

An in-depth overview of the fact that recommender systems are highly beneficial as they enhancetheengagementofthetouristsandtheirsatisfactionratesthroughtheanalysisoftheir preferences and behaviour patterns.

Limitations: NotesThenotesrestrictedtheuseofAI-poweredsystemsinculturaltourismas other commercial tourism industries did.

Generosietal.,2025--WebTourismRecommender-basedPlatformintheInland Tourism.

Theworkpresentsaplatformthatwillfacilitatethemarketingoflesser-knowndestinationsin terms of preference-based recommendation logic and user profiling. It emphasizes the importance of recommender systems in marketing the non-mainstream destinations.

Limitations: Narrowsdowntodestinationpromotion,andisnotholisticallyrepresentativeof the culture e.g. food, festivals or crafts.

Arregoces-Julioetal.,2025--FlexibleProfile-BasedCulturalTourismRecommender System.

Proposesanadaptablerecommendermodeltothenewculturaldestinations.Thesystemis flexible enough to adjust to the changing user preferences through profile-based filtering.

Limitations: Notabletoincorporatecommunity-createdcontentormultilingualcultural background.

ImmersiveTechnologies:VR/ARinCulturalTourism2.1.6.

Yinetal.,2024--VR/ARCulturalHeritageLearning.

The analysis of VR/AR-based virtual heritage tours is aimed at increasing the cultural learningprocessandaccessibility.Showsthatimmersivesettingspromoteculturalawareness and diversity.

Limitations: Expensivetoimplement,requiresadevice,andpotentialprivacyissuesthatthe data might have during the tracking process.

Mengetal.,2021-meaning-awareculturalnavigation system.

Presentsanavigationsystemthatcombinessemanticanalysistodirectthetouristsincultural attractions on the basis of meaning and context.

Limitations: Needshugevolumesofsemantics,andcannotbeeasilyadaptedtosmaller areas.

TourismRecommenderSystemstoSocialInclusion.

Gasparetti&Micarelli,2021--TourismRecommenderSystemstoSocialInclusion.

Illustrateshowtherecommendersystemscanenhanceaccessibilityandinclusivenessby allowing the marginalized groups to become cultural contributors.

Limitations: Lacksimplementationmodelsondevelopingcountrieswithlessertechnical infrastructure.

ResearchGapsIdentified

Accordingtotheresearchmentionedabove,thefollowinggapscanbedistinguished:

1. **Absenceofa centralizedculturaltourismplatform.**

Thereisnosystemthatcombinestheculturalheritage,festivals,stories,food,artand community contribution in one interface.

2. **Inadequatecommunityinvolvement.**

Thelocalcommunitiesarenotinapositiontoenterorcontroltheculturalinformationinmost digital platforms.

3. LackofAI-basedculturaldata personalization.

Thecurrentrecommendersystemsaretargetingmainstreamtourismorareculturallyshallow.

4. Absenceofvibrantandreal-timeupdatesofcultural events.

Majorityof theportalsarebased onthe static content andnot thedynamicdatabases.

5. Issuesofaccessibilityand multilingual.

Existingplatformsarehardlyruralormultilingualintermsofculturalrepresentation.

6. LittleimmersiveVR/ARmoduleintegration.

Researchindicatespotentialbutplatformscannotputthemintogoodpracticebecauseofcost and technical difficulties.

7. Thelackofdigitalrecordsonintangiblecultural heritage.

Culturalaccounts,folklore,rituals,craftsandoral historiesarestillunderrepresentedonline.

ObjectivesoftheProposed System

Inlinewiththeliteraturefindings,theCulture-BasedTourismDevelopmentPortalobjectives can be identified as:

1. Todevelopafull-scaleelectronicinfrastructureofculturaltourism.

Combininghistoricalattractions,festivals,cultures,foodandarts.

2. TocreateawebportalwithFlaskandSQLiteasafullstack.

Scalabilityandassuranceofdynamiccontentmanagement.

3. Toallowcommunityinvolvement.

Thecontentcanbeaddedormodifiedbythelocalartisans,culturalorganizations,andthe community members.

4. Toaddindividualizationcharacteristics.

Suggestionsrulestofindacommongroundbetweentheuser andculturalinterests.

5. **Toenhancesustainableandinclusiveculturaltourism.**

6. **Investinginsmalltownsandthe economy.**

Inorderto improveoncultural learning.

7. **Withthehelpofmultimediagalleries,stories,andinteractiveparts.**

Inorderto haveeasy navigation,responsivedesign, andreliable data.

8. **Offeringaneffectiveplatformtothetouriststoexploretheoriginalcultural experiences.**

CHAPTER 3

METHODOLGY

Culture-Based Tourism Development Portal (CBTDP) is constructed in a systematic and structured approach in order to be accurate, usable, and scalable. The approach will integrate software engineering concepts and user-focused design approaches to provide a powerful, interactive, and community-based cultural tourism service. The chapter describes the development strategy, flow of work, system workflow, architecture, as well as technologies employed.Consistentwiththecapstoneformat,theV-Modelischosenasthe maindevelopment approach because it is clear, sequential, and highly focused on testing and validation at each phase.

DevelopmentMethodologyofV-Model.

AverypopularsoftwaredevelopmentmethodologyistheV-Model(VerificationandValidation model), which is appropriateto usewhen working on academicand professional projects with tight documentation, testing, and review cycles.

TheReasonV-Modelwasselectedinthisproject?

- Offersawell-organizedandstringentdevelopmentcycle.
- Assuresateach stageof testing.
- Fitswithfull-stacksystemsonthefrontandtheback side.
- Helpstocopewithrequirements predictably.
- Fitsinwithscholarlyprojectrequirementsandthosethatinvolvealotofdocumentation.

V-ModelStagesusedinthisproject.

1. RequirementsAnalysis(Checking)

Duringthisstage,non-functionalandfunctionalrequirementsoftheportalweredetermined.

Examples include:

- Exhibitingculturalsites,festivals,foodand art.

- User-friendlynavigation
- Admincontent management
- Securityofstoreddata
- Mobile-responsive UI

Therequirementswereobtainedbasedon:

- Literaturereview findings
- Community needs
- Culturaltourismstandards
- Bestpracticesoftheuserexperience.

2. SystemDesign

Systemdesignwasdone inhigh-levelarchitecture,andit included:

- Webarchitectureworkflow
- Frontend-backendcommunication.
- Databasestructure (SQLite)

Modular Flask-based router backend: The router supports a routing approach that is modular andcanbeextendedandmodifiedtomeetspecificapplicationneeds.<|human|>ModularFlask-based router backend: The router is based on a routing model that is modular and can be expanded and customized to suit specific application requirements.

This was aimed at making sure that it was scalable, low in complexity and the code can be reused.

3. ArchitectureDesign

Inthiscase,specificdesignchoiceswere selected:

- DataFlow
- Functional components

- Databaseschema(ERD)
- Pagestructure anduserinterface/experience.
- RESTAPIendpoints design

Thisactiondeterminedthequalityofinteractionofeachmodule withtherestofthesystem.

4. Module Design

Eachofthemajormoduleswasdesigned separately:

- User Interface Module

CulturalInformationDisplayModule

|human|>CulturalInformationDisplay Module.

- Festival&EventModule
- FoodandArtListing Module
- AdminManagementModule
- Structurethatisreadyto berecommended.

Eachmodulewasmadeto standaloneso thatit could bedebugged easilyand also scaled.

5. Implementation(Coding)

Realdevelopmenthasbeendone using:

- JavaScript,Bootstrap,CSS,HTMLfrontend.
- Python Flask for backend
- SQLitefor database
- Jinja2 in dynamic templating.
- Flaskrouting ofnavigation.

Eachofthemoduleswasdesignedbasedonthespecificationsofthedesignintheprior stages.

6. UnitTesting(Validation)

Allthemoduleswereretested separately:

- Pagerenderingtests
- APIendpointtests
- DatabaseCRUDoperations
- Inputvalidationtests

Themajorityoftestswereperformedonthelocalserver thatwasbuiltintothe Flask.

7. IntegrationTesting

Testingwasdoneontheabilityofmodulesto interact:

- Frontend↔Backenddataflow
- Flask–SQLite interactions
- IntegrationoftheAdmindashboard.
- Diversificationoffigures,imagesandmultimedia loading.

Thismadethesystemactinamanner thatwasdesiredontheentire platform.

8. SystemTesting

Fullsystemvalidationwasdoneto ensure:

- Navigation correctness
- Pageload efficiency
- Reactivityacrossscreensizes.
- Data accuracy
- Securitycomplianceand error handling.

9. Deployment/UserAcceptanceTesting.

Thefinalstageinvolved:

- Locatingthesiteeither locallyorina cloud.

- Lookingatthefeedbacksofsample users.
- Checkingtheculturalcontentvalidity.
- Measuringtheworkfloweffectivenessoftheadministration.

Thefeedbackofusershelpedtomakeminoradjustmentstoenhanceexperienceand accessibility.

SystemWorkflow

Theworkflowexplainstheinteractionbetweentheportalandthetouristsandtheadmins. User

Workflow (Tourist)

1. UserlandsonHomePage
2. Surfscultural(Art,Heritage,Food,Festivals,Events)categories.
3. Clicksonsingleculturalpages.
4. Viewsprovideinformation,pictures,descriptionsandmeaning.
5. Searchingoptionallybyculturespecificsearch.
6. Practiceswithmediaorotherrelated materials.

AdminWorkflow

1. Adminlogsin
2. Enhancesoraddscultural content.
3. Organizeseventsand festivals.
4. Postsphotographsand texts.
5. Approves/reviewsdata
6. WriteschangestoSQLitedatabase.

DataFlowoftheSystem

Theoverallflowthatisupheldthroughouttheportalisthefollowing: Step 1:

User Request (Frontend)

Userclicksanitemorapageintheculture,HTTPrequestissent. Step 2:

Flask Backend Processing.

Requesttoflaskisreceivedbytheflask,whichidentifiestheroute,andretrievesthenecessary data.

Step3:DatabaseAccess

SQLiteDBwasusedtoqueryculturalinformation,events,foods,crafts,etc. Step 4:

Response Generation

PreparesJinja2templateinflask—insertsthedatabasecontentinthetemplate. Step 5:

Response to User

Pageisdynamicintermsofculturalcontentandimages.

SystemArchitecture

Thesystemarchitectureisathree-layered system:

1. PresentationLayer(Frontend)

- HTML5/CSS3
- Bootstrap
- JavaScript
- ResponsiveUI
- Thepagesoftheuserinterface(Home, Culture,Events,About Us).

2. ApplicationLayer(Backend)

- Python Flask
- Routing system
- API endpoints
- Templates
- Validationandprocessingofcontent.

3. DataLayer(Database)

- SQLite database

Tablesonheritageplaces,festivals,foods,artforms, events.

- Admin tables
- Imagereference tables

The architecture can be maintained, scaled, and enhanced in the future, such as recommender system or analytics.

TechnologyStackJustification.

Backend–PythonFlask

- Lightandnon-integrityrisky.
- Academicandproductionsystems appropriate.
- Lowlevelofconfiguration required.
- Jinja2supportsdynamicHTMLgeneration.
- Outofthe box support to SQLite.

Database– SQLite

- File-based,easyto deploy
- Quickfastenersonapplicationsofreadiness.
- Lightweightculturaltourismsystems.

Firstly, zero configuration was needed.

FrontendHTML,CSS,Bootstrap,Javascript.

- Enhancesuserexperience
- Fasterdevelopmentcycle
- Offersmobileresponsivedesignsto tourists.

DevelopmentToolsUsed

- VSCode– main IDE

Theserver canbea flaskdevelopmentserver thatisusedto test locally.

- SQLiteBrowser-database visualization.
- GitHub– version control
- Figma–UI/UX design

Summary

V-Model made sure that the Culture-Based Tourism Development Portal had a structured process of development and testing. The process was facilitated with the methodology of a structuredrequirementcollection,architecturaldesign,modulardevelopment,testinginphases and smooth integration. The portal provides a community-driven, scalable and inclusive cultural tourism solution by integrating user-centered design and full-stack development practices.

CHAPTER4

PROJECTMANAGEMENT

GoodprojectmanagementwouldmakesurethatCultourism.PortalofCulture-BasedTourism. isbuiltinasystematicmannerandwithintheallocatedtime,scopeandresources.Thischapter includesplanning,organization,monitoring,andcontrollingmethodsduringthelifecycleofthe development process. It contains the scope of the project,Work Breakdown Structure (WBS), schedule (Gantt chart), team roles, risk analysis, cost estimation and PESTELanalysis. These tools also facilitate effective coordination, delivery and generally quality of the system.

ProjectScope

Thescopeoftheprojectestablishesthe scope,functionalityand deliverablesoftheportal.

In-ScopeActivities

- Flask(Backend)andHTML/CSS/JS(Frontend)Full-stackdevelopment.
- SQLitedatabasedevelopmentand implementation.
- Contentmanagementadministrationmodule.
- Viewingmoduleofculturaldata.

Categoriesofculturalcontent(Food,Heritage,Art,Festivals).

- Dynamicweb site.
- Testing,documentationanddeployment.

Out-of-ScopeActivities

- RecommendersystemsthatarebasedonAI(enhancementinfuture)
- VR/AR immersive modules

Themultilingualtranslationengine.

- Mobileapplication(justwebversioncreated)

WorkBreakdownStructure(WBS).

Theprojectisdividedintomanageabletasksandisrepresentedbythe WBS:

Level1:ProjectTitle

Culture-BasedTourismDevelopmentPortal

Level2&Level3 Breakdown

1. Planning

- 1.1Requirementsgathering
- 1.2Literature review
- 1.3Feasibility study
- 1.4Technologyselection

2. Design

- 2.1Systemarchitecturedesign
- 2.2Databaseschema (ERD)
- 2.3UI/UX design

Flowchartsanddataflowdiagrams2.4.

3. Development

- 3.1Frontenddevelopment
  - 3.1.1 Homepage
  - 3.1.2Culturepages
  - 3.1.3Events&Festivals pages
  - 3.1.4About&Contact pages
- 3.2Backenddevelopment (Flask)
  - 3.2.1 Routing

- o 3.2.2Admin module
- o 3.2.3CRUDoperations
- 3.3SQLitedatabase development.

4. Testing

- 4.1 Unit testing
- 4.2Integration testing
- 4.3 System testing
- 4.4Useracceptance testing

5. Deployment

- 5.1Serversetup(local/cloud)
- 5.2 Final deployment
- 5.3Backup&documentation

6. Documentation

- 6.1Report preparation
- 6.2Finalreview&formatting
- 6.3Presentationslides

ProjectSchedule(GanttChartRepresentation)

RolesandResponsibilities

Role	**Responsibilities**
ProjectManager	Scheduling, planning, monitoring progress, resourceallocation
SystemAnalyst	Requirementanalysis,feasibilitystudy,workflow design
Designer(UI/UX)	Screenlayout,userinterface,wireframes,colour scheme
BackendDeveloper	Flaskroutes,serverlogic,integrationwithDB
Frontend Developer	HTML/CSS/JS pages, responsiveness, visual elements
DatabaseEngineer	SQLiteschemadesign,CRUDoperations,data security
Tester	Unit&integrationtesting,bugreporting
DocumentationLead	Report preparation, formatting, diagrams, Appendices

RiskManagement

RiskManagementtable

Risk	**Category**	**Impact**
Requirementchanges	Technical	Medium
Timeconstraints	Schedule	High
Bugs/Errorsincode	Quality	Medium
Bugs/Errorsincode	Quality	Medium
Databasecorruption	Technical	High
Lack of cultural content availability	Resource	Medium
Versionconflicts	Technical	Low
Deploymentfailure	Operational	Medium

RiskMitigationStrategies

Risk	**MitigationApproach**
Requirementchanges	Finalizerequirementsearly&documentscope clearly
Timeconstraints	Maintainweeklymilestones& buffers
Bugsincode	Regularunittestingandpeer review
Databaseissues	Usefrequentbackups&validationrules
Lackof content	Collectcontentfrommultiplesources&publicdata
Versionconflicts	UseGit forproper version control
Deploymentfailure	Testdeploymentlocallybeforefinalhosting

CostEstimation

Although academic projects do not incur commercial cost, a hypothetical cost model is often required to keep a check on the cost.

EstimatedSoftware&ResourceCosts

Item	**Cost(INR)**
Laptop/DeviceUsage	10,000 (depreciation)
Software Tools (VS Code, SQLite)	Free
InternetUsage	2,000
HostingSetup (optional)	1,000
DesignTools(Figma/Canva)	Free/500
Miscellaneous	1,500

PESTELAnalysis

Political Factors

- Governmentculturalpoliciessupportheritagepreservation.
- Tourismregulationsimpactcontentauthenticity.
- DigitalIndiainitiativespromoteonlineculturalplatforms.

EconomicFactors

- TourismcontributessignificantlytonationalGDP.
- Digitalplatformsreducemarketingcostsforruralartisans.
- Economicdownturnsmayaffecttourism activity.

SocialFactors

- Increasinginterestinculturalexperiencesandlocaltraditions.
- Communityinvolvementimprovescultural preservation.
- Awarenessofsustainabletourismisrising.

TechnologicalFactors

- Growthofwebtechnologies,Flaskframeworks,databases.

- Smartphonesincreaseaccesstocultural portals.
- Potentialfor futureexpansionusingAIandAR/VR tools.

EnvironmentalFactors

- Reducedphysical explorationthroughdigitalalternativeslowersenvironmentalimpact.
- Culturaltourismencouragesresponsibletravelpractices.

LegalFactors

- Needcompliancewithdataprivacylaws (ITActofIndia).
- Copyrightconsiderationsforculturalimages and narratives.
- Licensingforculturalcontent usage.

ChapterSummary

This chapter presented a comprehensive project management strategy for the Culture-Based Tourism Development Portal. Using structured planning tools such as WBS, Gantt Charts, riskassessments,andPESTELanalysis,theprojectwasexecutedinanorganized,controlled, and efficient manner. These management practices ensured timely completion, quality development, and alignment with system goals.

CHAPTER5

SYSTEMDESIGN

The system design serves as a roadmap to the whole Culture-Based Tourism Development Portal.Itspecifiesthewaythesystemwillrun,themannerinwhichthepartswillinteract,the movement of data across the platform and how the users interact with the interface. This chapter presents the structural, behavioural and architectural models in detail by use of industry standard diagrammatic models like UML diagrams, DFDs, ER diagrams and workflow models. This is aimed at making the system pre-implementation and in the implementation process, clear, modular and scalable.

SystemArchitecture

Culture-BasedTourismDevelopmentPortalhasthethreetierarchitecturethatinvolves presentation layer, logic layer, and data layer.

1. PresentationLayer(Frontend)

- TheworkisbasedonHTML,CSS,Bootstrap,JavaScript.
- Giftsculturaldata(heritagesites,festivals,art forms,andso on)
- Dealswithuserinteraction,responsivenessandnavigation.
- TherearеHome,CulturalListings, Festivals,Food,andAdminDashboardpages.

2. ApplicationLayer(Backend)

PythonFlaskwasusedtodevelop it.

- Dealswithrouting,sessionprocessinganddataprocessing.
- rendersJinja2 templates.
- Checksinputandgetsintouchwiththe database.

3. DataLayer (Database)

SQLitedatabaseincludesallculturalinformation.

- Includestablesfor:
  - Heritage_Culture
  - Festivals_Events
  - Art_Forms
  - Food_Culture
  - Admin
  - Images

Itisanarchitecturethatallowsdevelopinginamodularway,updatingitmorequickly,and maintaining it with ease to provide a seamless cultural tourism experience.

UseCase Diagram

PrimaryActors

- Tourist/User
- Admin

UserUseCases

Description:Thelearner isexpectedtobe abletoperceiveCulturalInformation.

- UC2:ViewFestivalsand Events
- UC3:SearchCultural Content
- UC4:ExploreFoodandArt

UC5:BrowsingthroughDetailedCulturalDescriptions.

Admin Use Cases

- UC6: Login
- UC7:Add Cultural Entries
- UC8: Edit Existing Entries
- UC9:Delete Entries
- UC10:Upload Images
- UC11:OrganisingEventsandFestivals.

UseCase Descriptions

UC1:SeeCulturalInformation.

- Actor:Tourist

Description:Theuserisexposedtoculture-specificsites,includingheritagesites,arts, cuisine, and festivals.

- Output:Showsappropriateculturalinformationthatwasaccessedinthedatabase.

UC6: Admin Login

- Actor: Admin
- UsernamesandPassword: Inputs.
- Operation:Authenticate withFlaskbackend.

/*Result:Accesstothedashboardoftheadministrationisobtained.

UC7: Add Cultural Entry

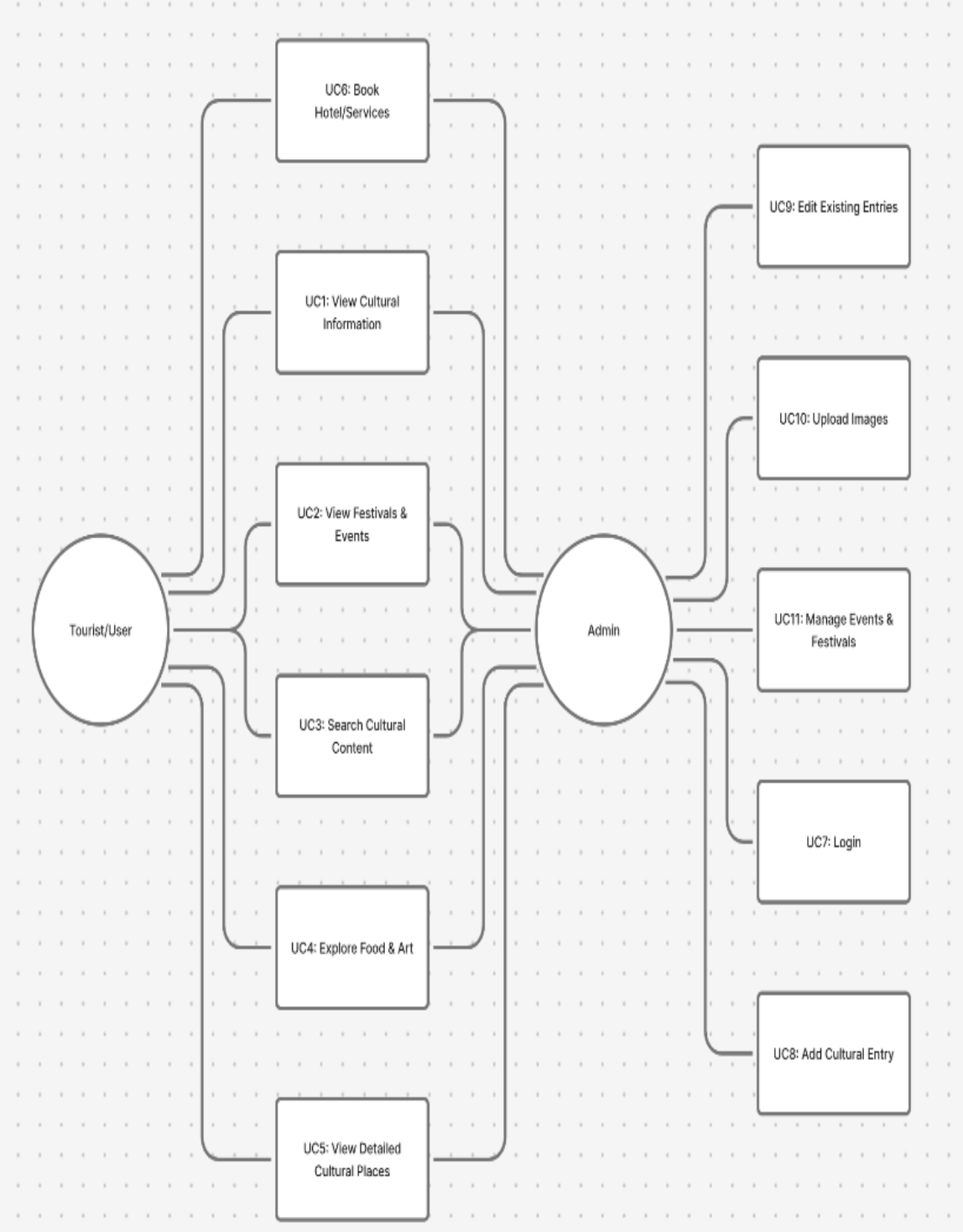
- Actor: Admin
- Precondition:Adminisloggedin.
- Process:Adminwillenterculturaltitle,description,category andimage path.

OutcomeThenewculturalentryhasbeenstoredinSQLite. UC9:

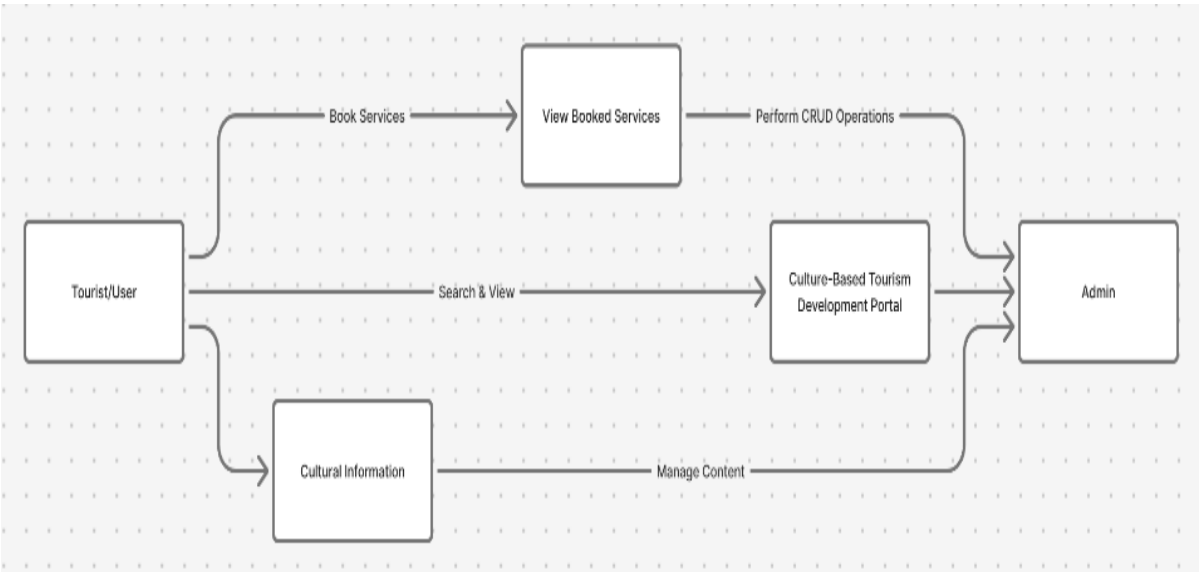
Delete Entry

- Actor: Admin
- Action: Click on entry deletion

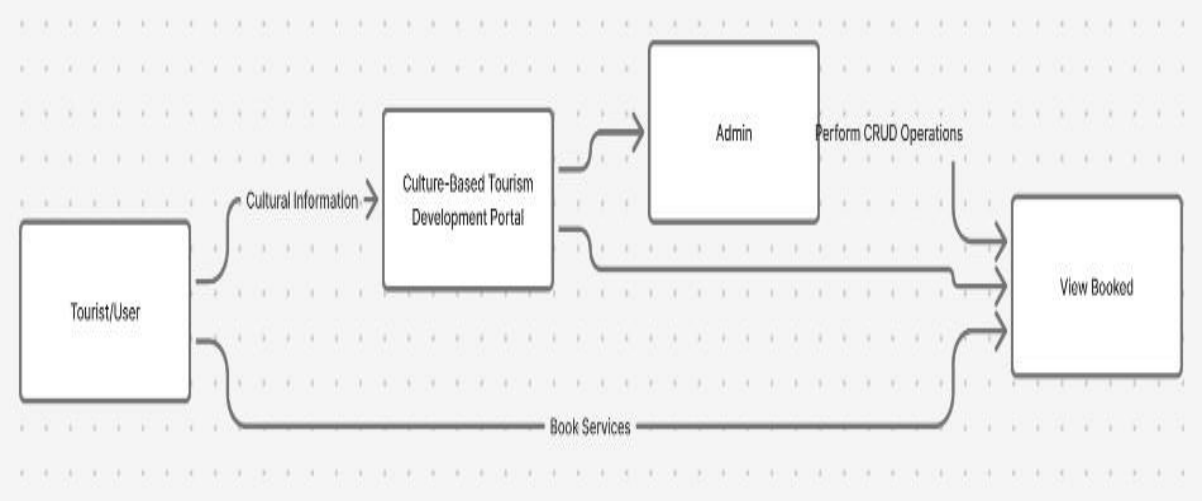
Output:Removalofoutcomeofthedatabase.


UC6: Book Hotel/Services
UC9: Edit Existing Entries
UC1: View Cultural Information
UC10: Upload Images
UC2: View Festivals & Events
Tourist/User
Admin
UC11: Manage Events & Festivals
UC3: Search Cultural Content
UC7: Login
UC4: Explore Food & Art
UC8: Add Cultural Entry
UC5: View Detailed Cultural Places

DataFlowDiagrams (DFD)



DFDLevel0(ContextDiagram)



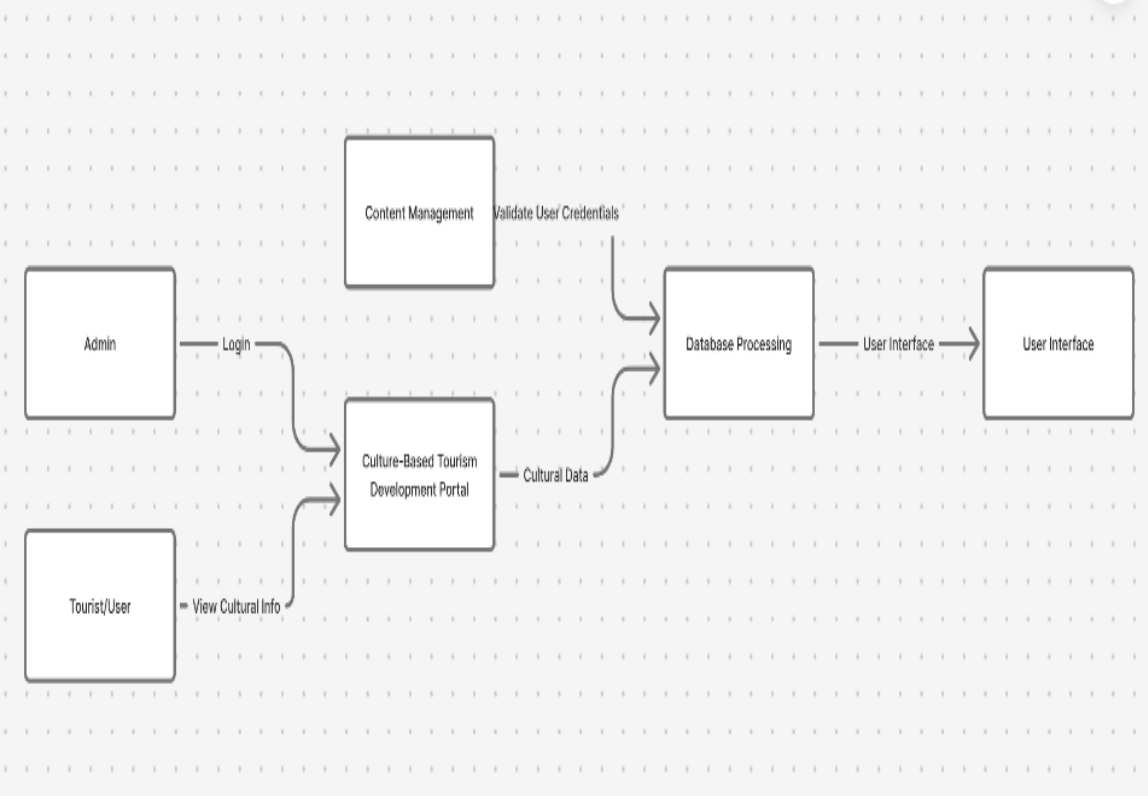
DFDLevel1

Main Processes

1. UserInterfaceInteraction
2. CulturalDataRetrieval
3. AdminAuthentication

4. Content Management

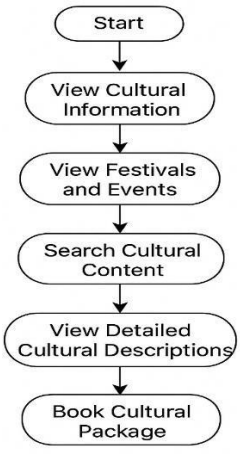
5. DatabaseProcessing

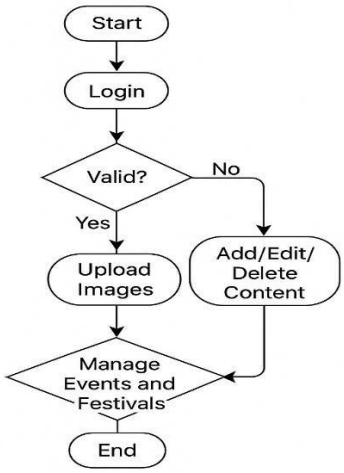


Flow

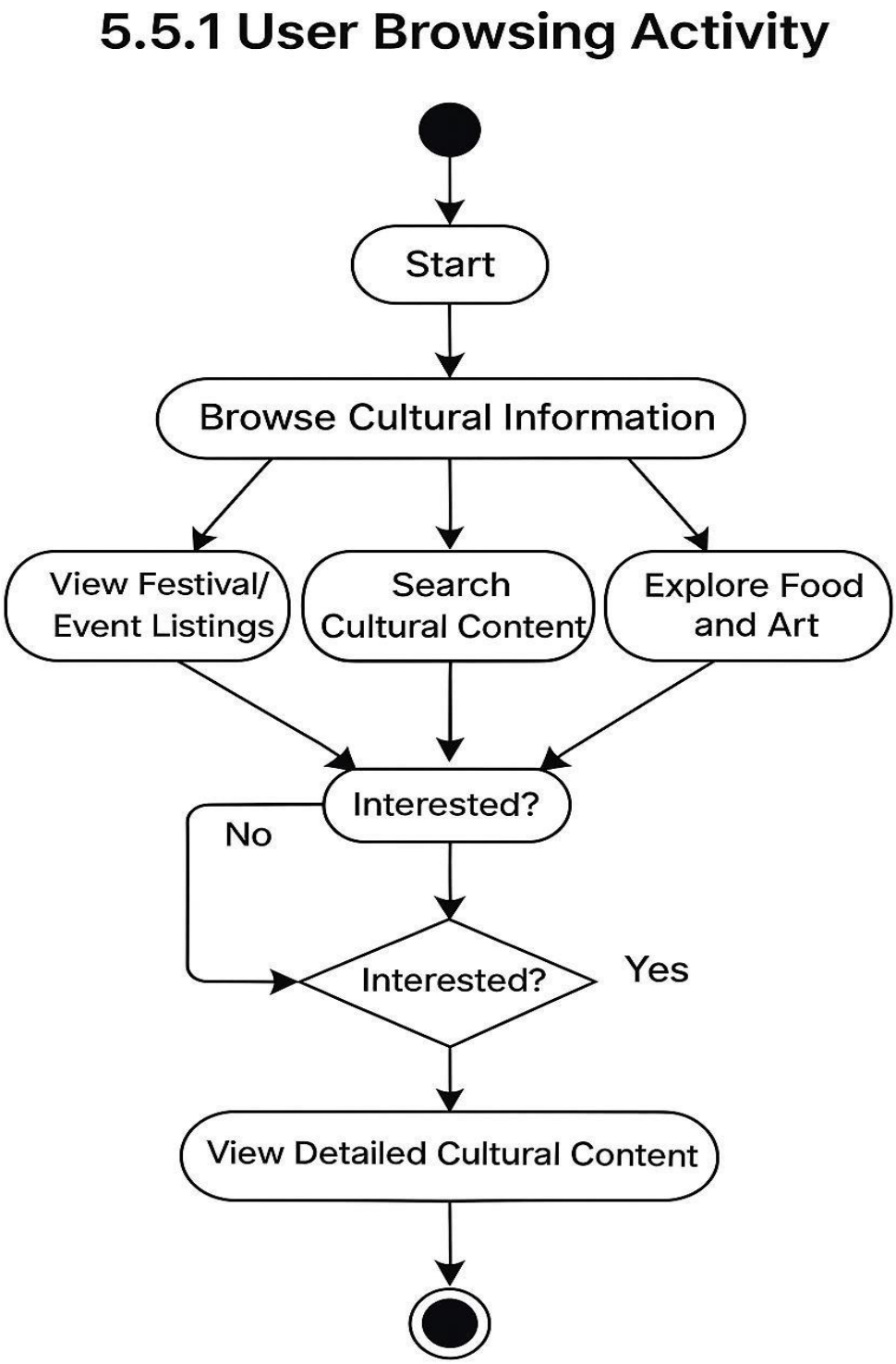
User→UI →FlaskBackend →Database→ UI

ActivityDiagrams

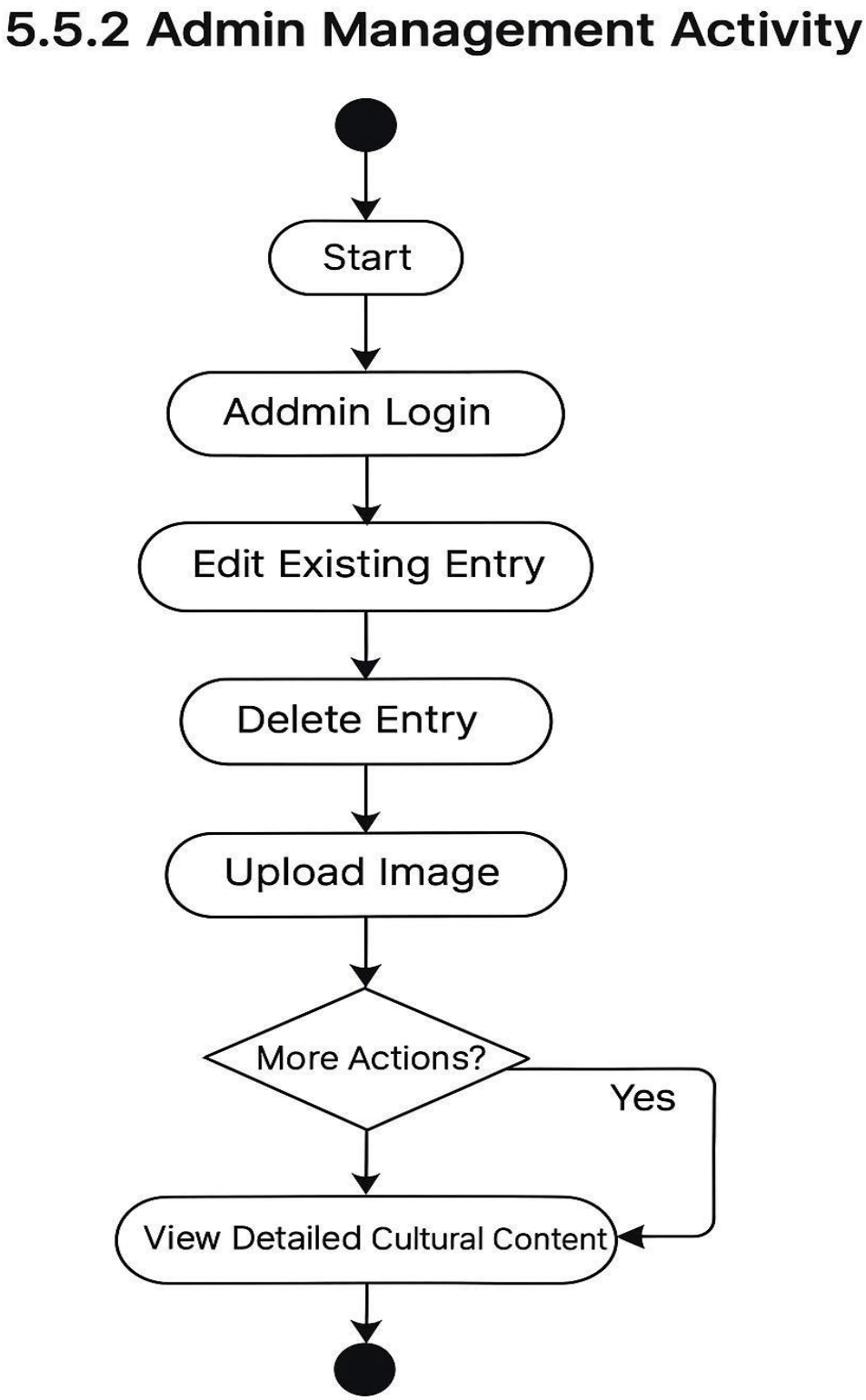




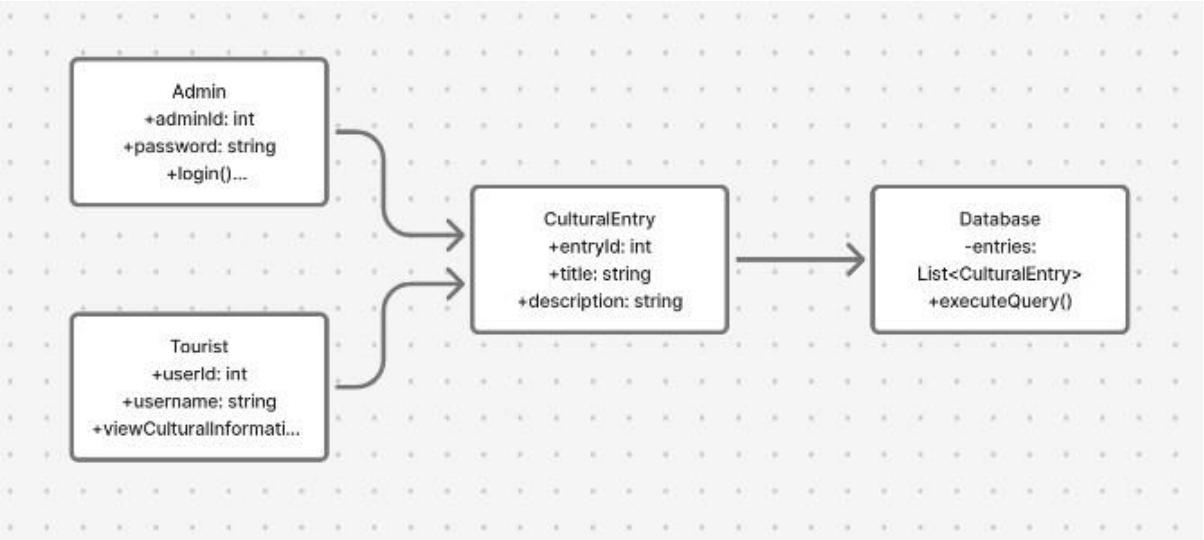
UserBrowsingActivity



AdminManagementActivity



ClassDiagram(UML)



ER(Entity–Relationship)Diagram

Entities

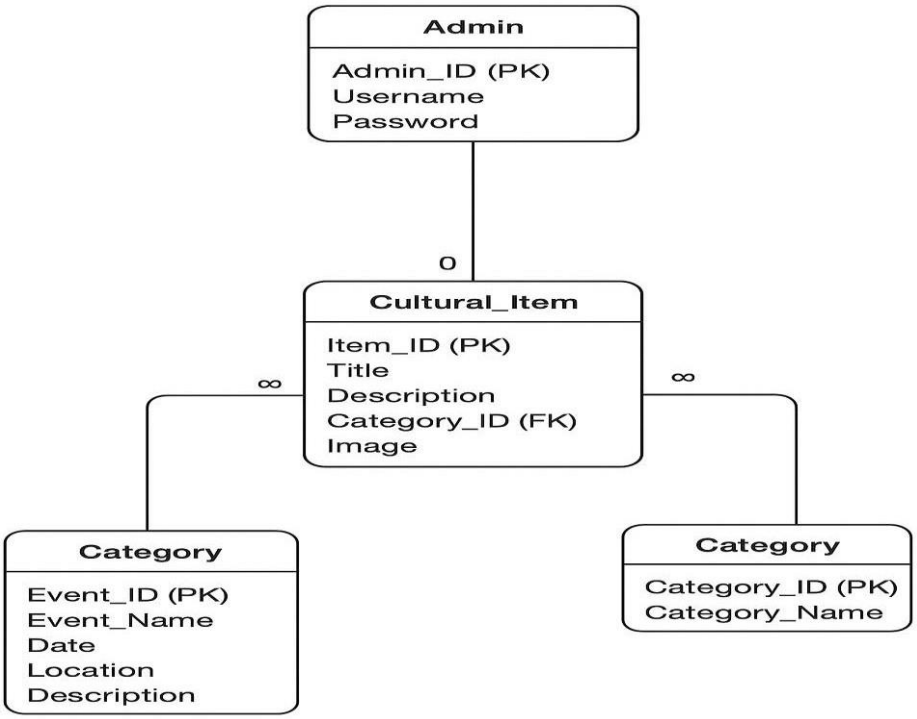
1. **Admin**
   - **Admin_ID**
   - **Username**
   - **Password**
2. **Cultural_Item**
   - **Item_ID**
   - **Title**
   - **Description**
   - **Category_ID**
   - **Image**
3. **Category**
   - **Category_ID**
   - **Category_Name(Heritage/Food/Art/Festival)**

4. **Festival_Event**

- **Event_ID**
- **Event_Name**
- **Date**
- **Location**
- **Description**

Relationships

- **Admin→Cultural_Item(1tomany)**
- **Category→Cultural_Item(1 tomany)**
- **Cultural_Item→Festival_Event(optional relationship)**



DatabaseSchema(SQLite)

Table: admin

Field	**Type**
admin_id	INTEGERPRIMARYKEY
username	TEXT
password	TEXT

Table:categories

Field	**Type**
category_id	INTEGERPRIMARYKEY
category_name	TEXT

Table:cultural_items

Field	**Type**
item_id	INTEGERPRIMARYKEY
title	TEXT
description	TEXT
category_id	INTEGER(FK)
image_path	TEXT

Table:festivals

Field	**Type**
festival_id	INTEGERPRIMARYKEY
name	TEXT
description	TEXT
date	TEXT
location	TEXT
image_path	TEXT

UserInterfaceDesign (Wireframes)

(Thesearedescriptivesincediagramscannotbedrawnhere) Home

Page

- Bannerwithcultural imagery
- Navigationbar(Home, Culture,Festivals,Food,Art,About Us)
- Quicklinkstocategories
- Featuredculturalhighlights

Cultural Listing Page

- "ViewMore"button

Detail Page

- Largeimage
- Detaileddescription
- Cultural significance
- Relatedculturalitems

Admin Dashboard

- Sidebarwithoptions:AddItem,EditItem,Delete Item
- Form-basedinterfaceforCRUD operations

ChapterSummary

ThischapterpresentedthecompletesystemdesignoftheCulture-BasedTourismDevelopment Portal, including architecture diagrams, UML models, DFDs, ER diagrams, schema, and UI structure.Thesemodelsserveasthefoundationfortheimplementationprocessandensurethat thesystemislogicallysound,well-structured,andscalableforfutureenhancementssuchasAI- based recommendations.

CHAPTER6

SYSTEMIMPLEMENTATION

System Implementation refers to the actual development and integration of all modules that collectivelyformtheCulture-BasedTourismDevelopmentPortal.Aftercompletingthedesign phase, the system was implemented using **HTML/CSS/Bootstrap** for the frontend, **Python Flask** forthe backend, and **SQLite**for database management.This chapter explains how each module was implemented, discusses code-level functionalities, and provides a walkthrough of major features. Screenshots of the executed system (to be added in your final report) are described wherever necessary.

Overviewof Implementation

The implementation phase focuses on developing a fully functional and responsive portal that allows users to explore cultural categories and enables the admin to manage content. The following components were developed:

- **FrontendPages:**Home,Heritage,Art,Food,Festivals, Contact
- **Backend(Flask):**Routing,sessioncontrol,CRUD operations
- **Database(SQLite):**Tablesforfestivals,culturalitems,admin,categories
- **AdminDashboard:**Add,update,deletecontent
- **Templates:**ReusableUIlayoutusingJinja2

Eachcomponentisintegratedintoacohesivefull-stacksystemensuringsmoothnavigationand dynamic content flow.

FrontendImplementation

Thefrontend wasbuiltusing **HTML5,CSS3,Bootstrap5,andJavaScript**.

HomePage Implementation

Thehomepage actsasanentrypoint with:

- Banner image

- Introductiontoculturaltourism
- Quicknavigationbuttons
- Featuredcultural items

CoreCode (index.html)

```
{%extends"base.html"%}

{%blocktitle%}CulturalTours-BharatCultureTrails{%endblock%}

{%blockcontent %}

<sectionclass="hero-section">
 <divclass="container">
  <divclass="rowalign-items-centergy-4">
   <divclass="col-lg-7">
    <h1class="display-5fw-boldmb-3text-gradient">
     Curated Cultural Tours of South & West India
    </h1>
    <pclass="leadtext-light">
     Exploretemples,forts,folkarts,coastalheritage,androyallegaciesacross
     Karnataka, Tamil Nadu, Andhra Pradesh, and Maharashtra.
    </p>
    <divclass="d-flexflex-wrapgap-2mt-3">
     <ahref="#places" class="btnbtn-primarybtn-lg">
      <iclass="bibi-compass"></i>BrowseTours
     </a>
     <ahref="{{url_for('admin_login')}}"class="btnbtn-outline-light">
```

```
      <iclass="bibi-person-lock"></i>AdminLogin
    </a>
   </div>
  </div>
  <divclass="col-lg-5text-center">
   <divclass="hero-cardshadow-lg">
    <h5class="mb-3text-uppercasesmalltext-muted">Filterby State</h5>
    <formmethod="get"action="{{url_for('index')}}">
     <selectname="state"class="form-selectmb-3">
      <optionvalue="">All States</option>
      {%forstin states%}
       <optionvalue="{{st}}" {%ifselected_state==st%}selected{%endif %}>
        {{ st }}
       </option>
      {%endfor %}
     </select>
     <buttonclass="btnbtn-accentw-100"type="submit">
      <iclass="bibi-funnel"></i>ApplyFilter
     </button>
    </form>
    <pclass="mt-3smalltext-muted">
     Discoverhandpickedculturalexperiencescraftedforheritage lovers.
    </p>
```

```
      </div>
    </div>
  </div>
 </div>
</section>
<sectionid="places"class="py-5">
 <divclass="container">
  <divclass="d-flexjustify-content-betweenalign-items-centermb-4">
   <h2class="section-titlemb-0">
    AvailableCulturalExperiences
   </h2>
   <spanclass="badgebg-primary-subtletext-primary">
    {{places|length}}toursfound
   </span>
  </div>
   {%ifplaces%}
   <divclass="rowg-4">
    {%forplacein places%}
     <divclass="col-md-6col-lg-4">
      <divclass="cardtour-cardh-100shadow-sm">
       {%ifplace.image_url%}
        <divclass="ratioratio-16x9">
         <imgsrc="{{place.image_url}}"class="card-img-top"alt="{{place.name}}">
```

```
            </div>
          {%endif %}
          <divclass="card-bodyd-flexflex-column">
            <h5class="card-title">{{place.name }}</h5>
            <pclass="card-subtitlemb-2text-muted">
              {{place.cityifplace.city}}{%ifplace.city%},{%endif%}{{place.state}}
            </p>
            <pclass="card-textflex-grow-1">
              {{place.short_intro }}
            </p>
            <divclass="d-flexjustify-content-betweenalign-items-centermt-2">
              <spanclass="text-primaryfw-semibold">
                ₹{{'%.0f'|format(place.price_per_person)}}/ person
              </span>
              <spanclass="badgebg-lighttext-dark">
                {{place.duration_days}}days
              </span>
            </div>
            <ahref="{{url_for('place_detail',place_id=place.id)}}"class="btnbtn-outline-
primary w-100 mt-3">
              ViewDetails&amp;amp;Book
            </a>
          </div>
        </div>
```

```
        </div>
      {%endfor %}
    </div>
  {%else %}
    <divclass="alertalert-info">
      Notoursaddedyet. Pleasecheckbacksoon.
    </div>
  {%endif %}
 </div>
</section>
{%endblock %}
```

BackendImplementation(Flask)

Thebackend handles:

- Routing
- Fetchingdatabasecontent
- Form submission
- Admin validation
- Templating

FlaskInitialization

```
fromflaskimportFlask,render_template,request,redirect,url_for,flash,session,abort from
flask_sqlalchemy import SQLAlchemy
fromdatetimeimportdatetime,timedelta#Addtimedeltatotheimport import
os
fromurllib.parseimporturlparse, parse_qs
```

```
app=Flask(_name_)
app.config['SECRET_KEY'] = 'change-this-secret-
key'app.config['SQLALCHEMY_DATABASE_URI'] =
'sqlite:///cultural_tours.db'app.config['SQLALCHEMY_TRACK_MODIFICATIONS'] = False
db =SQLAlchemy(app)
```

DatabaseImplementation (SQLite)

TheSQLitedatabaseissimple,lightweight,and idealforfull-stack projects.

TableCreation

```
classPlace(db.Model):
    id = db.Column(db.Integer, primary_key=True)
    name=db.Column(db.String(120),nullable=False)
    state=db.Column(db.String(50),nullable=False)#Karnataka,TamilNadu,etc. city =
    db.Column(db.String(80), nullable=True)
    short_intro = db.Column(db.String(200), nullable=False)
    description = db.Column(db.Text, nullable=False)
    culture_description=db.Column(db.Text,nullable=False)
    image_url = db.Column(db.String(300), nullable=True)
    video_url = db.Column(db.String(300), nullable=True)
    price_per_person=db.Column(db.Float,nullable=False,default=0.0)
    duration_days = db.Column(db.Integer, nullable=False, default=2)
    created_at = db.Column(db.DateTime, default=datetime.utcnow)

classBooking(db.Model):
```

```
id=db.Column(db.Integer,primary_key=True)
place_id=db.Column(db.Integer,db.ForeignKey('place.id'),nullable=False)
place = db.relationship('Place', backref=db.backref('bookings', lazy=True))
name = db.Column(db.String(120), nullable=False)
email = db.Column(db.String(120), nullable=False)
phone = db.Column(db.String(20), nullable=False)
travel_date = db.Column(db.Date, nullable=False)
num_people = db.Column(db.Integer, nullable=False)
special_requests=db.Column(db.Text,nullable=True)
status=db.Column(db.String(20),default='Pending')#Pending/Confirmed/Rejected
created_at = db.Column(db.DateTime, default=datetime.utcnow)
  classHotel(db.Model):
id=db.Column(db.Integer,primary_key=True)
place_id=db.Column(db.Integer,db.ForeignKey('place.id'),nullable=False)
place = db.relationship('Place', backref=db.backref('hotels', lazy=True))
name = db.Column(db.String(120), nullable=False)
description=db.Column(db.Text,nullable=True)
price_per_night=db.Column(db.Float,nullable=False,default=0.0)
rating = db.Column(db.Float, nullable=True)# 1-5 stars
amenities=db.Column(db.String(300),nullable=True)#commaseparated
image_url = db.Column(db.String(300), nullable=True)
contact_info = db.Column(db.String(200), nullable=True)
created_at=db.Column(db.DateTime,default=datetime.utcnow)
```

```
  classTransport(db.Model):
   id=db.Column(db.Integer,primary_key=True)
   place_id=db.Column(db.Integer,db.ForeignKey('place.id'),nullable=False)
   place = db.relationship('Place', backref=db.backref('transports', lazy=True))
   transport_type=db.Column(db.String(20),nullable=False)#bus,cab, train
   name = db.Column(db.String(120), nullable=False)
   description=db.Column(db.Text,nullable=True)
   price = db.Column(db.Float, nullable=False, default=0.0)
   capacity = db.Column(db.Integer, nullable=True)duration_hours
   = db.Column(db.Float, nullable=True) operating_hours =
   db.Column(db.String(100), nullable=True) contact_info =
   db.Column(db.String(200), nullable=True)
   created_at=db.Column(db.DateTime,default=datetime.utcnow)
   class ServiceBooking(db.Model):
   id=db.Column(db.Integer,primary_key=True) #
   Main booking reference
   main_booking_id=db.Column(db.Integer,db.ForeignKey('booking.id'),nullable=True)
   main_booking=db.relationship('Booking',backref=db.backref('service_bookings',
lazy=True))
    # Direct booking without main tour
   bookingcustomer_name=db.Column(db.String(120),nullable
   =True)
   customer_email=db.Column(db.String(120),nullable=True)
   customer_phone = db.Column(db.String(20), nullable=True)
```

```
place_id=db.Column(db.Integer,db.ForeignKey('place.id'),nullable=False)
```

```
place=db.relationship('Place',backref=db.backref('service_bookings',lazy=True)) #
Service details
hotel_id=db.Column(db.Integer,db.ForeignKey('hotel.id'),nullable=True)
hotel = db.relationship('Hotel', backref=db.backref('service_bookings', lazy=True))
transport_id = db.Column(db.Integer, db.ForeignKey('transport.id'), nullable=True)
transport=db.relationship('Transport',backref=db.backref('service_bookings',lazy=True)) #
Booking details
check_in_date = db.Column(db.Date, nullable=True)
check_out_date = db.Column(db.Date, nullable=True)
num_people=db.Column(db.Integer,nullable=False,default=1)
num_rooms=db.Column(db.Integer,nullable=False,default=1)
num_days = db.Column(db.Integer, nullable=False, default=1)
special_requests = db.Column(db.Text, nullable=True)
# Pricing
hotel_total = db.Column(db.Float, nullable=False, default=0.0)
transport_total=db.Column(db.Float,nullable=False,default=0.0)
total_amount = db.Column(db.Float, nullable=False, default=0.0)
 status=db.Column(db.String(20),default='Pending')#Pending/Confirmed/
Cancelledcreated_at = db.Column(db.DateTime, default=datetime.utcnow)
```

AdminModuleImplementation

TheAdmin module includes:

- LoginPage
- Dashboard

- Add/Edit/Delete Items

AdminLogin

```
{%extends"base.html"%}

{%blocktitle %}AdminDashboard{%endblock%}

{%blockcontent %}

<divclass="container py-4">

 <h3class="mb-4">AdminDashboard</h3>

 <divclass="rowg-3mb-4">

  <divclass="col-md-4">

   <divclass="stat-card">

    <h6>TotalPlaces</h6>

    <h2>{{total_places }}</h2>

   </div>

  </div>

  <divclass="col-md-4">

   <divclass="stat-card">

    <h6>TotalBookings</h6>

    <h2>{{total_bookings}}</h2>

   </div>

  </div>

  <divclass="col-md-4">

   <divclass="stat-card">

    <h6>PendingBookings</h6>

    <h2>{{pending}}</h2>
```

```
    </div>
   </div>
  </div>
 <divclass="d-flexgap-2">
   <ahref="{{url_for('admin_places')}}"class="btnbtn-primary">
    <iclass="bibi-geo-alt"></i>Manage Places
   </a>
   <ahref="{{url_for('admin_bookings')}}"class="btnbtn-outline-primary">
    <iclass="bibi-card-checklist"></i>ViewBookings
   </a>
  </div>
</div>
{%endblock %}
```

ADMINDASHBOARD

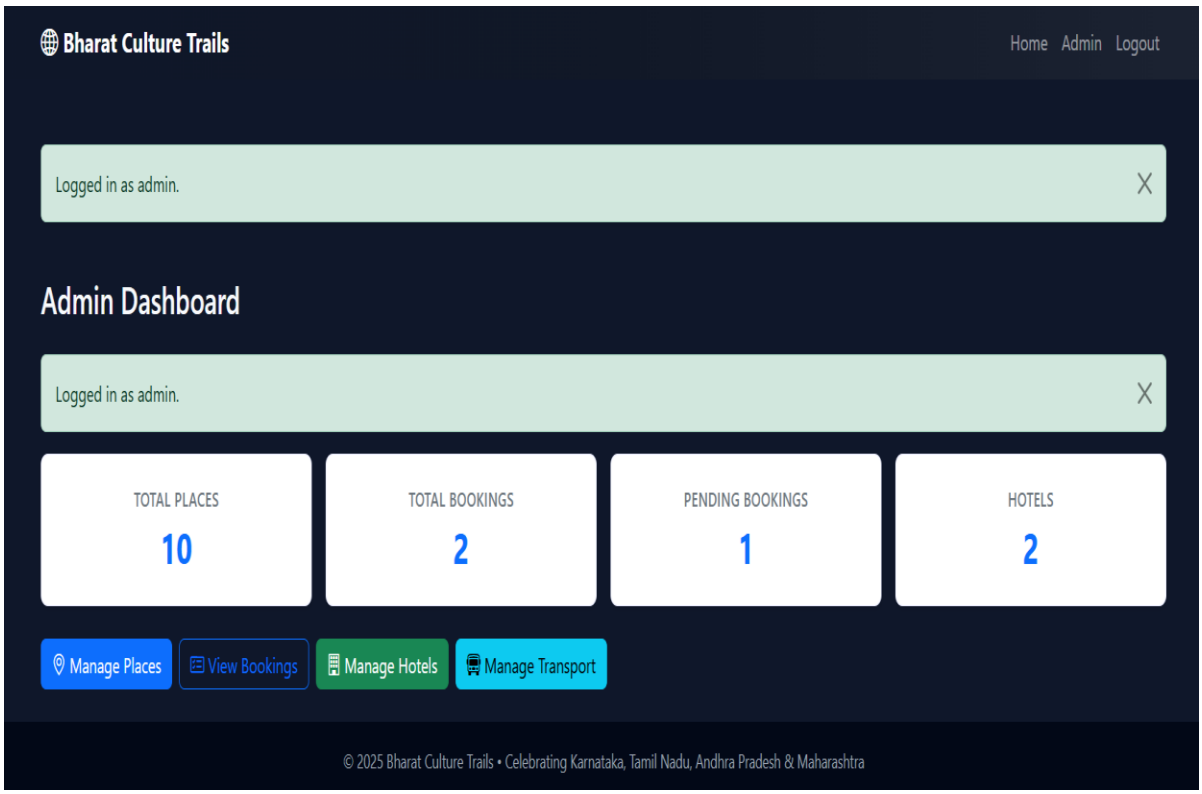
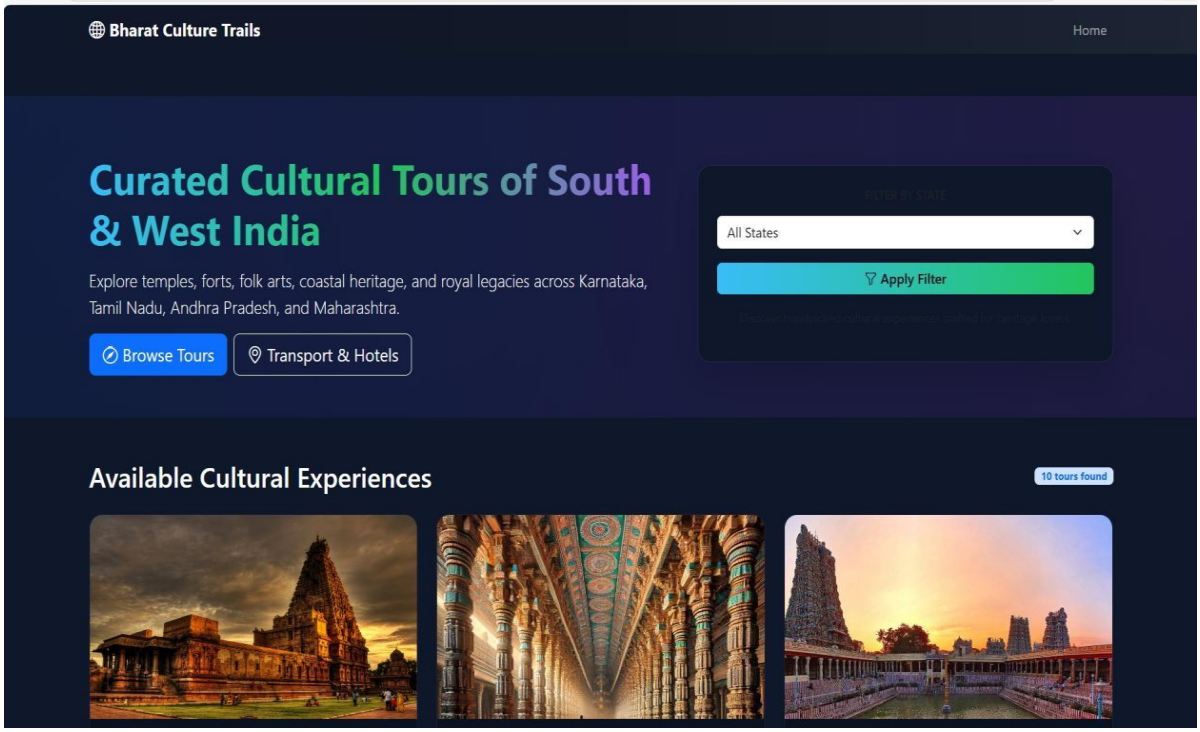
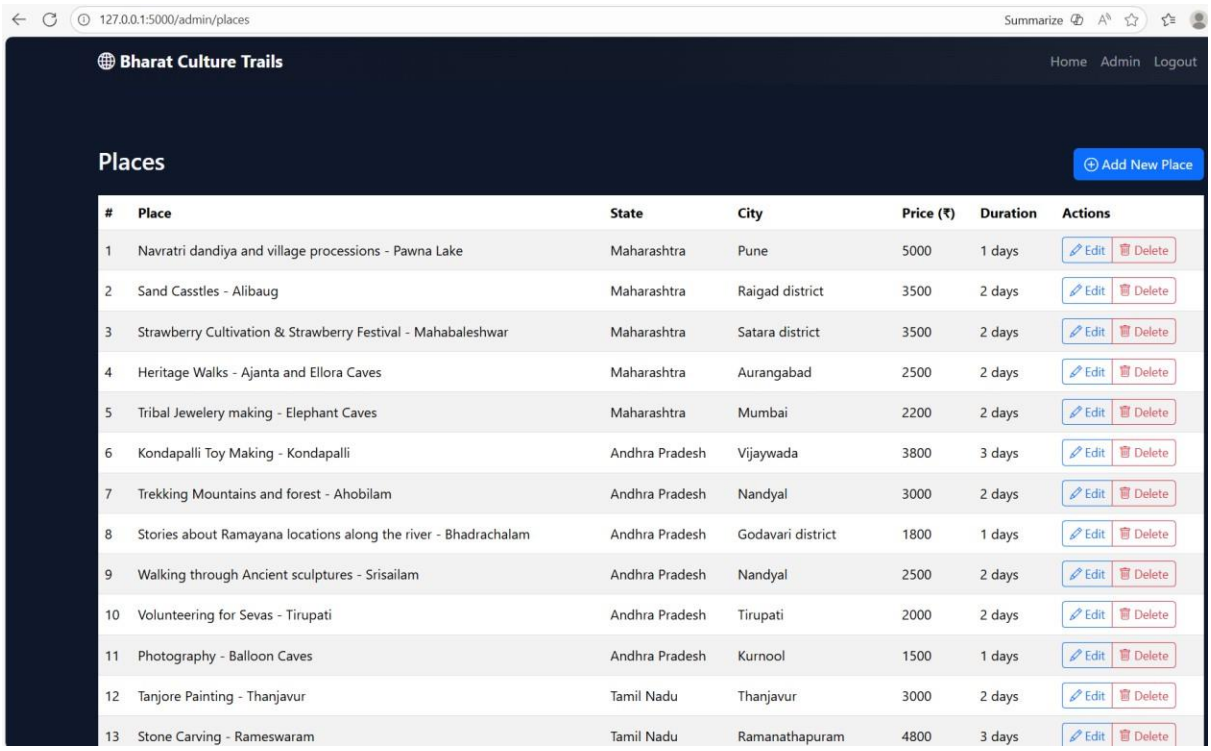


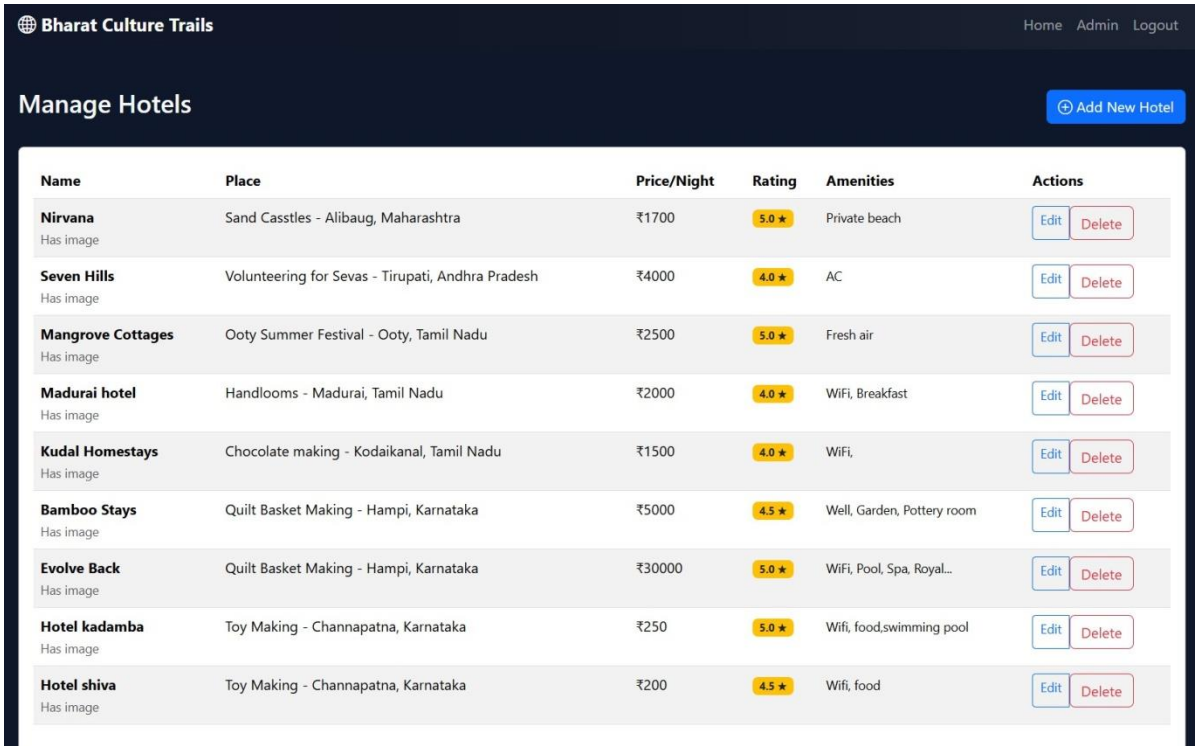
Figure6.6.2AddCulturalEntryPage



6.6.3EditandDeleteOperations Delete

Route

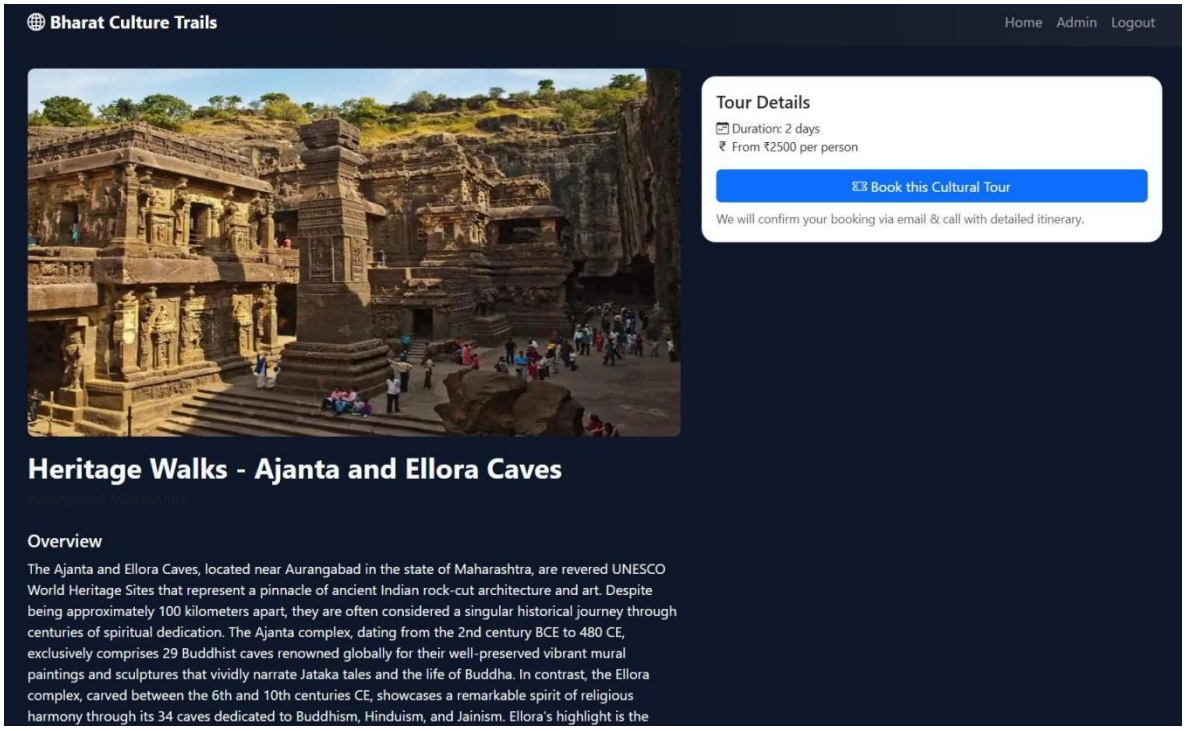


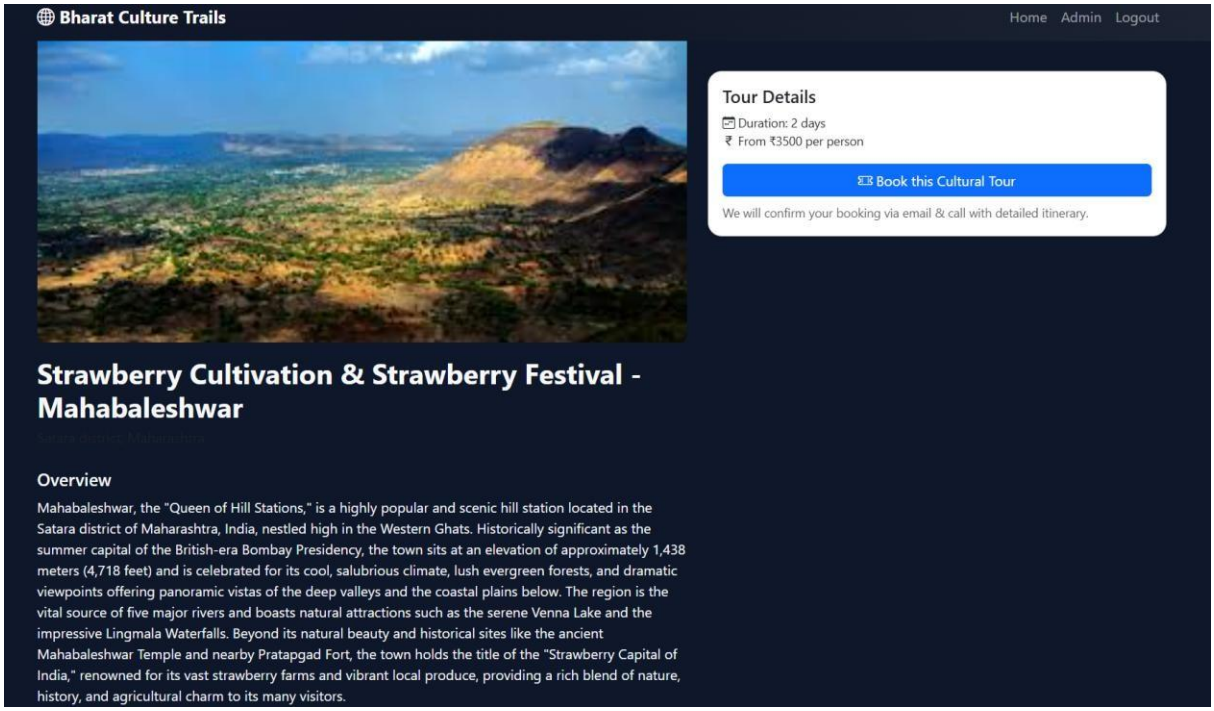


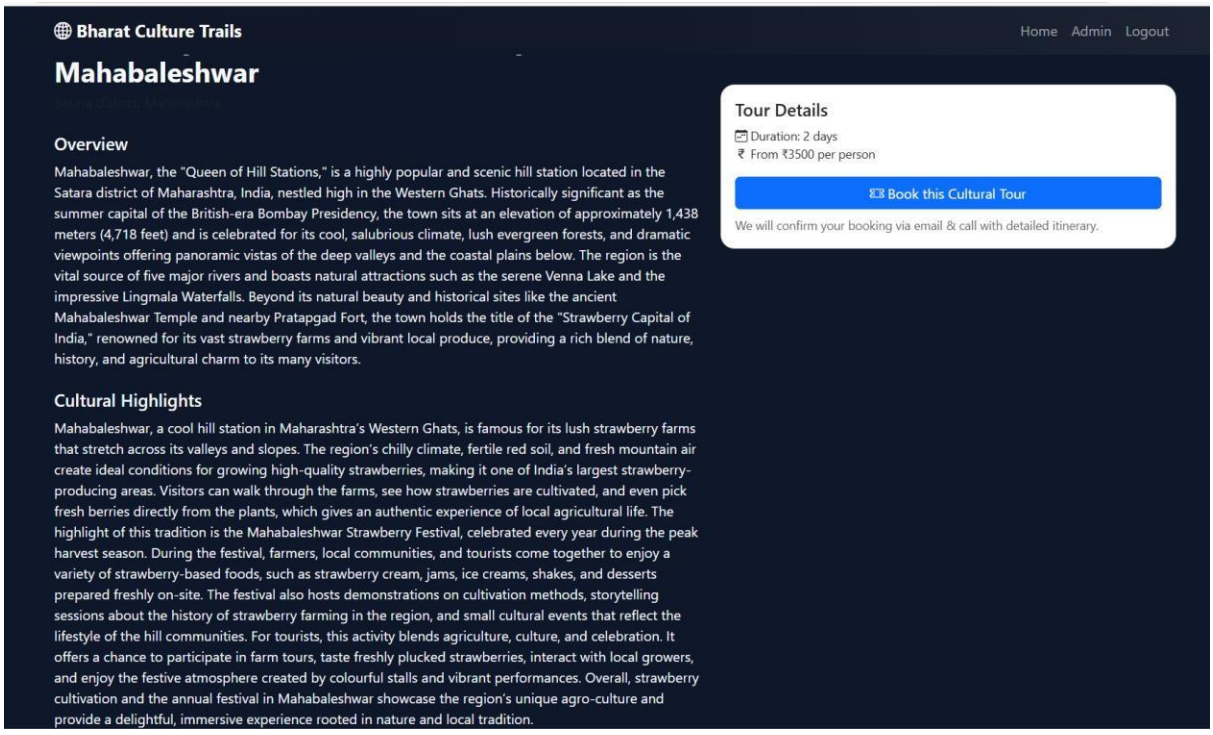
DisplayingCulturalContentDynamica

lly heritage.html

Figure6.7:CulturalItemsDisplayPage







TestingDuringImplementation

- Unit Testing:

Authenticatedpageviews,featureresponses,webformsubmission.

- IntegrationTesting:

NavigationCheckedPagesPageControl,database connectivity.

- UITesting:

Mobileanddesktopresponsivedesign ensured.

- AdminWorkflowTesting:

ConfirmedCRUDoperationsofvariousentries.

Deployment

Oneof thefollowing wasused to deploy the project:

Localhost(Flaskdevelopmentserver)

|human|>Localhost(Flaskdevelopmentserver)

PythonAnywhere/Heroku(optional):Thisisasupportedplatform.<|human|>Python Anywhere / Heroku (optional): This is a supported platform.

Deployment Steps:

1. Requiredependencies Installdependenciespipinstall-rrequirements.txt
2. Runserver→pythonapp.py
3. Browseraccess:Localhost:5000.

ChapterSummary

Chapter6describedthefullimplementationofCulture-BasedTourismDevelopmentPortal, such as frontend, backend and database. Code samples, documentation of modules, folder hierarchy, and administration were pointed out to show how the proposed system was

convertedintoaworkingproductinitsentirety.Thischapterfillsthegapbetweenthedesign and the practical execution.

CHAPTER7

TESTING

Software testing is done to make sure that Culture-Based Tourism Development Portal is functioning properly, reliably and efficiently. Test is used to prove the functionality, performance, usability and stability of the system. In this chapter, the different testing approaches used are explained such as unit testing, integration testing, system testing, user acceptancetesting,andfunctionalvalidation.Themainaimwastofindoutasearlyaspossible the mistakes and also to check every module and also to make sure that the system fulfills its functional requirement.

TestingObjectives

Thekey purposesof thetesting were:

- Tomakeevery modulework asexpected.
- Tochecktheaccuracyof thelogicanddatabaseoperationsofthebackend.
- Toprovethedynamic representationofculturalinformation.

Toensurethatitisusableandresponsiveacross gadgets.

- ToverifytheactionsoftheadministrationsuchasAdd,Update,Delete.
- Todetectandresolveissuespriortoimplementation.
- Toensureeasy navigationandaccessing data.

TypesofTestingConducted

Thelevelsof testingthatwereused werethe following:

Unit Testing

Unittestingisusedtotestthesmallesttestablecomponentsofthesystemwhichcanbepython functions, HTML templates, routes and database operations.

Modules tested:

- Flaskroutehandlers
- Admin login validation
- Insert,update,deletefunctionsinthedatabase.

templating rendering works.

- Form validation

IntegrationTesting

IntegrationTesting:modulesshouldbeworkingtogether properly:

- FrontendBackend Interaction.

Back-endBack-endCommunicationBack-endDatabase Communication.

- CRUDOperations ↔AdminDashboard.
- Template↔DataBinding

SystemTesting

Fullend-to-endtestingofportalwasconductedtoassure:

- Correctnavigation
- Culturalobjectsshouldberetrievedanddisplayedproperly.
- Responseonvariousscreensizes.
- Error-freeuserexperience

UserAcceptanceTesting (UAT)

Theportalwastestedwithasmallgroupoftestusers (students/mentors):

- **Easeof navigation**
- **Clarityofculturalcontent**
- **Administrativeworkflow**
- **Aestheticsandreadability**

TestCases

Belowaretestcasesbasedon theproject functionalities.

TestCase:Admin Login

TestCaseID	**TC01**
Description	Validateadminloginfunctionality
Precondition	Admin page accessible
Test Steps	1.Enterusername & password → 2. Submit
Input	admin/ admin123
ExpectedOutput	Redirectto Dashboard
Actual Output	As expected
Status	Pass

TestCase:AddCulturalEntry

TestCaseID	**TC02**
Description	Addanew culturalrecord
Input	Title,Description,Category,ImagePath
ExpectedResult	Entrysavedtodatabase
Actual Result	Entryvisibleon culturallisting page
Status	Pass

TestCase:Delete CulturalEntry

TestCaseID	**TC03**
Description	Deletecultural entryfrom admin panel
ExpectedResult	Itemremovedfromdatabase
Actual Result	Itemnolongerappearsonwebsite
Status	Pass

TestCase:DynamicDisplayofHeritagePage

TestCaseID	**TC04**
Description	Ensureheritageitemsdisplay dynamically
Expected	FetchitemsfromDBand displaycardlayout
Actual	Allentriesdisplayedwithimages
Status	Pass

TestCase:Navigation Testing

TestCaseID	**TC05**
Description	Testnavigationbetweenpages
Steps	Clickmenu links
Expected	Proper redirection
Actual	Smooth navigation
Status	Pass

TestCase:DatabaseConnection

TestCaseID	**TC06**
Description	ValidateSQLiteconnectionstability
Expected	SuccessfulDBoperations
Actual	Noissuesdetected
Status	Pass

Bug Report

Bug ID	Description	Severity	Status
B01	Image not loading duetoincorrectpath	Medium	Fixed
B02	Input validation missing for admin fields	High	Fixed
B03	Non-responsive layout for mobile view	Low	Improved
B04	Unicode characters not displaying in description	Medium	FixedusingUTF-8
B05	Duplicate entries allowed	Medium	Resolved with form validation

ValidationTesting

Validationtestingchecks whetherthesystemmeetsuserrequirements.

UserRequirementsValidation.

Culturalcontentappropriatelypresented-Yes.

- Admincancreate/modify/deleteentries- Yes.
- Mobile-responsiveUI→Yes
- Photosshowninaproper way:Yes.
- InformationsavedandaccessedinSQLite→Yes.

FunctionalRequirementsChecking.

- Routingworks correctly

- Homepageopensimmediately.

Allofthecategoriesare dynamicallypresentedwith data.

- Databasequeries areanswered appropriately.

PerformanceValidation

- Pageload time<2 seconds
- Operationsondatabases arelightweight.
- Navigationis smooth

UsabilityTesting

Usersfoundtheportal:

- Simpleandeasytonavigate
- Visuallyappealing
- Informativeandstructured
- Deskandmobilefriendly.

Feedbackincluded:

- Addmoreimages
- Betterspacingofcertain parts.
- Implementsearch(enhancementinfuture)

TheserecommendationswereusefulinimprovingthefinalUI.

SummaryofTestingPhase

Thetesting stagemadesurethat:

- Everymoduleworks properly.
- TheCRUDoperationson theadminpanelareerror-free.
- Culturaldataloadsona dynamic basis.
- Systemiscompatibleon devices.
- Bugsdetectedwereallfixed.

ThesetestsidentifiedthattheCulture-BasedTourismDevelopmentPortalisstable,operational, user-friendly and deployable.

CHAPTER8

RESULTSANDDISCUSSION

Thechapterprovidestheresultsofthe Culture-BasedTourismDevelopmentPortalandassesses theeffectivenessofthesystemtoachievethegoals.Theoutcomesindicate howthedeveloped modules work, how the system works, and the usability feedback.The discussion goes further toexaminehowthesystemleadstoculturaltourismandmeetstheexpectationsoftheresearch and how it has benefited the users and cultural communities.

ResultsoftheImplemented System.

TheCulture-BasedTourismDevelopmentPortalmanagestoprovethemainfunctionalitiesthat were designed in the design stage. The key findings are as follows:

FullOperationalCulturalTourismWebSite.

Thesystemoffersresponsiveandeasytouse culturaltourismportalthathas:

- AneatHomePagewithcategoriesof culturaltypes.
- SpecializedHeritage,Art andCrafts,FoodCultureandFestivals.
- Dynamicalpresentationofculturalinformationstoredin SQLite.
- Culturalcardsinformof imagestoimprovethevisual perception.

Theusersareabletoviewand accesscultural informationeasily ina systematic way.

RenderingofDynamicCulturalContent.

Theportal isdynamicloading culturaldataout of thedatabase:

- Culturalobjectsarepresentedingrids.
- Therearedescriptions,picturesand classificationsthatareloadedimmediately.
- Thepagesthatcontainthe culturearеupdatedassoon asthe adminsmakechanges.

ThisprovesthefactthatFlaskandSQLiteintegrationiseffective.

AdminModuleOutput

Theadmin moduleisknown tobecompatiblewith:

- LoginAuthentication
- AddCulturalItem
- Edit Item
- DeleteItem
- EntrancestoFestivalsandFoods.

CRUDoperationswereconfirmedtobeerrorfree.

Thiswillprovideeasycontentmanagementwithouteditingthedatabasemanually.

MobileResponsiveness

Bootstrapassuresthattheportalisavailablein:

- Smartphones
- Tablets
- Desktops

Thetestingrevealedcorrectalignment,scalableimagesandadequatetextvisibility.

SystemPerformance

- Averageloadtimeofthepage:1.4seconds.
- SQLitequeries:runwithinseconds.
- Memoryconsumption:smallasit isbased onalightweight architecture.

Thesystemwasefficientindifferentload tests.

Discussion

Thefindingsofthisstudycanbecomparedtothoseofotherresearchersinthesame field.<|human|>8.2.1 Consistency with the Research Results.

Fromtheliterature review:

- Culturaltourismisgoingonline.

- Thereisa needto havecommunity-based systems.
- Experiencethatisuser-focusedenhancesinteraction.

Recommenderandonlinetoolsmakeculturalexplorationmoreeffective. The correspondence of the Project to these findings.

- Offersanonlineplatformofpresentingculturalidentity.
- Scaleseasilytocontributionsbythecommunity.
- Guaranteeseasyinteractionstolearntheculture.
- EstablishesabaseofAI-basedpersonalizationinthe future.
- Promotesculturalsustainabilitythroughtherecordofintangible heritage.

BenefitstoTourists

- Culturalitemsareeasilyexplored.
- Attractivelydesigned interface.
- Classifieddatatofacilitatefastlearning.
- Assiststhetouristsinmakingcultural trips.

BenefitstoCommunities

- Onlinepresenceof thelocal traditions.
- Forumtoadvertisefestivals,foodsandarts.
- Promotesthepreservationofculture.
- Areabletobridgeculturalprovidersand population.

SystemLimitations

Eventhoughit wassuccessfully implemented,therearesomelimitations:

- Noneoftherecommendersystemstoindividualizeculturaloptions.
- Lacksmultilingual support

- NoVR/AR integration
- Rolebasedaccessisnotsupportedbytheadminpanel.
- Novideo support, only static pictures.

Itisontheselimitationsthatthefutureimprovementsare based.

OverallDiscussion Summary

The system achieves its goal of offering a convenient user-friendly portal on cultural tourism. Itfillsthegapbetweenculturalcontentandonlineaccessibilityandestablishesabasisofmore advanced features in later stages. The findings attest to the fact that the project is viable, productive, and effective within the digital tourism environment.

CHAPTER9

CONCLUSIONANDFUTUREENHANCEMENTS

Thischapterisaconclusionofthewholeproject, whichsummarizesthemainresults,success, and the general effect of the Culture-Based Tourism Development Portal. It also presents recommendations and future improvements to increase the capabilities of the system.

Conclusion

The Culture-Based Tourism Development Portal was designed, developed and tested as an inclusivewebbasedsystemthatwouldfacilitateculturalknowledge,heritageconservationand interactionwithusers.Thecombinationoffrontendtechnologies(HTML,CSS,Bootstrap)and backend logic (Flask) and a powerful SQLite database allows the system to satisfy the functional and user experience requirements.

Themajorachievements are:

- Anoperationalculturaltourismportal.
- Dynamiccontentandeasytouseinterface.
- Administratorcontrolled contentmanagementsystem.
- Orderlyclassificationofcultural data.
- Mobileresponsive layouts
- Constantperformanceandlowloadtimes.

The project is in line with current tourism trends which were unveiled in the literature review like digital transformation, immersion in culture, and community-based cultural preservation.

Allinall,theportalattainsitsobjectiveofaddingtosustainableandcommunity-basedcultural tourism using the digital platform.

FutureEnhancements

In order to enhance the system capability and scalability, a number of improvements can bemade:

1. AI-BasedRecommenderSystem

Acustomizedrecommendationservicecanrecommendusersrelatedcultureobjectsonthebasis of interests, location or the browsing patterns.

2. MultilingualSupport

The number of languages (Hindi, Telugu, Tamil, etc.) will make itmore accessible to morepeople.

3. CommunityUploadModule

Upload:allowknownlocalartisansorrepresentativesofthe community:

- Cultural descriptions
- Photos
- Festivalupdates

Thiswillrendertheportalmorecommunity-based.

4. VirtualHeritageTour:VR/ARIntegration.

Theuserisableto visitinanimmersiveway the monuments,museums,dances,orfestivals.

5. MobileApplicationVersion

Anandroid/iOSapplicationwillenhanceaccessandoffline browsing.

6. CulturalMappingthroughGeolocation.

Aninterfacein theform ofamap that displays:

- Culturalplacesnearby
- Thingsthatoccurimmediatelyaroundtheuser.
- Localfoodhotspots

7. EnhancedSecurityFeatures

Suchas:

- Role-basedadministrative controls.

- User authentication
- Secureloginwith hashing

8. CloudDatabaseMigration

SwitchingSQLitetoPostgreSQLorFirebasebecause:

- Largerdatasets
- Real-timeupdates
- Scalabilitywithmore users

ChapterSummary

The final chapter is the conclusion that summarizes the project achievements and the contribution that the portal can make to the cultural preservation and digital tourism. It also describesmajor improvementswhichwouldmakethesystemalargescale,intelligentcultural tourism platform.

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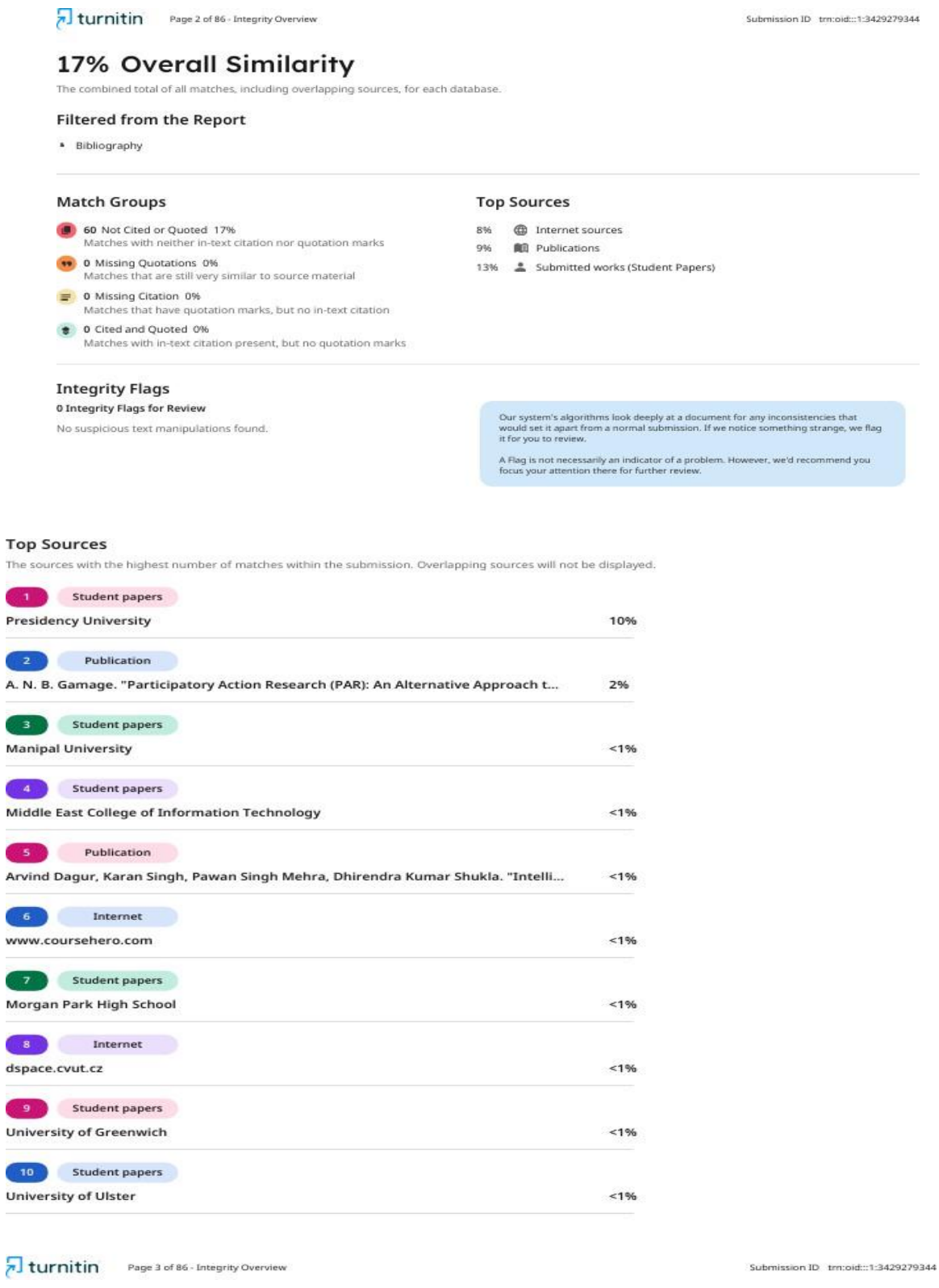
Appendix

GitHubLink

https://github.com/Rakshithaprakash08/Capstone-Project-Culture-based-tourism-development-

SimilarityIndex/PlagiarismCheckReport



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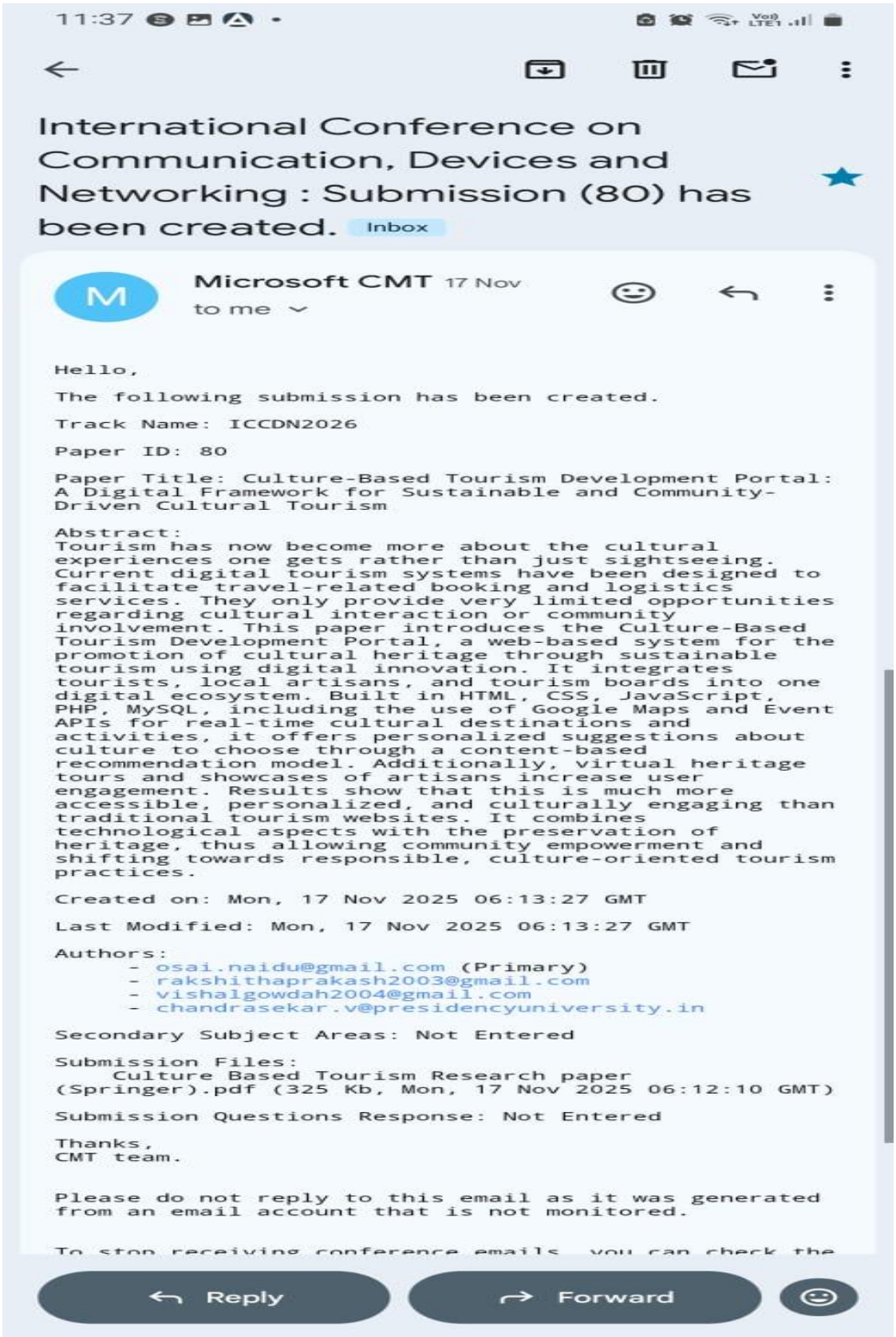

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Paper Title: Culture-Based Tourism Development Portal: A Digital Framework for Sustainable and Community-Driven Cultural Tourism

Abstract:
Tourism has now become more about the cultural experiences one gets rather than just sightseeing. Current digital tourism systems have been designed to facilitate travel-related booking and logistics services. They only provide very limited opportunities regarding cultural interaction or community involvement. This paper introduces the Culture-Based Tourism Development Portal, a web-based system for the promotion of cultural heritage through sustainable tourism using digital innovation. It integrates tourists, local artisans, and tourism boards into one digital ecosystem. Built in HTML, CSS, JavaScript, PHP, MySQL, including the use of Google Maps and Event APIs for real-time cultural destinations and activities, it offers personalized suggestions about culture to choose through a content-based recommendation model. Additionally, virtual heritage tours and showcases of artisans increase user engagement. Results show that this is much more accessible, personalized, and culturally engaging than traditional tourism websites. It combines technological aspects with the preservation of heritage, thus allowing community empowerment and shifting towards responsible, culture-oriented tourism practices.

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- chandrasekar.v@presidencyuniversity.in

Secondary Subject Areas: Not Entered

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